## Academic and Registration Calendar

**2017–18**

### SUMMER 2017

<table>
<thead>
<tr>
<th>Event</th>
<th>START</th>
<th>END</th>
</tr>
</thead>
<tbody>
<tr>
<td>May Intensive</td>
<td>May 10</td>
<td>May 27</td>
</tr>
<tr>
<td>Registration</td>
<td>March 20</td>
<td>April 30</td>
</tr>
<tr>
<td>Late registration</td>
<td>May 1</td>
<td>May 9</td>
</tr>
<tr>
<td>Add/drop</td>
<td>May 10</td>
<td>May 11</td>
</tr>
<tr>
<td>Last day to drop for 100% Tuition/Tech Fee Refund</td>
<td>April 30</td>
<td>Aug. 8</td>
</tr>
<tr>
<td>14-week semester</td>
<td>May 10</td>
<td>Aug. 8</td>
</tr>
<tr>
<td>Semester final exam, paper, or research project period</td>
<td>Aug. 9</td>
<td>Aug. 15</td>
</tr>
<tr>
<td>Registration</td>
<td>March 20</td>
<td>April 30</td>
</tr>
<tr>
<td>Late registration</td>
<td>May 1</td>
<td>May 9</td>
</tr>
<tr>
<td>Add/drop</td>
<td>May 10</td>
<td>May 16</td>
</tr>
<tr>
<td>Last day to drop for 100% Tuition/Tech Fee Refund</td>
<td>May 1</td>
<td>May 1</td>
</tr>
<tr>
<td>Withdraw/Audit Deadline</td>
<td>July 10</td>
<td></td>
</tr>
<tr>
<td>12-week semester</td>
<td>May 10</td>
<td>Aug. 14</td>
</tr>
<tr>
<td>Semester final exam, paper, or research project period</td>
<td>Aug. 15</td>
<td>Aug. 21</td>
</tr>
<tr>
<td>Registration</td>
<td>March 20</td>
<td>April 30</td>
</tr>
<tr>
<td>Late registration</td>
<td>May 22</td>
<td>May 29</td>
</tr>
<tr>
<td>Add/drop</td>
<td>May 10</td>
<td>June 5</td>
</tr>
<tr>
<td>Last day to drop for 100% Tuition/Tech Fee Refund</td>
<td>May 21</td>
<td></td>
</tr>
<tr>
<td>Withdraw/Audit Deadline</td>
<td>July 31</td>
<td></td>
</tr>
<tr>
<td>Summer I</td>
<td>May 10</td>
<td>June 27</td>
</tr>
<tr>
<td>Semester final exam, paper, or research project period</td>
<td>June 28</td>
<td>July 4</td>
</tr>
<tr>
<td>Registration</td>
<td>March 20</td>
<td>April 30</td>
</tr>
<tr>
<td>Late registration</td>
<td>May 1</td>
<td>May 9</td>
</tr>
<tr>
<td>Add/drop</td>
<td>May 10</td>
<td>May 16</td>
</tr>
<tr>
<td>Last day to drop for 100% Tuition/Tech Fee Refund</td>
<td>May 1</td>
<td></td>
</tr>
<tr>
<td>Withdraw/Audit Deadline</td>
<td>June 12</td>
<td></td>
</tr>
<tr>
<td>Summer II</td>
<td>June 28</td>
<td>Aug. 8</td>
</tr>
<tr>
<td>Semester final exam, paper, or research project period</td>
<td>Aug. 9</td>
<td>Aug. 15</td>
</tr>
<tr>
<td>Registration</td>
<td>March 20</td>
<td>April 30</td>
</tr>
<tr>
<td>Late registration</td>
<td>June 19</td>
<td>June 29</td>
</tr>
<tr>
<td>Add/drop</td>
<td>June 28</td>
<td>July 3</td>
</tr>
<tr>
<td>Last day to drop for 100% Tuition/Tech Fee Refund</td>
<td>June 19</td>
<td></td>
</tr>
<tr>
<td>Withdraw/Audit Deadline</td>
<td>July 31</td>
<td></td>
</tr>
</tbody>
</table>

**Holidays - (Classes will not meet May 29, July 4)**

### FALL 2017

<table>
<thead>
<tr>
<th>Event</th>
<th>START</th>
<th>END</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full semester</td>
<td>Aug. 28</td>
<td>Dec. 9</td>
</tr>
<tr>
<td>Semester final exam, paper, or research project period</td>
<td>Dec. 11</td>
<td>Dec. 16</td>
</tr>
<tr>
<td>Registration</td>
<td>June 19</td>
<td>Aug. 19</td>
</tr>
<tr>
<td>Late registration</td>
<td>Aug. 20</td>
<td>Aug. 27</td>
</tr>
<tr>
<td>Add/drop</td>
<td>Aug. 28</td>
<td>Sept. 3</td>
</tr>
<tr>
<td>Last day to drop for 100% Tuition/Tech Fee Refund</td>
<td>Aug. 19</td>
<td></td>
</tr>
<tr>
<td>Withdraw/Audit Deadline</td>
<td>Nov. 3</td>
<td></td>
</tr>
<tr>
<td>Fall I</td>
<td>Aug. 28</td>
<td>Oct. 16</td>
</tr>
<tr>
<td>Semester final exam, paper, or research project period</td>
<td>Oct. 17</td>
<td>Oct. 23</td>
</tr>
<tr>
<td>Registration</td>
<td>June 19</td>
<td>Aug. 19</td>
</tr>
<tr>
<td>Late registration</td>
<td>Aug. 20</td>
<td>Aug. 27</td>
</tr>
<tr>
<td>Add/drop</td>
<td>Aug. 28</td>
<td>Sept. 3</td>
</tr>
<tr>
<td>Last day to drop for 100% Tuition/Tech Fee Refund</td>
<td>Aug. 19</td>
<td></td>
</tr>
<tr>
<td>Withdraw/Audit Deadline</td>
<td>Sept. 29</td>
<td></td>
</tr>
<tr>
<td>Fall II</td>
<td>Oct. 24</td>
<td>Dec. 18</td>
</tr>
<tr>
<td>Semester final exam, paper, or research project period</td>
<td>Oct. 24</td>
<td>Dec. 31</td>
</tr>
<tr>
<td>Registration</td>
<td>June 19</td>
<td>Aug. 19</td>
</tr>
<tr>
<td>Late registration</td>
<td>Oct. 15</td>
<td>Oct. 23</td>
</tr>
<tr>
<td>Add/drop</td>
<td>Oct. 24</td>
<td>Oct. 30</td>
</tr>
<tr>
<td>Last day to drop for 100% Tuition/Tech Fee Refund</td>
<td>Oct. 15</td>
<td></td>
</tr>
<tr>
<td>Withdraw/Audit Deadline</td>
<td>Nov. 17</td>
<td></td>
</tr>
</tbody>
</table>

**Holidays - (Classes will not meet September 4, November 23-26)**
## Academic and Registration Calendar

### 2017–18

<table>
<thead>
<tr>
<th><strong>SPRING 2018</strong></th>
<th><strong>START</strong></th>
<th><strong>END</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>January Intersession</td>
<td>Jan. 2</td>
<td>Jan. 21</td>
</tr>
<tr>
<td>Registration</td>
<td>Oct. 30</td>
<td>Dec. 30</td>
</tr>
<tr>
<td>Add/drop</td>
<td>Jan. 2</td>
<td>Jan. 3</td>
</tr>
<tr>
<td>Last day to drop for 100% Tuition/Tech Fee Refund</td>
<td>Dec. 24</td>
<td></td>
</tr>
<tr>
<td>Full Semester</td>
<td>Jan. 8</td>
<td>April 23</td>
</tr>
<tr>
<td>Semester final exam, paper, or research project period</td>
<td>April 24</td>
<td>April 30</td>
</tr>
<tr>
<td>Registration</td>
<td>Oct. 30</td>
<td>Dec. 30</td>
</tr>
<tr>
<td>Late registration</td>
<td>Dec 31</td>
<td>Jan. 7</td>
</tr>
<tr>
<td>Add/drop</td>
<td>Jan. 8</td>
<td>Jan. 14</td>
</tr>
<tr>
<td>Last day to drop for 100% Tuition/Tech Fee Refund</td>
<td>Dec. 30</td>
<td></td>
</tr>
<tr>
<td>Withdraw/Audit Deadline</td>
<td>March 16</td>
<td></td>
</tr>
<tr>
<td>Spring I</td>
<td>Jan. 8</td>
<td>Feb. 26</td>
</tr>
<tr>
<td>Semester final exam, paper, or research project period</td>
<td>Feb. 27</td>
<td>March 5</td>
</tr>
<tr>
<td>Registration</td>
<td>Oct. 30</td>
<td>Dec. 30</td>
</tr>
<tr>
<td>Late registration</td>
<td>Dec 31</td>
<td>Jan. 7</td>
</tr>
<tr>
<td>Add/drop</td>
<td>Jan. 8</td>
<td>Jan. 14</td>
</tr>
<tr>
<td>Last day to drop for 100% Tuition/Tech Fee Refund</td>
<td>Dec. 30</td>
<td></td>
</tr>
<tr>
<td>Withdraw/Audit Deadline</td>
<td>Feb. 9</td>
<td></td>
</tr>
<tr>
<td>Spring II</td>
<td>March 6</td>
<td>April 30</td>
</tr>
<tr>
<td>Semester final exam, paper, or research project period</td>
<td>May 1</td>
<td>May 7</td>
</tr>
<tr>
<td>Registration</td>
<td>Oct. 30</td>
<td>Dec. 30</td>
</tr>
<tr>
<td>Late registration</td>
<td>Feb. 26</td>
<td>March 5</td>
</tr>
<tr>
<td>Add/drop</td>
<td>March 6</td>
<td>March 12</td>
</tr>
<tr>
<td>Last day to drop for 100% Tuition/Tech Fee Refund</td>
<td>Feb. 25</td>
<td></td>
</tr>
<tr>
<td>Withdraw/Audit Deadline</td>
<td>April 13</td>
<td></td>
</tr>
</tbody>
</table>

*Holidays: (Classes will not meet January 15, March 19-25)*
KRIEGER SCHOOL of ARTS & SCIENCES
ADVANCED ACADEMIC PROGRAMS

ACADEMIC CATALOG
2017–2018

The Washington, DC Center
Administrative Offices
1717 Massachusetts Ave. NW
Suite 104
Washington, DC 20036
202-452-1280

Homewood Campus
3400 N. Charles St.
Suite S740
Wyman Park Building
Baltimore, MD 21218
410-516-6749

Montgomery County Campus
9601 Medical Center Drive
Rockville, MD 20850
301-294-7162

Online Courses
blackboard.jhu.edu
advanced.jhu.edu/online

The university reserves the right to change without prior notice any programs, tuition and fees, requirements, or regulations published in this catalog. This catalog is not to be regarded as a contract. Multiple means of communication may be used by the university for announcing changes of this nature including, but not exclusive to, email and/or paper notice. Students are provided an email account from Johns Hopkins University (JHU). The JHU email account will be used by the university for general and official notice/business. To establish an email account, visit myjh.edu.

Published once a year by Johns Hopkins University, Krieger School of Arts and Sciences, Advanced Academic Programs. March 2017.
A Message from the Associate Dean

We at the Johns Hopkins University Advanced Academic Programs want to change your life. Our professional graduate degree programs help you get to where you want to be in your career and in levels of knowledge attained. We know that as an adult with a lot of competing demands, you look for the flexibility and depth our professional graduate programs offer. We hope you will find in this catalog courses that inspire you to achieve your goals.

Advanced Academic Programs offers a variety of graduate degrees and certificates in fields ranging from biotechnology to museum studies. In all AAP programs, a strong academic foundation supports the applied knowledge and skills students acquire. Classes are offered in several locations and online. AAP also offers joint degrees with other schools at Johns Hopkins University. Our teachers include research faculty members from across the university and practitioners at the highest levels of their professions from government, industry, and the nonprofit sector. Our students choose Johns Hopkins because they know that where you study matters. They desire an academically rigorous education that challenges them intellectually and offers them opportunities to meet others who have similar goals to advance in their careers or enrich their personal lives. Together, Advanced Academic Programs faculty and students create a learning experience that is unparalleled in part-time graduate education.

Meeting the same criteria for excellence that characterize all Johns Hopkins University programs, AAP courses are judged among the best in the country, if not the world. We recognize that as an adult student, you bring a wealth of life experience and practical insights to your classroom learning. Our faculty members are committed to their teaching and to their own learning in professions that are rapidly changing. AAP demands that its faculty members design and deliver courses that integrate your real-world perspectives with the knowledge they bring as researchers, scholars, and practitioners. The combination produces innovative ideas and engaged learning. In an AAP class, you will find your assumptions challenged, your old ways of thinking changed, and your mind opened to new concepts and conversations.

Learning happens in the classroom, whether it is on-site or online, and also in countries around the globe. Many of AAP’s programs include workshops and short-term classes led by Johns Hopkins faculty members in Europe, Asia, and other international locations. International students enroll in virtually all AAP programs, adding global perspectives to your discussions and enriching your network of colleagues and friends.

While you are studying for your degree and after you graduate, AAP offers internship and career advising on-site and online, networking with alumni from throughout the university and the world, and many opportunities to become part of a vibrant community of faculty and students.

We invite you to explore this catalog. Visit our website, advanced.jhu.edu, and contact us for more information. We are eager to help you advance in your career, prepare for a new profession, and grow personally. We look forward to telling you more about the Advanced Academic Programs at Johns Hopkins University.

Sincerely,

John Caron, EdD
Associate Dean
The Krieger School of Arts and Sciences is at the heart of a leading, diverse, global coeducational university. Privately endowed, the Johns Hopkins University was founded in 1876 as the first true American university on the European model: a graduate institution with an associated preparatory college, a place where knowledge would be created and assembled, as well as taught.

Today, the Krieger School of Arts and Sciences is the core institution of the Johns Hopkins complex of schools, centers, and institutes. Its home is the park-like Homewood campus in the residential Charles Village section of northern Baltimore City.

Advanced Academic Programs
The School of Arts and Sciences recognizes the intellectual strength and educational requirements of working adults. Through Advanced Academic Programs, it offers a Johns Hopkins education to those wishing to attend graduate school. Courses leading to master's degrees are held in the evening and on weekends at the Homewood campus in Baltimore; the Montgomery County Campus in Rockville; the Washington, DC Center near Dupont Circle; and online.

Drawing upon over a century of research and teaching expertise, the programs offer advanced instruction in scientific fields of current interest and innovative graduate study in the humanities and social sciences. While based on the latest scientific and scholarly knowledge, course work emphasizes the application of such knowledge to practical problems. Classes are designed to provide individual attention and to encourage student contribution.

Degree-Granting Divisions of the Johns Hopkins University
- Bloomberg School of Public Health
- Carey Business School
- Krieger School of Arts and Sciences
- Paul H. Nitze School of Advanced International Studies
- The Peabody Institute
- School of Education
- School of Medicine
- School of Nursing
- Whiting School of Engineering

The Johns Hopkins University is privately endowed and accredited by the Middle States Commission on Higher Education, 3624 Market St., Philadelphia, PA 19104-2680; 267-284-5000. Since the university's first president, Daniel Coit Gilman, assembled the first faculty in 1876, education in the arts and sciences at Johns Hopkins has been carried out in a research environment, with international distinction, under the supervision of active researchers. The belief in the inseparability of education and research still guides the academic programs of today's School of Arts and Sciences. Distinguished scholars and scientists share and exchange ideas and knowledge with undergraduates and graduates, encouraging creative thinking and independent research. Residential students take courses from anthropology to writing seminars, offered by 24 degree-granting departments that confer the Bachelor of Arts, the Bachelor of Science, the Master of Arts, the Master of Fine Arts, the Master of Science, and the Doctor of Philosophy. Information regarding full-time education can be found in the Arts and Sciences/Engineering Undergraduate and Graduate Programs catalog. Admission information for the Office of Undergraduate Admissions, Mason Hall, Homewood Campus, or 410-516-8171. Graduate admissions for full-time students in the Krieger School of Arts and Sciences and the Whiting School of Engineering can be found at 101 Whitehead Hall, Homewood Campus, or 410-516-8174.
Contact Information

THE WASHINGTON, DC CENTER
1717 Massachusetts Ave. NW, Suite 104
Washington, DC 20036

Advanced Academic Programs
Admissions and Registration, Suite 101
Main Number 202-452-1940
Fax Number 202-452-970
Email aapadmissions@jhu.edu

Administrative Office, Suite 104
Main Number 202-452-1280
Fax Number 202-452-8713
Student & Faculty Support Services 202-452-0749
Career Services 202-452-0983
Disability Services 202-452-1287

Sheridan Libraries @ DC
Washington Library Resource Center, Suite 100
Main Number 202-452-0714
Fax Number 202-530-9857
Email washrocklibraries@jhu.edu
Submit A Question: Askdc.library.jhu.edu

MONTGOMERY COUNTY CAMPUS
9601 Medical Center Drive
Rockville, MD 20850

Administrative Offices, Gilchrist Hall
Main Number 301-294-7162
Fax Number 301-315-7103
Student & Faculty Support Services 301-294-7162

Sheridan Libraries@Montgomery
Montgomery County Library Resource Center 301-294-7030

GENERAL INFORMATION
Course Schedules advanced.jhu.edu
Weather/Cancellation Information 410-516-7781
800-548-9004
www.jhu.edu/alert
Textbooks 800-325-3252
mbsdirect.net

HOMEWOOD CAMPUS
Wyman Park Building Suite S740
3400 N. Charles St.
Baltimore, MD 21218

Administrative Offices
Main Number 410-516-6749
Fax Number 410-516-6017
Student & Faculty Support Services 410-516-6749
Financial Aid 410-516-8028
Sheridan Libraries Milton S. Eisenhower Library
Circulation 410-516-8370
University Registrar 75 Garland Hall 410-516-8080
Student Accounts B31 Garland Hall 410-516-8158
Transcripts 75 Garland Hall 410-516-8080
Office of International Services 358 Garland Hall 410-516-1013
Krieger School of Arts and Sciences
Administration and Faculty

ADMINISTRATION

Beverly Wendland .......................................... James Barclay Knapp Dean
John Caron .......................... Associate Dean, Advanced Academic Programs
Brandon Boulter ... Assist. Dean, Admissions, Marketing & Enrollment
Kai Sauer ............ Assist. Dean, Finance and Business Operations
Pamela Wimbush ... Director, Instructional Resource Center

FACULTY

Applied Economics

Laurence Ball ................................................... Program Chair
Frank D. Weiss ............................................. Program Director
Ahmed Mahmud ............................................ Program Coordinator
Genevieve Briand ........................... Assistant Program Director

Biotechnology Studies

Bertrand Garcia-Moreno ........................... Program Chair
Kristina Obom ................................. Program Director, Biotechnology; Individualized Genomics and Health, Director of the Center for Biotechnology Education
Patrick J. Cummings ........................ Program Director, Biotechnology
Lynn Johnson Langer .... Program Director, Biotechnology Enterprise and Regulatory Science
Alexandra Tan ............................. Program Director, Health Science Intensive
Zuri Obado .......... Academic Advisor, Health Science Intensive
Robert Lessick ........................................ Program Director, Bioinformatics
Thomas Colonna ........................ Associate Program Director, Regulatory Science, Senior Lecturer

Meredith Safford .......... Senior Lecturer and Coordinator, Biotechnology
Karen Wells .......................... Senior Lecturer, Biotechnology
Olivia Spicer .......................... Lecturer and Coordinator, Biotechnology
Katherine Wellman .......... Senior Lecturer and Coordinator, Biotechnology Enterprise

Beatrice Kondo ........................ Senior Lecturer and Coordinator, Biotechnology, Post-Master's Certificate in Sequence Analysis and Genomics
Emil Wang .......................... Senior Lecturer and Coordinator, Regulatory Science
Jonathan Helfgott ................... Senior Lecturer and Coordinator, Regulatory Science

Communication

Brad Leithauser ........................... Interim Program Chair
Jennifer Todd .......................... Program Director
Stella-Monica Mpande ........ Program Coordinator

Environmental Programs

Thomas Haine ........................... Program Chair
Daniel Zachary .......... Director, Energy Policy and Climate
Jerry Burgess .......................... Director, Environmental Sciences and Policy & GIS
Geri Miller .......... Program Coordinator, Geographic Information Systems
Jennifer da Rosa .......................... Faculty Coordinator

Film & Media Studies

Douglas Mao .......................... Program Chair
Roberto Buso-Garcia .......................... Program Director
Scott Metcalfe .......................... Program Coordinator

Governmental Studies

Benjamin Ginsberg .......................... Program Chair
Kathy Wagner Hill ........................ Director of the Center for Advanced Governmental Studies
Dorothea Wolfson ........................ Program Director, Government
Mark Stout .......................... Program Director, Global Security Studies & Intelligence
Paul Weinstein Jr. ........................ Program Director, Public Management
Jennifer Bachner ........................ Program Director, Government Analytics
Sarah O’Byrne ........................ Program Coordinator, Center for Advanced Governmental Studies
Karin Orr ........................ Program Coordinator, Nonprofit Management

Master of Liberal Arts

Pier M. Larson .......................... Program Chair
Elizabeth Patton ........................ Program Director, MLA Senior Lecturer, Alexander Grass Humanities Institute
Keith Sisson .......................... Associate Program Director

Museum Studies

Rebecca M. Brown .......................... Program Chair
Phyllis Hecht .......................... Program Director
Sarah Chicone ........... Assistant Director
Karen Wizevich ........................ Program Coordinator
Judith Landau .......................... Internship Coordinator
Joyce Ray ........................ Program Coordinator, Digital Curation

Research Administration

Benjamin Ginsberg .......................... Program Chair
Marianne Woods ........................ Program Director

Science, Technology, and International Security

Mark Stout .......................... Program Director

Writing, Science Writing, & Teaching Writing

Brad Leithauser .......................... Program Chair
Elise Levine .......................... Program Director, Writing
Karen Houppert ........................ Associate Director, Writing
Mark Farrington ........................ Program Director, Teaching Writing
Melissa Joyce ........................ Program Coordinator, Science Writing
Table of Contents

Administrative Information

About Krieger School of Arts and Sciences ......................................................... 3
Contact Information .......................................................................................... 4
Arts and Sciences Administration and Faculty .................................................. 5
Graduate Degrees, Concentrations, Certificates, and Centers of Advanced Academic Programs .................................................. 7
Enrollment Services .......................................................................................... 8
Admissions ........................................................................................................ 8
Admissions Requirements ................................................................................... 8
Graduate Records Examination (GRE) ............................................................... 8
International Applicants .................................................................................... 9
Student Visas ...................................................................................................... 9
Admissions Process ........................................................................................... 10
Review Process ................................................................................................... 10
Offer of Admission ............................................................................................ 10
Waived Classes .................................................................................................. 11
Advanced Standing ............................................................................................ 11
Transfer Credits ................................................................................................. 11
Acceptance of Admissions .............................................................................. 11
Deferral of Admission ...................................................................................... 11
Denial of Admission ......................................................................................... 11
New Student Orientation .................................................................................. 11
Admission to Other Divisions or Programs of the University .................................. 11
Registration ....................................................................................................... 11
Ways to Register ............................................................................................... 12
Proof of Immunization Prior to First Registration .......................................... 12
Late Registration ............................................................................................... 12
Adding/Dropping/Changing to Audit Course Enrollment Limits ................... 12
Completion of Prerequisites ............................................................................. 12
Course Load ...................................................................................................... 12
Auditing a Course ............................................................................................. 13
Change of Program ......................................................................................... 13
Tuition Payment ............................................................................................... 13
Registering for Courses in Other JHU Programs ............................................ 13
International and Off-Site Courses ................................................................... 14
Leave of Absence, Inactive Status, Dismissed ................................................... 14
Graduation Requirements ............................................................................... 14
Application for Graduation ............................................................................ 14
Completion of Degree Requirements ............................................................... 14
Alumni Benefits ............................................................................................... 14
Academic Regulations for Online Courses ....................................................... 15
Online Orientation for Online Students ............................................................ 15
Online Library Access ...................................................................................... 15
Online Class Structure ..................................................................................... 15
Online Bookstore ............................................................................................. 15
Residency Requirement .................................................................................... 15
Grading System ............................................................................................... 16
Scale ................................................................................................................ 15
Requirements .................................................................................................. 16
Probation and Dismissal ................................................................................... 16
Incomplete ........................................................................................................ 16
Withdrawal ........................................................................................................ 16
Academic Standing and Conduct .................................................................... 17
Academic Integrity ............................................................................................ 17
Grade Disputes ................................................................................................. 17
Time Limitation ............................................................................................... 17
Academic Structure .......................................................................................... 17
Advisors ............................................................................................................. 17
Course Numbering System ............................................................................. 18
Course Credit ................................................................................................... 18
Course Cancellations ......................................................................................... 18
Enrollment/Degree Verification ...................................................................... 18
Transcripts ........................................................................................................ 18
Second Master’s Degree ................................................................................... 18
Applying Courses From a Certificate Toward a Degree in Advanced Academic Programs .................................................. 18
Tuition and Fees .............................................................................................. 18
Application Fee ............................................................................................... 18
Tuition .............................................................................................................. 19
Course Fees ..................................................................................................... 19
Technology Fee .............................................................................................. 19
Continuous Enrollment Fee ........................................................................... 19
Thesis Continuation Fee ................................................................................. 19
Graduation Fee ............................................................................................... 19
Refund Policy .................................................................................................. 19
JHU Locations and Student Services ............................................................... 20
Homewood Campus .......................................................................................... 20
Montgomery County Campus ......................................................................... 21
Washington, DC Center ................................................................................... 22
Online Learning ................................................................................................ 23
Additional Student Services ............................................................................ 23
Career Services ............................................................................................... 23
Disabilities Services ....................................................................................... 24
Inclement Weather Announcements .................................................................. 24
Financial Aid ................................................................................................... 24
Alternative Loans ............................................................................................ 24
Financial Aid Programs .................................................................................. 24
Veteran’s Benefits ........................................................................................... 24
Policy Statements ............................................................................................ 25
Policy on Student or Alumni Letters of Reference ........................................... 25
Notice of Nondiscriminatory Policy .................................................................. 25
Policy on Possession of Firearms on University Premises ................................ 25
Statement Regarding the Privacy Rights of Students ....................................... 25
Americans with Disabilities Act Policy ............................................................ 25
Sexual Violence, Sexual Assault, Relationship Violence, and Stalking Policy ........................................................................... 25
Procedures on Discrimination, Harassment, Sexual Misconduct, Relationship Violence, and Stalking .......................................................... 26
Sexual Harassment Prevention and Resolution Policy ...................................... 26
University Alcohol and Drug Policy ............................................................... 27
Photography and Film Rights Policy ............................................................... 27
Principles for Ensuring Equity, Civility, and Respect for All ............................ 27
Course listings ................................................................................................ 28
See “Graduate Degrees, Concentrations, Certificates, and Centers of Advanced Academic Programs” on page 7 for more information.

Additional Administrative Information

Other Krieger School of Arts and Sciences Programs ......................................... 237
Presidential Cabinet, Deans, and Directors ....................................................... 238
Graduate Degrees, Concentrations, Certificates, and Centers of Advanced Academic Programs

Master’s Degrees

MS in Applied Economics ........................................ 28
MS in Applied Economics/Certificate in Finance .......... 30
MS in Applied Economics/Certificate in Environmental Planning and Management .......................... 30
MS in Applied Economics/MBA ................................ 29
MS in Biotechnology .................................................. 44
Optional Concentrations:
Biodefense ................................................................ 45
Bioinformatics ............................................................ 46
Biotechnology Enterprise ............................................ 46
Molecular Targets and Drug Discovery Technologies .. 47
Regulatory Affairs ...................................................... 47
Health Science Intensive ............................................ 47
MS in Biotechnology/Certificate in National Security Studies 46
MS in Biotechnology/MBA ........................................ 49
Master of Biotechnology Enterprise & Entrepreneurship .. 50
Optional Concentrations:
MBEE Legal/Regulatory Affairs ................................ 51
MA in Communication .............................................. 78
Optional Concentrations:
Public and Media Relations ........................................ 81
Political Communication .......................................... 81
Health Communication ............................................. 81
Digital Communication ............................................ 81
Corporate and Nonprofit Communication ..................... 82
MA in Communication/MBA ........................................ 93
MA in Cultural Heritage Management ........................ 98
MS in Energy Policy and Climate ............................... 103
MS in Energy Policy and Climate/Certificate in National Security Studies ................................. 230
MS in Environmental Sciences and Policy .................... 110
Optional Concentrations:
Environmental Monitoring and Analysis ..................... 112
Ecological Management .......................................... 112
Environmental Management .................................... 113
Environmental Planning ......................................... 114
MA in Film and Media ............................................... 126
MS in Food Safety Regulation .................................... 52
MS in Geographic Information Systems ..................... 130
MA in Global Security Studies .................................. 142
Optional Concentrations:
Strategic Studies ..................................................... 143
Energy and Environmental Security .......................... 143
MA in Government .................................................... 137
Optional Concentrations:
Political Communication ........................................ 138
Security Studies ...................................................... 138
Legal Studies ........................................................... 138
MA in Government/MBA .......................................... 139
MS in Government Analytics .................................... 138
MS in Individualized Genomics and Health ............... 187
Master of Liberal Arts ................................................. 189
MA in Museum Studies ............................................ 202
MA in Museum Studies/Certificate in Nonprofit Management ....................................................... 212
MA in Public Management ........................................ 145
MA in Public Management/Certificate in Nonprofit Management ....................................................... 146
MS in Regulatory Science ........................................ 54
MS in Research Administration .................................. 216
MA in Science Writing ............................................. 251
MA in Teaching Writing .......................................... 240
MA in Writing .......................................................... 232
Concentrations:
Fiction ..................................................................... 234
Nonfiction ............................................................... 234
Post-Baccalaureate Certificates
Advanced Graduate Study in Liberal Arts .................... 170
Applied Research in Communication ......................... 90
Biototechnology Education ........................................ 56
Biototechnology Enterprise ....................................... 57
Digital Curation ....................................................... 213
Geographic Information Systems .............................. 125
Government Analytics ............................................. 150
Intelligence ............................................................... 151
Nonprofit Management ........................................... 152
Science, Technology and International Security .......... 228
Post-Master’s Certificates
Quantitative Methods in Applied Economics ............... 31
Sequence Analysis and Genomics ................................ 58
Centers
Center for Biototechnology Education ......................... 36
Center for Advanced Governmental Studies ................ 135
Center for Liberal Arts ................................................. 185

At the time of publication of the 2017-2018 catalog, additional academic programs (degree and certificate programs) are under program development and are anticipated to launch in the 2017-2018 academic year. A full list of academic program offerings may be found on the Advanced Academic Programs website: advanced.jhu.edu.
Enrollment Services

The Advanced Academic Programs Enrollment Services Office, consisting of the Admissions Office and the Registration Office, is located at the Johns Hopkins Bernstein/Offit Building, 1717 Massachusetts Ave. NW, Suite 101, Washington, DC 20036-2001. It is open Monday through Thursday from 9 a.m. to 6 p.m. and Friday from 9 a.m. to 5 p.m. Students may also reach the office by email: aapinfo@jhu.edu or aapregistration@jhu.edu.

ADMISSIONS

Below are the general admissions criteria for all Advanced Academic Programs.

Admissions Requirements for Degree or Certificate Seeking Applicants

- Bachelor's degree from a regionally accredited U.S. college or university (or current enrollment in final semester of undergraduate studies). Applicants who receive their bachelor's degree in a country other than the U.S. must have the U.S. equivalency of a bachelor's degree from a regionally accredited institution. AAP's Post-Masters' certificates also require the completion of a master degree or equivalent (example: Post-Master Certificate in Sequence Analysis and Genomics).
- Minimum GPA of 3.0 on a 4.0 scale. (Meeting the minimum GPA requirement does not guarantee admission.)
- AAP online application.
- Nonrefundable application fee of $75.
- Unofficial transcripts from domestic colleges and universities must be uploaded to the online application as part of the application process and include name, school name, cumulative GPA (if applicable), and degree confirmation (if applicable). Transcripts depicting fewer than 12 credits are not required unless prerequisites are listed on them.*
- If offered admission, all required official transcripts must be mailed or delivered in a sealed institutional envelope to the AAP D.C. office or sent from the institution through a secured system, such as SCRIP-SAFE or Docufide prior to the beginning of the second term in which they enroll. Applicants are encouraged to send in their official transcripts prior to the start of their intended start term (See Section on "Conditional status").
- Course-by-course credential evaluation for all course work completed outside of the U.S. (See subsection titled "Collegiate-Level Course-Work Earned Outside of the U.S." for details.)

- Official TOEFL, IELTS or PTE score report is required for international applicants who do not meet the criteria below. (See section titled “English as a Second Language” for details.)
- Additional materials required by the chosen program as listed in that program’s section of this catalog

* The Health Science Intensive concentration of the Master of Science in Biotechnology requires the receipt of official copies of ALL transcripts for every college and/or university attended prior to committee review. Unofficial copies will not be accepted to complete an application.

Note: All application materials submitted to Advanced Academic Programs become the property of Johns Hopkins University and will not be returned to applicants under any circumstance. Any misrepresentation or omission of information included as part of an application will constitute cause for cancellation of the application prior to admission, reversal of acceptance, dismissal, or initiation of disciplinary action. In the event new information is provided/discovered after a final decision has been made, the Admissions Committee has the right to re-evaluate the application.

Graduate Records Examination

Most of AAP's programs do not require GRE scores. Please check your program's page to determine whether you must send in a GRE score. Do not send in the GRE unless it is required by the program or the committee. If it is required, applicants will need to have the scores sent to AAP. To send your GRE scores, please visit: ets.org/gre. Our institutional code is listed under the District of Columbia: 8747 (Johns Hopkins Adv Acad Programs).

Requirements for Special Student/Non-Degree Applicants

A non-degree seeking or special student is one who would be eligible for admission as a degree or certificate candidate to the chosen program, but who is not interested in pursuing the credential. Admitted students with non-degree seeking/special status are:

- Permitted to enroll in courses for which they satisfy the prerequisites
- Permitted to take up to 4 courses
- Not qualified to receive financial aid
- Not eligible for graduation
- Required to reapply to become degree-seeking (Acceptance not guaranteed)
To be considered for special student or non-degree admission to any Advanced Academic Programs course, applicants must submit the following:

- A completed online application
  - Indicate non-degree seeking under AAP Program tab in application
- Uploaded unofficial transcripts (preferred) or copy of diploma
  - Upon offer of admission, official transcript for the highest degree attained
- Statement of Purpose
- Resume
- Writing Sample (Writing, Science Writing, and Teaching Writing applicants only)

**Note:** Applicants for Applied Economics and Communications must follow the same application process as degree-seeking students. Please refer to the program-specific web pages for complete admissions requirements.

**International Applicants**

**Collegiate-Level Course Work Earned Outside of the U.S.**

Applicants who earned their postsecondary degree(s) in a country other than the United States are required to have a “course-by-course” credential evaluation with GPA performed by an outside evaluation service. Evaluations are waived only if the student received his/her undergraduate degree from a U.S. institution and the undergraduate course work taken internationally was transferred to that institution. However, the official transcript, in English, is still required of the international school.

Evaluations must be completed by a current National Association of Credential Evaluation Services member. The most up-to-date list of current members can be found at http://www.naces.org/members.html.

Washington, DC 20036.

**English as a Second Language**

International applicants must demonstrate English proficiency by meeting at least one of the following requirements:

- The applicant submits official TOEFL, IELTS, or PTE scores.
- The applicant holds a post secondary degree from an accredited U.S. institution.
- English is both the official language and the only language of instruction in the applicant’s native country.

**TOEFL:** Official TOEFL score reports must be sent to us in the mail. Photocopies or electronic TOEFL score reports will not be accepted. AAP requires a minimum score of 600 on the paper test, 250 on the computer-based test, and 100 on the Internet-based test. To send TOEFL scores, please visit: ets.org/toefl. Our institutional code is listed under the District of Columbia: 8747 (Johns Hopkins Adv Acad Programs).

**IELTS:** Submit IELTS results through its website at: ielts.org. Applicants should contact the test center where they took the test directly and request that test scores be sent electronically using the IELTS system. Please be sure to select “Krieger School of Arts and Sciences Advanced Academic Programs.” All IELTS test centers worldwide are able to send scores electronically. AAP requires a band score of 7.0.

**PTE:** Official PTE Academic results must be sent to us in the mail or electronically. Photocopies of PTE Academic score reports will not be accepted. Submit electronic PTE Academic results through their website at vue.com/pte. AAP requires a minimum score of 68. Our institutional code is: Krieger School of Arts and Sciences – Advanced Academic Programs.

**Student Visas**

Applicants seeking admission to enroll in onsite courses in the U.S., taking at least three courses per semester, may request certification for an F-1 visa by indicating “yes” for the “Do you plan to initiate the F-1/J-1 visa process through Johns Hopkins University?” question on their admissions application.

AAP international students on F-1 visas usually begin their program in the fall or spring semester. In order to maintain status on an F-1 visa, students in AAP must be enrolled in a minimum of three courses per semester, one of which can be an online course. The students must complete their certification process with the Office of International Services. For more information, international applicants should refer to the International Applicants webpage: advanced.jhu.edu/students/international-students.

**Admissions Process**

Applicants may apply throughout the year and begin study during any of the three semesters (summer, fall, spring). While applications are accepted year-round for all programs, all applicants are strongly encouraged to apply and complete the application process four to six weeks before the start of the desired semester. International applicants seeking a visa should submit all application materials three months prior to the start of the intended semester of study. However, the Admissions Office requires no deadlines by which an applicant needs to submit an application.

Applications are accepted up to one year in advance of the intended semester of study. An incomplete application (including application fee) is valid for one year from the date submitted. Applicants who fail to submit required supporting materials within this period and who wish to be considered for admission are required to submit a new application, fee, and all required supporting documents.
Review Process
Once the Admissions Office has received all required materials, it sends the completed application to the Admissions Committee. The Admissions Committee for the chosen program assesses the application and its supporting documents. All materials must be received prior to the Admissions Committee review. Academic background; personal, professional, and field-related experience and achievements; and any program-specific criteria are all considered in this review. Review times for completed applications range from approximately three to four weeks. If a decision is not reached by the Admissions Committee in time for the upcoming semester, the program will automatically consider the applicant for the following semester. The Admissions Committees reserve the right to require that more than the minimum standards be met for admission to any academic program and may require additional materials of the applicant, if deemed necessary to make an admission decision.

Offer of Admission
Degree/Certificate Candidates
Qualified applicants are admitted as degree or certificate candidates by the committee after the Admissions Committee reviews the completed application and determines eligibility. A degree or certificate candidate may also be admitted conditionally, if Admissions determines eligibility. (See Conditional Status below)

Provisional Student
Provisional students are admitted to this status because, in the view of the Admissions Committee, they do not fulfill academic requirements for admission as a degree candidate at the time of the application. A provisional student may also be admitted conditionally, if Admissions determines eligibility. (See Conditional Status below)

Provisional students are required to take specific prerequisite courses and/or program courses, identified in their admissions letter (additional criteria may be listed). Those with provisional status are held to grading criteria stricter than those required of degree candidates. Provisional students must receive a grade of B or better (A- or better for the Writing, Science Writing, and Teaching Writing programs) in all courses taken while under provisional status. Failure to meet the provisional grade requirement will result in dismissal from the program. When the provision is met, the student's status will be changed from provisional to degree candidate.

Note: Conditions may apply regarding financial aid eligibility for provisional students—contact the Office of Financial Aid for specifics.

Special Student/Nondegree
A special student is one who may be eligible for admission as a degree or certificate candidate to the chosen program but is not interested in pursuing the credential. A special student may also be admitted conditionally, if Admissions determines eligibility. (See Conditional Status below)

Special students are permitted to enroll in any courses for which they satisfy the stated prerequisites (MA in Writing students must receive program approval for all course registration). As long as special students do not interrupt their studies for more than one year and remain in good academic standing, they can take up to four courses under this status. A special student who does not remain in good academic standing may be dismissed from AAP. If more than one year lapses between registrations, special students are required to reapply.

Special students are welcome to apply to be accepted as a degree candidate at any time during their studies. The program's Admissions Committee will determine if any courses completed at the time of application will count toward the degree. Program requirements and time limitations in effect when applying will guide the admission decision.

Conditional Student
The conditional status is applied to any admitted student, who, at the time of admission, is an undergraduate student in the last semester of undergraduate studies (Type A) and/or has not submitted all required official transcripts (Type B).

Type A - These applicants can be admitted with the conditions that they successfully complete their undergraduate studies and submit an official transcript or evaluation verifying degree conferral prior to registering for their second semester.

Type B – These applicants can be admitted with the conditions that they successfully submit their official transcripts prior to registering for their second semester.

Once the condition is met, final transcript and/or official transcripts (or evaluation) received, the conditional status will be removed. Note: Conditional students are not eligible to receive financial aid nor permitted to register beyond the term for which they have been admitted.

Additional Considerations with Admissions
Accelerated Undergraduate Students
In some programs (Applied Economics, Biotechnology, Environmental Sciences and Policy, Global Security Studies, Government, and Public Management), current Johns Hopkins undergraduates may be allowed to accelerate their time to complete an AAP master's degree. Applied Economics, Biotechnology and Government consider academically strong and eligible candidates from JHU's undergraduate programs for the accelerated option. The Environmental Sciences and Policy program allows eligible, upper-level students from the Global Environmental Change and Sustainability major in JHU's Department of Earth and Planetary Sciences to begin taking limited course work in the MS in Environmental Sciences and Policy program prior to the completion of their undergraduate degree. Please contact the appropriate program director/advisor for further details.
Waived and Replaced Classes
In some programs, the Admissions Committee may allow a core or prerequisite course to be waived based on previously completed coursework. Supporting documentation, such as copies of syllabi and course descriptions, may be requested from the committee to assist in making a decision. All waived courses must be replaced by electives in order to satisfy the required number of courses to complete the degree.

Advanced Standing
Advanced Standing allows consideration for seasoned professionals with accomplishments in a field or those who have graduate-level coursework from an accredited college or university to be exempt from taking up to two courses toward degree completion. This policy applies to the programs listed below only, and the request for consideration must be made at the time of application. Applicants approved for advanced standing will receive official notification in their acceptance letter. More information regarding specific qualifications and application requirements for advanced standing can be found on the respective admissions requirements webpages for each program.

Transfer Credits
Graduate courses taken at any institution other than the Johns Hopkins University are not accepted as transfer credits, and they cannot count toward graduate degree requirements in Advanced Academic Programs.

Acceptance of Admission
Newly accepted students are directed to an Enrollment Decision form, available through the electronic version of their official admission decision letter. Starting from the point of enrollment, the first course counted toward fulfillment of the master’s degree or certificate program, the student has a maximum of five years to complete all course work. However, students must maintain continuous enrollment throughout the duration of time spent in the degree or certificate (see Continuous Enrollment section under Registration). Applicants can pursue only one program at a time, unless they are applying to an approved dual or combined program in AAP.

Deferral of Admission
Admitted students may defer the start of their studies for up to one year from the term of admission (example: a fall admit can defer until next fall; a spring admit can defer until next spring). Applicants need to complete the Enrollment Decision form, which is available through the electronic version of their official admissions decision letter. If an admitted student wishes to enroll beyond the year of admission, he/she will need to reapply to the program by submitting a new application, application fee, and any additional supporting documents. A student who reapplies must satisfy admission and program requirements in effect at the time of reapplication.

Denial of Admission
All admission decisions are final. The Admissions Office cannot discuss the committee decision. In the case of denied admission, applicants must take at least one year to attempt to improve their qualifications before reapplying to the same degree or certificate program. Improvements can include but are not limited to taking the GRE, submitting a new writing sample, or taking additional courses in a related field at a regionally accredited college or university. Please note that an improvement to the application or reapplication does not guarantee admission into the program. The applicant will need to reapply to the program by submitting a new application, application fee, and any additional supporting documents.

New Student Orientation
Once admitted to Advanced Academic Programs, all students are encouraged to complete a Web-based new student orientation at advanced.jhu.edu/students/orientation. This orientation provides guidance for all AAP students, regardless of modality, to understand administrative processes at Advanced Academic Programs and to learn about available resources. New student orientation is separate from “online orientation,” which is required for students enrolled in online courses/programs. The online orientation provides specific information regarding the use of Blackboard and enrollment in online courses.

Admission to Other Divisions or Programs of the University
An admitted student in Advanced Academic Programs who wishes to transfer to another school in the university or to a full-time program in the School of Arts and Sciences must apply to the appropriate school or the School of Arts and Sciences’ full-time programs. Admission to Advanced Academic Programs establishes no claim or priority for admission to other divisions or programs of the university.

REGISTRATION
The Student Information System (SIS) provides students access to financial aid, billing, and enrollment records in one location with the same interface. Strong authentication security assures confidential access to information by students using any popular Web browser and their JHED login ID and password. New and active students can register for courses online using SIS at SIS.jhu.edu. Students can also register using the online add/drop form or the paper registration form. The form can be found at advanced.jhu.edu/current-students/forms. If you complete the paper form, please fax to 202-452-1970 or email a PDF file to aapregistration@jhu.edu.
A completed registration requires payment or verification of how payment is to be made. Students who have not completed financial aid forms or have unpaid bills from a previous
Online at sis.jhu.edu
Email completed registration form to
The student does not currently live in D.C., nor does
Fax paper registration form to: 202-452-1970
The student is in a fully online program that does not have
Hand-deliver paper registration form to AAP at any of the
Online add/drop form
check the refund schedule.
students. Check the Academic and Registration Calendar for
after registration ends and requires a $150 fee for returning
the start of a semester/term. Late registration starts the day
is received, allow one to three working days before checking
your confirmation online at SIS.jhu.edu.
Ways to Register
1. Online at sis.jhu.edu
2. Online add/drop form
3. Fax paper registration form to: 202-452-1970
4. Hand-deliver paper registration form to AAP at any of the
3 locations
5. Email completed registration form to
aapregistration@jhu.edu
Each semester the course schedule is posted at advanced.jhu.
edu/registration. The course schedule is available only online,
and students are encouraged to enroll early for best selection.

Proof of Immunization Prior to First
Registration
The District of Columbia requires all students under the age of
26 to submit an immunization form. The form can be found at
advanced.jhu.edu/current-students/forms. This requirement
may be waived for students if they meet both of the following
criteria:
1. The student is in a fully online program that does not have
optional or mandated residency requirements, classes, or
activities that may be taken in D.C.
2. The student does not currently live in D.C., nor does
he/she plan to move to D.C., or any contiguous state,
including Maryland, Virginia, Delaware, Pennsylvania,
or West Virginia. If he/she moves to D.C. or one of the
aforementioned states, it is the student’s responsibility
to complete the immunization form and conform to the
immunization requirement prior to the move. This form
can be found at: advanced.jhu.edu/current-students/forms.

Late Registration
Registration is open for approximately two months prior to
the start of a semester/term. Late registration starts the day
after registration ends and requires a $150 fee for returning
students. Check the Academic and Registration Calendar for
late registration deadlines. Students registering late should
check the refund schedule.

Adding/Dropping/Changing to Audit
Students wishing to add, drop, or audit a course can use the
online add/drop form or the paper add/drop form. Both can be
found on advanced.jhu.edu/current-students/forms. Students
on financial aid should consult the Office of Financial Aid before
making these types of changes. For those using the paper form,
please submit to the fax or email listed on the form. Deadlines
for completing this procedure are featured in the academic
calendar.
Faculty members cannot initiate, complete, or process add/
drop changes. Students who register but never attend, or stop
attending a course but do not officially drop the course will be
given an F grade for the course and will not be given a refund.
Students who register for a course but never attend or stop
attending, and later drop, are subject to the refund schedule at
the time of their drop. All registered students are subject to the
refund schedule, regardless of attendance. Requests to drop a
registration must be received by email or fax to be processed for
the appropriate refund. Refunds will be based on the date the
request to drop is received by the Advanced Academic Programs
Registration Office. See the AAP refund schedule posted for each
semester on the web at advanced.jhu.edu/current-students/
refund-schedule.

Course Enrollment Limits
All AAP courses have enrollment limits. It is not always possible
to offer additional sections of oversubscribed courses. A
waiting list option is available in SIS during the registration
period for most courses with full enrollment. Enrollment is not
guaranteed.

Completion of Prerequisites
The prerequisites for each course can be found in the program
sections of this catalog. It is the student’s responsibility to check
the prerequisites for each course and register appropriately.
A student may be administratively dropped from a course
if he/she has not met the stated prerequisite. Students are
encouraged to consult with their academic advisors.

Course Load
Students who are working full time are advised that two courses
per semester is a challenging academic load. Students who elect
to register for more than two courses should be working less
than full time to successfully manage three or more courses
per semester. Students expecting to take three or more courses
(except international students seeking an F-1 visa who are
required to be in a full-time classification) should consult their
program director/adviser prior to registration to ensure their
course load is appropriate for their individual case. Students
taking two courses (six to eight credits) per semester are
considered as half-time enrolled. The full-time course load for a
graduate student is three to four courses (nine to twelve credit
hours) per semester.

Some programs require permission from the academic adviser
before enrolling in three or more courses. Students have five
years to complete their academic program from the start of their
first graduate-level course within their academic program, and
it is highly recommended that students take the appropriate
time to do well in all courses.
Auditing a Course

Students may register as auditors. Auditors receive no credit for the course, and a grade of "AU" is placed on their official transcript. There is no reduction of fees or tuition when auditing a course. Although regular attendance is expected of auditors, they are exempt from quizzes, examinations, and other assigned work. Students who take courses for credit are given enrollment priority over auditors. Students who are enrolled for credit but wish to become auditors during the active semester may request the necessary change by filling out an online add/drop form. Please refer to the Academic and Registration Calendar for the deadline by which to request to audit a course. Auditors cannot change their status to credit seeking after the start of the semester.

Change of Program

Students who wish to change to another degree program within Advanced Academic Programs must fill out a change of program (COP) request form at advanced.jhu.edu/current-students/forms. Documents required by the new program but not submitted previously must be included with the COP form. Students are not automatically admitted to a new program; their request is reviewed by the appropriate Admissions Committee according to the stipulations of the new program. There is no charge for the first change of program, but a $75 charge is administered to subsequent COP requests. Tuition rates in AAP vary with each academic discipline/program; therefore, changing programs may result in different tuition rates. COP applications may be submitted at any time, but if approved, the student's program information will not be updated until the end of the current semester. Please note: Taking courses outside the program to which you are admitted does not guarantee admission to another program. Average processing times for COP range from six to eight weeks from the date received.

Tuition Payment

In order to complete your registration, a verification of payment method of all tuition and fees is required for each semester at the time of registration. Students will not be not dropped from their courses if payments are not made in full. Subsequently, students remain financially responsible for the tuition and fees associated with each course.

AAP students can make payments by check, credit card, employer contract (employer authorization), tuition remission, or financial aid. In all cases, students are not permitted to register if there is a balance due on their account from a previous semester.

Employer Contract

Students whose tuition is paid by employer billing authorization (employer contract) should begin processing requests with their employers well before the start of registration. Send a copy of the employer contract by fax or email to the AAP Registration Office at 202-452-1970 or aapregistration@jhu.edu. Students using an employer contract are financially responsible for any tuition and fees not paid by the employer.

Employer Reimbursement

Students who are requesting employer tuition reimbursement must pay for the course at the time of registration with their own funds and request reimbursement from the employer at the appropriate time.

Financial Aid

Students who plan to request financial aid to cover their tuition should submit the appropriate paperwork in ample time prior to registering. Go to jhu.edu/finance/part_time.html or email aapfinaid@jhu.edu. Students must take a minimum of two courses to be eligible for federal financial aid. Students may also look at alternative loans for a single course registration. The JHU Policy for Satisfactory Academic Progress requires all students to advance in their program with appropriate grades and within the appropriate timeline to continue receiving financial aid. The financial aid code for JHU/AAP is E00473. See full Financial Aid section in the catalog for details regarding satisfactory academic progress required for compliance for financial aid.

JHU Tuition Remission

Students receiving tuition remission benefits from Johns Hopkins University should read the contract carefully. Call the Center for Training and Education at 443-997-6800 to address any questions. Please note that students are financially responsible for dropped courses paid for with tuition remission and any associated fees, if applicable. See JHU's benefits website for specific information regarding tuition remission: benefits.jhu.edu/tuition/remission.cfm.

Registering for Courses in Other JHU Programs

With adviser approval, AAP students may take up to two comparable courses and apply these courses from other JHU programs toward their master's degree or certificate.

Interprogram Courses

AAP students wishing to count a course outside their program toward their degree need to obtain adviser permission, unless the course is cross-listed in the course schedule (advanced.jhu.edu/registration) or otherwise listed as part of shared concentrations. To obtain adviser approval, students must forward to their adviser a written request that includes documentation of course description and any other information that may be helpful in assessing the course's applicability to a student's program. The student's adviser or academic program director then determines if the requested course is appropriate and whether the student is eligible to take it.

Interdivisional Registration for AAP Students

AAP students who wish to take a course at another Johns Hopkins school/division must submit a request to the AAP Registration Office using the online add/drop form or a paper add/drop form. To ensure that there is time for review and approval from other divisions within Johns Hopkins, the request must be received in the AAP Registration Office no later than two weeks before the first day of class. Advisor approval is required to allow non-AAP courses to count toward the AAP degree (excluding curricula that require courses from other JHU
divisions). To obtain adviser approval, students must forward to their adviser a written request that includes documentation of the course description, number of credits, and any other information that may be helpful in assessing the course’s applicability to a student’s program. The student’s adviser then determines if the requested course is appropriate and whether the student is eligible to take it.

Interdivisional Registration for Non-AAP Students
Non-AAP students in other divisions of Johns Hopkins may take up to two courses in AAP, if permitted by their home division, and with permission of the AAP program director or associate dean. Non-AAP students must complete the necessary paperwork and/or procedures required by their home school/division. Interdivisional requests are processed by the AAP Registration Office during late registration on a space-available basis, to allow AAP students first eligibility into courses. Interdivisional registration is not guaranteed. School of Medicine students should contact the AAP registration manager for assistance with interdivisional registration.

International and Off-Site Courses
Some AAP programs may offer courses at an international location or at a site that is not on the Johns Hopkins University premises. These courses may have different registration deadline requirements and refund schedules as well as additional registration paperwork and fees. Students should check the website and SIS messaging carefully for these differences.

Leave of Absence
Students who anticipate that they will not enroll in classes for a period of one semester or more but believe that they will resume their studies must complete a request for leave of absence form at advanced.jhu.edu/current-students/forms. In case of medical leave or leave due to military service, students must provide relevant documentation, which may include service orders or medical documentation, to aapregistration@jhu.edu. The AAP registrar, in consultation with the program director when needed, will consider the request, and the student will be informed in writing of the decision. Students who are granted a leave of absence must contact AAP’s Registration Office prior to resuming their studies at the end of the allotted leave time. If granted an LOA, students automatically receive an extension for the same period of time. All other criteria listed in the Time Limitation section remain in place. Students are limited to two years for an LOA, taken at one time or in combination during the academic career with AAP. Please note, a leave of absence may not be granted to a student who is currently in thesis continuation.

Inactive Status
With the exception of those on a leave of absence, students who do not enroll for two semesters will lose their active status. The student is considered to have withdrawn from the program. To resume taking courses in Advanced Academic Programs, students must contact the AAP Registration Office and/or reapply by submitting a new application form, a new application fee, and any new application materials required. Reapplying students are subject to the admissions and program requirements in effect at the time of the new application. Acceptance for inactive students is not guaranteed, and courses taken prior to the interruption of studies may not count toward degree requirements. Time limitation still applies; see the Time Limitation policy.

GRADUATION REQUIREMENTS
Application for Graduation
Students planning to complete their degree requirements at the end of the semester for which they are registering must notify the AAP Registration Office of their intentions by completing the online graduation application form found in SIS. This form should be completed when registering for the last course(s) needed to complete the degree; it initiates the graduation review process that students must undergo to be cleared for graduation. The Registrar’s Office will periodically correspond with the student using the JHU email account address provided to all students in order to provide important information about administrative details, events, and deadlines. A paid $100 graduation fee is required at the time of application for graduation. This fee must be paid for every degree earned. The application for graduation form is valid for only one semester. If students do not complete their degree requirements during the semester expected, they must resubmit the application form while registering for the next semester. Students who paid the $100 graduation fee (a one-time payment) are not required to submit another graduation fee.

Completion of Degree Requirements
The Johns Hopkins University confers degrees three times a year (August, December, and May) to all students who have completed requirements during the spring, fall, or summer semesters. The university wide commencement ceremony and the master’s degree ceremony take place once a year in May. Diplomas are mailed to graduates at the address given on the graduate application found online in SIS. The conferral date is the date that will appear on a graduating student’s transcript.

ALUMNI BENEFITS
Advanced Academic Programs alumni are always welcome to register for courses in AAP. Having alumni in courses boosts the academic rigor, knowledge, and experience in the classroom. To promote this interaction and to provide opportunities for alumni to take courses they missed or that will help them remain current in their fields, AAP offers the Alumni Tuition Benefit Program.

An alumni registration form is posted on the website for alumni. Interested alumni will select either a full-credit, full-tuition option or a noncredit, reduced-cost alumni benefit option. They will be required to complete the alumni registration form so we have updated information, but they will not be required to submit a resume, a writing sample, letters of recommendation, transcripts, or any other usual application materials.
Full-Tuition Option (with credit): Alumni who have applied through the method noted above will be able to register for an approved course as a special student. Their registration will be processed in a timely manner during regular registration or late registration. They will be in competition for seats along with current students (first come, first served). The course will appear with a grade on the transcript.

Space-Available Tuition Benefit (noncredit, audit): Alumni interested in this option will be eligible for a 50 percent reduction in tuition in any course for which they qualify, on a space-available system, in a participating program. The course will appear with an “AU,” to indicate the audit status, on the transcript.

Qualification Required: In all cases above, alumni can enroll only in courses for which they qualify. A program may elect to limit the courses open to alumni or may reserve a certain number of slots for current students.

ACADEMIC REGULATIONS FOR ONLINE COURSES

Online Orientation for Online Students
All students taking their first fully online AAP course will be required to participate in an online orientation course before the term starts. Students will learn how to navigate, collaborate, and communicate in a fully online course. The orientation provides valuable hands-on experience with the course management system. Important information regarding the technical requirements and support resources available will be given in the orientation. Students should expect to devote one to four hours to the orientation, but it may be spread out over several days. Information about where and how to take the orientation course will be provided to students by email.

Returning students are welcome to participate and to review techniques and tools. All students are encouraged to revisit the orientation to test for access to online library resources in the Library Module.

Online Library Access
AAP provides online library resources to all students. New online students are required to obtain access as part of the orientation and are supported in this process. The jhed id and password are needed to access most resources. For a list of resources, visit the library homepage at library.jhu.edu.

Online Class Structure
AAP online courses are asynchronous. Students access course materials and discussion at individually desired times. Students share learning actively through the Web-based course site with readings, assignments, group activities, and threaded discussions as guided by their instructor. Course format and structure promote active and interactive learning.

Online Bookstore
AAP has partnered with an online bookstore, MBS Direct, to service online students and students enrolled in on-site courses. MBS Direct offers competitive pricing, new and used books, and buybacks from its large distribution center. Students can access the bookstore at mbsdirect.net approximately four weeks prior to the start of each semester to purchase their texts. Questions about MBS Direct or its services can be directed to the customer service center at 800-325-3252 or vb@mbsDirect.net.

Residency Requirement
Some programs are offered fully online, and some have no on-ground courses. Still others have an on-ground residency requirement in addition to courses offered online. Each program has specific requirements, and it is the student’s responsibility to check with his/her program adviser to ascertain the requirements pertaining to his/her program.

AAP Online Course Access Policy
According to AAP policy, students have one full semester after the end of the semester in which they take an online course to retrieve their own student-generated work and to access course materials. The University’s policy on the use of Intellectual Property applies in all cases where students access online classes after a semester has already ended. Additionally, individual instructors or University administration have the option to make courses available for longer or shorter periods of time.
GRADING SYSTEM

Scale
The grading scale for students enrolled for credit is A+, A, A-, B+, B, B-, C, and F. An Incomplete (I) grade is assigned by the instructor who has given the student permission to delay completion of specific course for a justifiable reason for a specific amount of time. W (official withdrawal) and AU (audit) are requested by the student and cannot be assigned by the instructor. A grade of F indicates the student’s failure to complete or comprehend the course work and therefore does not count toward the courses needed for completion of the degree. F and C grades are not removed from a student’s transcript even if a course is repeated.

Students are graded under the following system:

Grading System

<table>
<thead>
<tr>
<th>Grade</th>
<th>Meaning</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>Excellent</td>
<td>4.00</td>
</tr>
<tr>
<td>A</td>
<td>Excellent</td>
<td>4.00</td>
</tr>
<tr>
<td>A-</td>
<td>Satisfactory</td>
<td>3.70</td>
</tr>
<tr>
<td>B+</td>
<td>Satisfactory</td>
<td>3.30</td>
</tr>
<tr>
<td>B</td>
<td>Satisfactory</td>
<td>3.00</td>
</tr>
<tr>
<td>B-</td>
<td>Satisfactory</td>
<td>2.70</td>
</tr>
<tr>
<td>C</td>
<td>Passing but marginal</td>
<td>2.00</td>
</tr>
<tr>
<td>F</td>
<td>Failure</td>
<td>0.00</td>
</tr>
<tr>
<td>P</td>
<td>Pass</td>
<td>1.00</td>
</tr>
<tr>
<td>I</td>
<td>Incomplete</td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>Withdrawal</td>
<td></td>
</tr>
</tbody>
</table>

Requirements
If a degree candidate receives a grade of C or below in a core course, the student must repeat that course. Even if the course is repeated, the original grade will remain on the student’s transcript, and the student may not receive another grade of C or below. For specific guidelines on what courses are considered core and/or required, please review the curriculum requirements listed for your program in this catalog or on the AAP website.

Special students—those who satisfy all requirements for admission to degree candidacy but who choose not to seek a degree—are held to the same performance standards as degree candidates. Provisional students cannot continue in a program if they earn a grade of B- or below (B+ or below for the Writing or Science Writing programs) in any course taken while they are in provisional admissions status.

Probation and Dismissal
Degree candidates who receive a grade of C or below are on academic probation. See “Requirements” section above for details and clarification regarding grade requirements for degree, special, and provisional students. When a course is repeated, both the original grade and repeated grade appear on the transcript. The degree candidate receives credit only once for the course; however, the original grade of C (or below) places the student on probation. If a degree candidate receives a grade of C in an elective course, the course need not be repeated, and the course can be counted toward degree requirements. Degree candidates who receive a second C or below in either a repeated core course or any course taken in the program will be dismissed from the program. Special students are held to the same performance standards as degree candidates. Provisional students who receive a grade of B- or below (B+ or below for the Writing or Science Writing programs) in any course cannot repeat the course and are dismissed from the program.

Students dismissed must wait one year from the date of dismissal before applying for admission to a different program in Advanced Academic Programs or applying for re-admission to the program in which he/she has been dismissed. Applications for readmission must include supporting materials describing steps and/or strategies the student has taken during the waiting period to demonstrate readiness to meet the academic requirements of the program. Readmission to a program is not guaranteed.

Incomplete
A designation of I (incomplete) is assigned when a student fails to complete a course on time for valid reasons as determined by the instructor. A student requests a status of incomplete from the instructor and submits a required form. The request for/resolution of incomplete form can be found at advanced.jhu.edu/current-students/policies/grading-policy. The student notes the reasons for requesting the incomplete and details the plans for resolving it. The student and instructor sign the form. Instructors send the completed form to the AAP registration manager.

An incomplete is granted at the instructor’s discretion, and conditions for absolving it are established by the instructor. It is the student’s responsibility to submit all work at the agreed-upon time. If a student does not complete the incomplete course, the I will convert to an F grade 60 days after the beginning of the following semester in which the student enrolled for that course. Under extraordinary circumstances, a student may petition the instructor of the course in which the student is enrolled for an extension of the period normally allowed for removal of the incomplete grade. Incomplete extensions are permissible one time for one semester.

Withdrawal
The W (withdrawal) grade signifies an official withdrawal from a course that has been approved by the Advanced Academic Programs Registration Office. The student initiates the withdrawal by completing an online add/drop form or sending in a paper add/drop form. The add/drop form can be found at advanced.jhu.edu/current-students/forms. A W cannot be assigned by the instructor. Students who register for a course but never attend or stop attending, and later drop, are subject to the refund schedule at the time of their drop. All registered
students are subject to the refund schedule, regardless of attendance. For further information, see advanced.jhu.edu/registration, and then select Step 4: Paying for Your Courses.

Academic Standing and Conduct

The university reserves the right to dismiss at any time a student whose academic standing or general conduct is deemed unsatisfactory.

Academic Integrity

Graduate students at Johns Hopkins are expected to understand the ethical standards of the university, hold the highest standard of integrity for their work, and avoid academic dishonesty in all forms. Ignorance of ethical rules is no excuse for cheating. It is the further responsibility of every student to report to the instructor or their program's director any suspected violations of academic ethics by peers. Enforcement of our code of conduct is a shared responsibility and should not depend on the university alone. We all celebrate the rigor of a Johns Hopkins education, but that rigor loses its meaning if students cheat. Students who violate this code of conduct face a range of penalties, including failure of a course, permanent university transcript notation of an ethics violation, loss of a degree, or expulsion from the university. Please see the Student Code of Conduct for procedures and responsibilities. This pamphlet is available at all three Advanced Academic Programs sites and is available online at advanced.jhu.edu/current-students/policies/code-of-conduct. At publication time for this catalog, Advanced Academic Programs was considering changes to the Student Code of Conduct. The revised code will be announced and posted at the link above.

Ethics violations of any kind are taken seriously and may result in dismissal from AAP's programs. The best way you can keep yourself from committing an act of plagiarism is to be properly informed. At a minimum, please remember that any words taken verbatim from a source must be cited and contained within quotation marks. Even if you have paraphrased an idea from a source, you must provide the appropriate citations. Ignorance of these principles will not be an acceptable excuse for violation of the policy. For further information and assistance in determining when and how to properly cite your sources, please link to an excellent resource provided by the Milton S. Eisenhower Library of Johns Hopkins University at library.jhu.edu/researchhelp/index.html. An equally useful resource with clear and specific definitions of plagiarism can be found at turnitin.com.

Grade Disputes

If a student does not agree with the grade an instructor assigned in a given course, the student must contact the instructor first to attempt to resolve the disputed grade. If the instructor and the student are unable to reach an agreement, the student may present his/her argument to the program committee in writing with supporting facts and documents. Facts considered during a grade dispute include but are not limited to: (1) whether there was an arithmetic error; (2) whether the faculty member applied consistent standards in assigning grades; and (3) whether the grade was a result of a faculty member's failure to follow the syllabus for assigning grades.

The Program Committee may solicit the instructor's evaluation in writing, or members may ask the instructor and/or the student to appear before them. The committee then determines whether the disputed grade should be changed or retained and promptly informs the student and the instructor of its decision. The committee's decision is final. Limited appeals to the Associate Dean are possible only regarding the Grade Dispute process, procedures or if new evidence is made available after the Program Committee meeting. This appeal must be made within 10 days of the receipt of the Program Committee's decision. Grade appeals, including all supporting documentation, must be submitted to the program committee no later than the last day of classes for the following semester. A graduating student has three months after graduation to submit a grade appeal for any course taken during his/her final term.

Time Limitation

Students must complete all academic work in a master's degree or certificate program within five years, calculated from the start of the first course that counts toward the degree (including time spent on continuous enrollment). Continuous enrollment does not stop or extend the time limitation requirement. This time limit includes any courses taken at another Johns Hopkins school/division that have been approved to count toward the degree or certificate.

If necessary, students may request from their program committee an extension of time to complete their program beyond the five-year limitation. An extension of time request form is available at advanced.jhu.edu/current-students/forms.

If an extension is granted, it will be communicated in a letter, and the five-year limit increased by the time included in the extension. All other criteria apply, including continuous enrollment should students fail to enroll in courses without approved leaves. An extension may be granted for a semester up to a full year, and in rare circumstances for two years.

ACADEMIC STRUCTURE

Advisers

Each student accepted into a degree program or certificate is assigned an academic adviser, who is available for consultation regarding the student's program of study. A student adviser's name and email address are provided on the admissions decision letter. Advising is available year-round. Consultation takes place by phone, email, Internet, or in person by appointment. Please see the program sections in this catalog for specific program adviser information.

Courses in all programs are offered in the summer, fall, and spring terms. The summer term permits three formats: two full semesters (14 or 12 weeks) and two accelerated eight week formats. The fall and spring terms have one full semester (15 weeks) and two accelerated eight week formats for regular classes depending on the program. The spring semester includes a three-week intersession for courses offered at the beginning of January to the end of the month. Similarly, the summer term includes a May intensive schedule available
in select programs. These intensive semester formats allow students to complete special-interest courses, such as travel courses, as well as regular courses offered in compressed format. See the AAP Academic Calendar and Registration periods posted for the academic year on the Web at advanced.jhu.edu/current-students/academic-calendar.

Course Numbering System
Advanced Academic Programs courses are numbered in the following form:

> 420.601.51 (Example)

> 420 indicates the program—in this case, Environmental Sciences and Policy;

> 601 indicates the course number—in this example, Geological Foundations of Environmental Science

> 51 indicates the section number and location where the course is offered—i.e., sections 01 to 09 are offered at the Homewood campus in Baltimore; sections 51 to 59 are offered at the Washington, DC Center; sections 71 to 79 are offered at the Montgomery County Campus in Rockville; and sections 81 to 89 are offered online. Section 91/92 indicates an international or off-site course.

Course Credit
Effective summer 2016, all Advanced Academic Programs graduate-level courses are assigned credits. In addition, graduate-level students may receive letter grades (A, B, etc.) or P (passing). Prior to May 2016, credit hours were not assigned to graduate-level courses unless taken by an undergraduate. No GPA is calculated. A transcript guide is available upon request that features grade points needed to calculate grade-point averages. The AAP registration office will not calculate grade-point averages for students or third parties.

Course Cancellations
The university reserves the right, in its sole discretion, to change instructors or cancel courses with insufficient enrollment.

Enrollment/Degree Verification
Enrollment verification provides proof of enrollment for a student’s financial lender, insurance company, sponsor, etc. Enrollment verifications can be obtained through SIS. Please expand the registration menu and choose the last option listed on the menu. Verifications may also be placed through the National Student Clearinghouse. If you have any questions regarding enrollment verifications, please contact the Homewood Registrar’s office by phone at 410-516-8080.

Transcripts
The transcript is part of the student’s permanent record at the university. No grade may be changed except to correct an error or to replace an incomplete with a grade. Active students can request a transcript through SIS. Please expand the registration menu and choose the last option to request a transcript. Graduates and former students, please go to the following link to request a transcript: web.jhu.edu/registrar/transcripts. If you need assistance, please contact the Homewood Registrar's Office by phone at 410-516-8080, or visit jhu.edu/registrar.

Second Master’s Degree
After receiving a master’s degree from Advanced Academic Programs, students may continue in a second program if prerequisites for that program are fulfilled. To receive a second master’s degree from Advanced Academic Programs, all course requirements for the second program must be satisfied. The student may count up to three courses taken as part of the first degree toward requirements of the second. However, the relevant program committee must approve the course(s) as appropriate to the plan of study, and the course(s) must satisfy the requirements of the second degree. The course(s) also must fall within the five-year limit for the second degree (i.e., the second degree must be completed within five years, counting from the beginning of the first course accepted toward the second degree).

To apply for a second master’s degree, the student must submit a new Advanced Academic Programs application form, an application fee (waived if previous master’s degree was earned within the past year), and any additional admissions materials required by the second degree program.

Applying Courses From a Certificate Toward a Degree in Advanced Academic Programs
Programs within AAP may allow courses earned and applied toward a graduate certificate to be applied toward a graduate degree. In most instances, up to three courses may be applied from an AAP certificate program toward a degree. Contact the program director of the respective program for details, conditions, and approval.

TUITION AND FEES
Full course tuition is due at the time of registration. All other fees are payable as noted below. All fees are nonrefundable. Tuition is refundable only according to the refund schedule. If a student registers for a course but does not attend OR officially drops/withdraws from a class, the student remains financially responsible for the tuition and fees associated with the course.

Application Fee
The application fee is $75 for all programs. The application fee must be submitted with the application and is not refundable under any circumstances. Johns Hopkins University alumni from any academic program will have their application fee waived. Please contact the Admissions Office to waive your fee.

Tuition
All tuition in the Advanced Academic Programs is determined according to academic program of study and varies across AAP disciplines. Students will be charged tuition based upon individual courses within the program of study in which
students have been admitted. If courses are taken outside of a student’s program of study, the student will pay the tuition rate in effect for the program in which the course is taken. Restrictions apply for how many courses may be taken outside of a student’s academic program and applied toward the degree (see section regarding registering for courses in other programs in AAP and outside of AAP). For a full tuition list for 2017-2018 (degree and certificate programs), visit: advanced.jhu.edu/registration/tuition-and-fees/index.htm.

Course Fees

Some courses require, in addition to tuition, field trip, laboratory, technology, materials fee or other related fees. These fees, specified in the course schedule (advanced.jhu.edu/current-students/course-schedule) for each term, are payable at the same time as the regular tuition charges and are nonrefundable.

Continuous Enrollment Fee

All degree and certificate students accepted for fall 2013 and beyond will be charged a nonrefundable $75 fee if they do not enroll in at least one course in the fall or spring semesters. January intersession, May intensive, and summer sessions have been excluded from this requirement. To avoid additional administrative steps later, students are strongly encouraged to adhere to the continuous enrollment policy and to register for classes no later than the end of drop/add period each semester. The continuous enrollment fee of $75 is charged for each term you are not enrolled in a credit course (see excluded semesters above). Continuous enrollment entitles students to advising, career and internship services, and use of the Johns Hopkins facilities, including library facilities. AAP students have a maximum of five years to complete all degree requirements applied toward graduation. Exemptions from the continuous enrollment policy will be granted only for documented medical emergencies, approved leaves of absence, or military service. Requests for exemption to the policy should be made to aapregistration@jhu.edu with supporting documentation. Those requesting an official leave of absence should complete the online form at: advanced.jhu.edu/students/forms/leave-of-absence.

Withdrawal From Academic Program

Students who elect to discontinue their program of study must formally withdraw from the program by completing the Program Withdrawal Form found on our Forms page on the website (INCLUDE LINK). Once students formally withdraw from their program, they are no longer considered students at AAP and can no longer receive services including but not limited to library access, health insurance coverage, or career services. Students who do not formally withdraw from their program will be charged the Continuous Enrollment Fee for two semesters, or until their status goes Inactive (please see Inactive Section). Inactive students are considered Withdrawn.

Thesis Continuation Course

Students who are in a thesis course and do not finish the thesis in the semester in which they enrolled for it must pay a thesis continuation fee of $500 for each subsequent term (including summer) until a final grade has been submitted. Thesis continuation is relevant only for students currently in the process of completing a thesis and who need more time to finish the thesis. Thesis continuation has a course number in the AAP schedule of classes and can be registered for through SIS. Thesis continuation and continuous enrollment are different. A student working on his/her thesis should not complete the continuous enrollment registration but rather the thesis continuation course. This fee, when paid, allows students to continue using university facilities, such as libraries and the Johns Hopkins Enterprise Directory (JHED).

Graduation Fee

The graduation fee is $100, payable upon receipt of a bill (through your JHU email account) from the Student Accounts Office. Student Accounts sends this bill upon submission of the application to graduate. Billing schedule is subject to change without advanced notice. However, any student who graduates must pay the $100 graduation fee.

Refund Policy

Students may elect to withdraw from one or more course(s) for a variety of reasons. Refunds apply only to the tuition portion of a student’s charges, excluding the field trip, lab, or technical fees, and are calculated based on the date the student request to drop or withdrawal is received by the Advanced Academic Programs Registration Office, The Johns Hopkins Bernstein/Offit Building, 1717 Massachusetts Ave. NW, Suite 101, Washington, DC 20036-2001. Such a request can be made by using the add/drop form found at advanced.jhu.edu/current-students/forms. Complete the form online or fax the form to the Registration Office at 202-452-1970. Telephone withdrawals are not accepted. Instructors or advisors never authorize or process withdrawals, though it is certainly courteous to inform the instructor of the intent to withdraw. Refunds are not granted to students suspended or dismissed for disciplinary reasons.

Students who drop a course before or on the deadline for a 75 percent refund will not have that course listed on their official transcript. Students who drop a course after the deadline for a 75 percent refund (receiving a 50 percent refund or less) and before the end of the semester will receive a W on their official transcript, indicating withdrawal from a course. The refund schedule for each semester is posted on the Web at advanced.jhu.edu/registration (choose Step 4: Paying for Your Courses). Refunds are made in accordance with the schedule listed below and are updated on the Web for each semester/term (jhu.edu/registration). If you withdraw after your registration has been processed, the refund to which you are entitled depends on the date your request is received by the Advanced Academic Programs Registration Office. On-site courses (e.g., international or regional) may be subject to a separate refund policy. Courses offered by other JHU divisions are subject to that division’s refund schedule.
REFUND REQUESTS

Exception to the Refund Policy Requests
In the case of rare or exceptional personal medical situations or personal military requirements, a student may request to appeal the standard AAP refund schedule/policy. Refund policy appeals must be submitted in writing (and received) by the Advanced Academic Programs Registration Office no later than the last day of classes of the very next semester/term. All supporting documentation and/or a thorough written explanation for the appeal must be included. In cases of rare or exceptional medical situations, supporting documentation should be limited to a letter from the appropriate medical professional, detailing the dates of care and the fitness for the student to attend class during that time. The appeal will be reviewed by the associate dean of AAP. Review times may vary depending upon the complexity of the appeal. Average review times for appeals range from four to six weeks from the date received. All decisions are final.

Refund Schedule

- Prior to eight days before the start of the term—dropped at 100 percent (military personnel see "below")
- Eight days before the first class and prior to the second week of class—dropped at 90 percent
- Second week of class and prior to the third week of class—dropped at 75 percent
- Third week of class and prior to the fourth week of class—dropped at 50 percent
- Beginning the fourth week of classes, courses will be withdrawn (W appears on transcript)
- Fourth week of class, prior to the sixth week of classes—withdrawn at 25 percent
- Beginning the sixth week of class—withdrawn with no refund

Some AAP programs may offer courses at an international location or at a site that is not on the Johns Hopkins University premises. These courses may have different registration deadline requirements and refund schedules as well as additional registration paperwork and fees. Students should check the website and SIS messaging carefully for these differences.

JHU LOCATIONS AND STUDENT SERVICES

The Advanced Academic Programs of the Krieger School of Arts and Sciences are offered on the Homewood campus in Baltimore; the Montgomery County Campus in Rockville; the Washington, DC Center; and online. Distances between the various AAP sites are considerable, and the university does not provide transportation between these sites, although public transportation may be available. The educational and student facilities and services provided at each location are described below.

The Johns Hopkins University portal at my.jhu.edu is the starting place for students and faculty members and offers a one-stop site for Johns Hopkins news, information, and technology resources. The primary goal of the portal is to simplify and centralize access to JHU services and content. Logging in to the portal requires activation of a Johns Hopkins Enterprise Directory (JHEd) login ID and password. The JHEd login ID and password are also used to access the Student Information System (SIS) at sis.jhu.edu, where students can register for courses, check grades, and view and pay bills. JHEd authentication is also needed for remote access to the JHU Sheridan Libraries and other campus resources.

New faculty members and students can go to my.jhu.edu to search for their name in the JHU directory and discover their personal JHEd login ID. Click the “First Time Users” tab and follow the instruction to activate a new account. Students and faculty can also activate their JHU email account in the myJHU portal. All official university information will be sent to the student’s JHU email address. For additional assistance, the help desk for Johns Hopkins Information Technology can be reached at 410-516-HELP (410-516-4357).

For more details, please visit advanced.jhu.edu/students for specific information on student services at each campus location.

Homewood Campus

Library Services
The Sheridan Libraries encompass the Milton S. Eisenhower Library and its collections at the Albert D. Hutzler Reading Room in Gilman Hall, the John Work Garrett Library at Evergreen Museum and Library, and the George Peabody Library at Mount Vernon Place. Together these collections provide the major research library resources for the university. The Sheridan Libraries also provide a rich array of resources and services including research consultation, instructional services and interlibrary loan services, for part-time and full-time students. The Milton S. Eisenhower Library is the university’s principal research library and the largest of a network of libraries at Johns Hopkins. The JCard serves as an ID and library card in the JHU libraries. Students who are Johns Hopkins employees at locations other than the Homewood campus use their divisional library or library/ID card. For more information on current hours of operation, parking, and services, and to get started using the resources, please visit the libraries’ website: library.jhu.edu.

Online Access to Library Resources
Johns Hopkins University provides several options through which Johns Hopkins students and faculty members can access library resources from any Internet-connected location. For information on how to access these online resources when off campus, please visit library.jhu.edu/services/computing/remot接入ess.html. For a list of resources, visit the library home page at library.jhu.edu.
CIRLA (Chesapeake Information and Research Library Alliance)
CIRLA is a program allowing Johns Hopkins faculty members and graduate students to go in person to a participating library in the region and borrow materials. A JCard must be presented to apply for CIRLA privileges. For participating libraries and instructions for borrowing, visit library.jhu.edu/services/circulation/otheraccess.html.

Computers
The range of Homewood IT services, equipment, and instruction can be found at it.jhu.edu. This website serves as a repository for all IT-related information at Johns Hopkins. You will find an abundance of useful information within this site, including an overview of the IT organization, its projects and services, support for applications and general questions, and news about emerging technologies and strategic initiatives. Students may also wish to learn more about computer facilities at the Homewood campus by visiting jhu.edu/classrooms.

Johns Hopkins Bookstore
Students can purchase supplies and JHU-themed merchandise at the Barnes & Noble Johns Hopkins Bookstore, located at 3300 St. Paul St. (at the corner of St. Paul and 33rd). For information and store hours, call 410-662-5850 or visit johns-hopkins.bncollege.com.

Johns Hopkins Student Union
The Student Union is located in Levering Hall and the Glass Pavilion and offers various programs and activities for students, faculty, staff, and friends of the university. Levering Hall also contains a complete dining facility that serves snacks and sandwiches during the late afternoon and early evening and hot meals during lunchtime.

Security Services
Visit jhu.edu/security for an in-depth review of security services available to students, faculty, and visitors to the Homewood campus. All are encouraged to report crimes or suspicious activity by calling 410-516-7777. For any other security-related matters, call 410-516-4600. Students are encouraged to register with the JHU voluntary crisis alert system. This system sends text messages to students when emergency conditions exist. To sign up, students log on to my.johnshopkins.edu, enter their Emergency Alert cellphone number, and select the appropriate Johns Hopkins campus.

Parking
The Homewood Parking Office is located in the South Garage, on the south end of campus, under Mason Hall. Office hours are Monday through Friday, 7:30 a.m. to 6 p.m. and Saturday and Sunday 10 a.m. to 6:00 p.m. Evening students and faculty members have a number of options for on-campus parking. For further information and a parking map, visit parking.jhu.edu or call 410-516-PARK.

Shuttle Service
The Blue Jay Shuttle provides students with transportation between Baltimore campuses and to various locations in Baltimore. More information and a schedule can be found at the parking website, parking.jhu.edu/bluejayshuttle.html.

Montgomery County Campus
The Johns Hopkins University Montgomery County Campus offers part-time graduate courses in several disciplines, including engineering, education, business, and biotechnology. Students attend classes in the evening, enabling them to hold full-time jobs during the day. Located minutes outside of Washington, D.C., the Montgomery County Campus boasts an ideal setting for academics, research, and corporate endeavors. The campus is close to I-270, the Shady Grove Metro Station on the Red Line and a Metro bus route. Gilchrist Hall and the Academic & Research Building include administrative offices, classrooms, computer labs, a wet lab, and an auditorium. Services available include wireless access, a library, and parking.

Library Services
The Montgomery Library Resource Center, a satellite of the Sheridan Libraries’ Milton S. Eisenhower Library, provides a wide range of services to students and faculty. Library staff members are available to provide individual reference assistance or group instructional sessions and to facilitate interlibrary loan, reserves, and an array of library services. The library, located on the first floor of Gilchrist Hall, offers access to hundreds of online databases, electronic journals, and an on-site collection of books supporting the programs offered at the Montgomery County Campus. In addition to the center collection, faculty and students have access to hundreds of full-text databases through workstations in the library, the open computer lab, and easy access from home and off campus. Students and faculty can obtain journal articles, books, and audiovisual material not available at the resource library. Articles can be delivered to the desktop, and material can be delivered to the center for pickup. To borrow materials, students must present their Johns Hopkins University JCard at the circulation desk. To find out more about the library, including hours and contact information, visit guides.library.jhu.edu/dcregional.

CIRLA (Chesapeake Information and Research Library Alliance)
CIRLA is a program allowing Johns Hopkins faculty members and graduate students to go in person to a participating library in the region and borrow materials. A JCard must be presented to apply for CIRLA privileges. For participating libraries and instructions for borrowing, visit library.jhu.edu/services/circulation/otheraccess.html.

Computers
Web-enabled computer workstations are located throughout the MCC campus, providing access to email and other Web resources. Kiosks are not enabled for printing. The MCC Open Computer Lab, located at Gilchrist 242, offers Internet access and the latest Microsoft Office software applications. Printing is available for a fee with a printing card, which can be purchased from the library on the first floor of Gilchrist Hall. The MCC Open Computer Lab is open from 8 a.m. to 10 p.m. Monday through Friday and 8 a.m. to 6 p.m. on Saturday.

Food and Refreshments
The Food for Thought Cafe offers beverages, sandwiches, salads, snacks, and more. It is located on the first floor of the Academic & Research Building. Hours vary. Several restaurants are open
along the parking garage facing Medical Center Drive, including Subway, Freshii, West Wing Café & Bakery, Blue Fin, and Natural Market.

Security Services
The Montgomery County Campus has a security presence in all buildings and a security car used to patrol parking areas. In case of an emergency, call 301-294-7000 or contact the front desk in the Academic & Research Building or front desk in Gilchrist Hall. Students are encouraged to register with the JHU voluntary crisis alert system. This system sends text messages to students when emergency conditions exist. To sign up, students log on to my.johnshopkins.edu, enter their emergency alert cellphone number, and select the appropriate Johns Hopkins campus.

Parking
Free parking is available in the lots on Broschart Road. All non-designated spaces are available for student and visitor use. All regular campus users must display a valid JHU Montgomery County Campus parking tag hanging from the rearview mirror of their vehicle(s). A parking tag may be obtained free of charge from the reception desk in Gilchrist Hall.

Washington, DC Center
The Johns Hopkins University Bernstein/Offit Building at 1717 Massachusetts Ave. NW is the administrative office for Advanced Academic Programs. Student Services, Admissions, Registration, and the Career Services Center are located in Washington, just two blocks south of Dupont Circle and accessible by Metro. The center includes a Library Resource Center, faculty and student lounges, an administrative and program management suite, classrooms, executive education conference rooms, computer labs, wireless access, and a large presentation room. The Washington, DC Center provides an excellent learning environment for Advanced Academic Programs and many School of Arts and Sciences Washington-based initiatives. Guests, faculty, staff, and students must sign in at the security guard’s desk in the lobby or show university ID.

Library Services
Under the direction of the Sheridan Libraries, Advanced Academic Programs students in Washington are welcome to do research in the Washington Library Resource Center. The databases, journals, the online catalog, reserve services, and a collection of materials supporting each of the programs offered by the schools.

Students and faculty can also obtain journal articles, books, and audiovisual material not available at the center library. Articles can be delivered to the desktop, and material can be delivered to the center for pickup. The J-Card is used for identification and borrowing privileges. The Library Resource Center has 10 workstations in the Electronic Research Room. Additionally, students may access electronic resources off campus. The library is open year-round from noon to 8 p.m., Monday through Thursday; noon to 5 p.m., Friday; and 9:30 a.m. to 1:30 p.m. on Saturday. To learn more, visit guides.library.jhu.edu/dcregional.

CIRLA (Chesapeake Information and Research Library Alliance)
CIRLA is a program allowing Johns Hopkins faculty members and graduate students to go in person to a participating library in the region and borrow materials. A J-Card must be presented to apply for CIRLA privileges. For participating libraries and instructions for borrowing, visit library.jhu.edu/services/circulation/otheraccess.html.

Computers
AAP has two teaching labs and one open lab for AAP students located on the fourth floor of the Bernstein/Offit Building. Internet access connects students to universitywide electronic services. Conventional and specialized software applications are installed to meet the needs of instruction and students. Hours vary each semester and are posted at the center. Wireless Internet access is available throughout the building.

DC Learning Commons
The Carey Business School, the Krieger School of Arts and Sciences, Advanced Academic Programs, and the Paul H. Nitze School of Advanced International Studies at Johns Hopkins University are pleased to announce the opening of the DC Learning Commons. Located in the Bernstein-Offit Building at 1717 Massachusetts Ave. NW, the DC Learning Commons is the first of many future initiatives to create a collaborative campus environment for Johns Hopkins students in Washington, D.C. The Commons provides a vibrant environment for study, collaboration, interaction, and the coming together of students of the three distinct, unique, and distinguished schools within the university.

Conference rooms, group study rooms, open group study areas, printing services, and a student kitchenette are provided. Student Services staff and faculty offices are co-located to provide opportunities for students and faculty to interact. The space is designed to accommodate the broad variety of learning styles including self-study, small-group study, open-group study, and technology-enhanced study. We look forward to welcoming our students to the new space, and are excited about the opportunity for enhanced learning and networking that the Learning Commons gives our students.

Classrooms
Nearly all classrooms at the Washington, DC Center are equipped with enhanced audiovisual technology, including a PC, projector, audio speaker system, remote control presenter, and DVD player. Faculty and students can deliver presentations using the classroom computer provided by Advanced Academic Programs or may alternately connect their own laptop to the AV projection system.

Additional Area for Food and Refreshments
An additional student lounge is located on the lower level and has snacks and refreshment machines. The lounge has tables and chairs for those who stop by any of the nearby eating establishments and wish to bring food to the center. The Galley Café, located at 1625 Massachusetts Ave. NW in the Airline Pilots Building, provides light fare to 7:30 p.m. Monday through Thursday and is closed on weekends.
Security Services
Washington, D.C. students are encouraged to register with the JHU voluntary crisis alert system. This system sends text messages to students when emergency conditions exist. To sign up, students log on to myjohnshopkins.edu, enter their emergency alert cell phone number, and select the appropriate Johns Hopkins campus.

At the Washington, DC Center, all students and faculty members must show a J-Card or other university ID at the lobby desk. Visitors are required to show a picture ID and sign in. There is a phone on the fourth & 2nd floor that connects directly to the lobby security guard in case of an emergency.

Parking
Parking at 1717 Massachusetts Ave. NW (underneath the Bernstein/Offit Building) is open to students and faculty. The parking garage opens Mon to Fri, 4 am to 11 pm, Sat, 7 am to 6 pm for a discounted rate of $7. For more information, call 202-862-8515. Rates and hours are subject to change without prior notice.

There is a reduced-fee parking arrangement with Central Parking at 1800 Massachusetts Ave. NW. The garage is located in the lower level of the SEIU building on the corner of 18th Street and Massachusetts Avenue, with the entrance on 18th Street. Students, faculty, and visitors may take advantage of the reduced fee 4:30 to 11 pm. Monday through Friday. Johns Hopkins University does not control the accessibility of this service.

Online Learning
AAP offers intensive, interactive, and rigorous academic online courses. Frequent meaningful participation is expected of all students, and the demands placed on online students are comparable to those in face-to-face courses. The bulk of course work is done on a student’s own schedule throughout the week, making these courses ideal for serious students who need flexibility in location and timing.

Learning Management System
All fully online courses and Web-supported course sites are provided via Blackboard, our learning management system. Students log in to Blackboard using their JHED login ID and password. This is the same ID and password used for course registration in SIS, remote library access, etc. For information on JHED login, course site addresses, technical assistance, and many of the Johns Hopkins digital resources, students can visit advanced.jhu.edu/students. Students registering for online courses should be sure to sign up for their Johns Hopkins University email account and use this account for all JHU business and academic matters.

Registration Requirements for Online Courses
Students taking their first online course with Advanced Academic Programs must participate in an online orientation course prior to the start of the term. Please see Academic Regulations for Online Courses for each specific degree program.

Library Services
Advanced Academic Programs provides access to all JHU electronic library resources. Learn more at advanced.jhu.edu/students/libraries.

Online Course Technical Support
The Johns Hopkins University believes technology should be a student asset and never an obstacle to online learning. This is why, as an online learner at JHU, you can access our 24/7 Personal Support Center anytime. The Personal Support Center is always available to assist you with any technical issues that may arise within your online classroom or pertaining to your online learning. To reach the Personal Support Center, call: 855-593-0086.

ADDITIONAL STUDENT SERVICES
Career Services
Career Services provides career development strategies and career counseling to assist graduate students to launch or advance their careers. Services range from one-on-one sessions to webinars. Appointments can be requested by using the online scheduler to submit a request. Log in here: https://advanced.jhu-csm.symplicity.com/students/?signin_tab=0. Current AAP students and alumni have access to The CAAP Center, a career management resource tool where you can search for job and opportunity openings, locate career resources in the career library, as well as view announcements, and develop career materials for your job search. Career services are for actively enrolled students and recent alumni.

MBS Direct Bookstore
Advanced Academic Programs is serviced by a virtual bookstore, MBS Direct. MBS Direct provides textbook information for students taking courses at all AAP on-site locations and online. The online bookstore offers competitive pricing, new and used books, and buybacks from its large distribution center. Visit the MBS Direct online store (bookstore.mbsdirect.net/jhu-aap.htm) to begin purchasing your textbooks. The bookstore opens four weeks before the start of the semester/term. If your book is not listed at that time, no textbook information has been entered by the instructor. If that is the case, keep checking back, as information is updated daily before the semester start. Orders can also be placed by phone at 800-325-3522 or fax at 800-499-0143. Direct questions about your book order to the MBS customer service line at 800-325-3522.

Disabilities Services
The Johns Hopkins University is committed to providing reasonable and appropriate accommodations to students with disabilities. For persons with disabilities, it is important to provide a request for accommodation form along with a comprehensive evaluation of a specific disability from an appropriate qualified diagnostician that identifies the type of disability, describes the current level of functioning in an academic setting, and lists recommended accommodations. All documentation will be reviewed, and reasonable
accommodations will be provided based on the student's needs. Depending on the accommodation, there may be a time delay before accommodations can be implemented. It is preferred, not required, for students to contact aapdisability@jhu.edu in the School of Arts and Sciences Advanced Academic Programs four weeks prior to the beginning of each semester or event to ensure that services will be available. An accommodation request form and further information can be found at advanced.jhu.edu/current-students/current-students-resources/disability-accommodations. Regarding universitywide disability concerns, contact 410-516-8949 or visit web.jhu.edu/disabilities.

Inclement Weather Announcements
When the university closes due to inclement weather, driving conditions, or other unforeseen circumstances, announcements are posted on the Emergency and Weather Hotline, at 410-516-7781 in Baltimore. For localities outside the Baltimore calling area, call 800-548-9004. The information is also made available on the Johns Hopkins University home page at jhu.edu.

Financial Aid
For information about federal financial aid in the form of student loans, students should contact the Office of Student Financial Services, 146 Garland Hall on the Homewood campus. Call 410-516-8028, email at aapfinaid@jhu.edu or visit the financial aid web page at pages.jhu.edu/~finaid/part_time.html.

Alternative Loans
All students, including students taking only one course, may borrow an alternative loan to assist with educational expenses. More information is available at jhu.edu/finaid/grads_loans.html.

Financial Aid Programs
Contact the Office of Student Financial Services for information about:

- Federal direct student loan
- Federal Perkins loan
- Title IV refunds

Veteran’s Benefits
Johns Hopkins University is approved by the Maryland Higher Education Commission for the training of veterans, active duty, eligible spouses, and children of military under provisions of the various federal laws pertaining to veterans' educational benefits. Information about veterans' benefits and enrollment procedures may be obtained at the Registrar’s Office, Garland Hall, 410-516-6635 or ncarr5@jhu.edu. Students eligible for veterans educational benefits register in the same manner as other students. However, they are required to notify the school certifying official at ncarr5@jhu.edu to request VA certification each semester after they enroll for classes. Veterans are certified on a per semester basis. If we do not receive a request from you, we will assume that you are choosing not to use benefits for that term.

Advanced Academic Programs offers a very limited number of Yellow Ribbon Awards for eligible veterans using Chapter 33 (Post-9/11) benefits. AAP students who are veterans may contact the AAP registrar in Washington, D.C. with general inquiries at aapregistration@jhu.edu or 202-452-1952. For detailed information about veterans' benefits and Yellow Ribbon, contact: Veterans Desk, Office of the Registrar, 75 Garland Hall, Johns Hopkins University, 3400 N. Charles St., Baltimore, MD 21218-2934, 410-516-6635, web.jhu.edu/registrar/veterans.

Satisfactory Academic Progress
Students who receive federal student financial aid, in accordance with federal, state, and institutional requirements, must meet satisfactory academic progress established specifically for financial aid purposes. SAP measures three components: cumulative grade-point average (or equivalent measure), cumulative completion rate of courses attempted, and whether students complete a degree or certificate within the university’s published maximum time frame. Because these measures are cumulative, all periods of enrollment (even periods when a student did not receive financial aid) must be included in the determination of SAP. The requirements needed for financial aid are different from what may be required by your academic program to remain in “good standing”—students who receive financial aid should take particular care to ensure compliance with SAP as well as AAP academic policies.

Under federal Title IV law, the college's financial aid SAP requirements must meet certain minimum requirements and be at least as strict as the college's standards for good academic standing. SAP is reviewed at the end of each traditional semester of enrollment. The policy applies to students applying for financial aid for semesters/period of enrollment that begin with the fall 2013 semester. For details regarding the financial aid SAP policy, please visit: jhu.edu/finaid/part_time.html#sap.

POLICY STATEMENTS

Students enrolled in course offerings provided by Advanced Academic Programs are responsible for adhering to the policies set forth and established by Johns Hopkins University. Students should visit my.jhu.edu to explore a more comprehensive list of university policies. Although every university policy is not listed in the catalog, AAP students are responsible for adhering to all policies set forth by JHU.

Policy on Student or Alumni Letters of Reference
No member of the faculty is obliged to provide a student or graduate with an evaluation or letter of recommendation that does not accurately reflect that faculty member’s true opinion and evaluation of that student's or former student's academic performance and conduct.
Notice of Nondiscriminatory Policy

The Johns Hopkins University admits students of any race, color, gender, religion, age, national or ethnic origin, disability, marital status, or veteran status to all of the rights, privileges, programs, benefits, and activities generally accorded or made available to students at the university. It does not discriminate on the basis of race, color, gender, marital status, pregnancy, ethnicity, national origin, age, disability, religion, sexual orientation, gender identity or expression, veteran status, or other legally protected characteristic in any student program or activity administered by the university, including the administration of its educational policies, admission policies, scholarship and loan programs, and athletic and other university-administered programs, or in employment. Questions regarding Title VI, Title IX, and Section 504 should be referred to the Office of Institutional Equity, 130 Garland Hall, 410-516-8075, TTY 410-516-6225.

Policy on Possession of Firearms on University Premises

The possession, wearing, carrying, transporting, or use of a firearm or pellet weapon is strictly forbidden on university premises. This prohibition also extends to any person who may have acquired a government-issued permit or license. Violation of this regulation will result in disciplinary action and sanctions up to and including expulsion, in the case of students, or termination of employment, in the case of faculty and staff. Disciplinary action for violations of this regulation will be the responsibility of the divisional student affairs officer, dean or director, or the vice president for human resources, as may be appropriate in accordance with applicable procedures. Any questions regarding this policy, including the granting of exceptions for law enforcement officers and for persons acting under the supervision of authorized university personnel, should be addressed to the appropriate chief campus security officer.

Advanced Academic Programs will consider exceptions to this policy only for law enforcement personnel who are required by law or their agency’s regulations to carry a weapon while on a campus or center. Requests for an exception must be addressed to Kathleen Burke, associate dean (kmburke@jhu.edu), in advance of coming to a campus or center. Law enforcement personnel will be required to submit a letter from an authorized official on agency letterhead; the letter must satisfactorily address the justification and need for an exception to the JHU policy.

Statement Regarding the Privacy Rights of Students

The Johns Hopkins University complies with the provisions of the Family Educational Rights to Privacy Act of 1974 (PL 93-380) as amended (PL 93-568) and any regulations that may be promulgated there under. Students and others who desire specific information regarding their rights of access to institutional educational records maintained in their names are advised to contact the Registrar’s Office, 75 Garland Hall, Homewood campus, for a copy of the university’s policy.

Americans with Disabilities Act (ADA) Policy

The Johns Hopkins University does not discriminate on the basis of gender, marital status, pregnancy, race, color, ethnicity, national origin, age, disability, religion, sexual orientation, veteran status, or other legally protected characteristics in any student program or activity administered by the university or with regard to admission or employment.

A person with a disability is defined by the Rehabilitation Act of 1973 and by the Americans with Disabilities Act of 1990 as an individual who has a physical or mental impairment that substantially limits one or more major life activities, has a record of such an impairment, or is regarded as having such an impairment. For faculty, staff, and students with disabilities, it is important to provide to the university a comprehensive evaluation of a specific disability from an appropriate qualified diagnostician that identifies the disability, describes the current level of functioning in an academic or employment setting, and lists recommended accommodations. The university provides appropriate, necessary, and reasonable accommodations in programs and facilities for those individuals who are qualified.

This policy is available at jhu.edu/oie/disability. Questions regarding compliance with the provisions of the Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973 should be referred to the Office of Institutional Equity, 130 Garland Hall, Homewood campus, 410-516-8949 or (TTY) 410-516-6225.

Sexual Violence, Sexual Assault, Relationship Violence, and Stalking Policy

Effective August 19, 2015, these procedures no longer apply to cases of sexual misconduct, which includes sexual harassment, sexual assault, relationship violence, and stalking. Complaints of sexual misconduct are processed pursuant to The Johns Hopkins University Sexual Misconduct Policy and Procedures (see http://sexualassault.jhu.edu/policies-laws/).

Purpose of This Policy

The Johns Hopkins University is committed to providing a safe educational and working environment for its students, trainees, faculty, staff, and other members of the university community. The university prohibits sexual violence and sexual assault—which, along with sexual harassment, prohibited by the university’s Policy Against Sexual Harassment, are forms of “sexual misconduct”—domestic violence and dating violence (collectively, “relationship violence”), and stalking. This conduct is disruptive of the learning and working environment of the university’s community members and will not be tolerated by the university. The university is committed to preventing sexual misconduct, relationship violence, and stalking, as well as addressing its effects on the university community. The university has adopted this policy in order to inform students, trainees, faculty, staff, and other members of the university community of their rights and responsibilities in the event they are or have knowledge of someone involved in an incident of sexual misconduct, relationship violence, or stalking, and of the services available to victims of sexual misconduct, relationship violence, and stalking.
Scope of This Policy
This policy applies to all members of the university community, including but not limited to students, trainees, faculty, and staff, and it covers prohibited conduct that occurs on campus or other university property; occurs in connection with JHU programs or activities, including academic, educational, extracurricular, athletic, or other programs and activities; or otherwise affects the university community. In certain instances, this policy applies to third parties (e.g., visitors, volunteers, vendors, and contractors while on university property, participating in a university-sponsored activity, or providing services to the university, applicants for admission to or employment with the university, and former affiliates of the university). This policy applies equally to all regardless of an individual’s sex, gender, sexual orientation, gender identity, or gender expression. All academic and administrative units of the university, including all schools, divisions, campuses, departments, and centers, must comply with and ensure that their policies and procedures comply with this policy. For more information, please refer to sexualassault.jhu.edu/policies-laws.

Procedures on Discrimination, Harassment, Sexual Misconduct, Relationship Violence, and Stalking

Purpose and Scope of Procedures
The Johns Hopkins University is committed to providing the members of its community with an environment free from discrimination and harassment, including sexual harassment, sexual violence, and sexual assault (collectively, “sexual misconduct”); domestic violence and dating violence (collectively, “relationship violence”); and stalking. The university will not tolerate discrimination, harassment, sexual misconduct, relationship violence, and stalking. The university is prepared to receive, investigate, and resolve complaints of discrimination, harassment, sexual misconduct, relationship violence, and stalking that are brought by members of the university community to the attention of a responsible employee, as identified in these procedures.

Members of the university community, including students, trainees, faculty, and staff, and certain third parties (e.g., visitors, volunteers, vendors, and contractors while on university property, participating in a university-sponsored activity, or providing services to the university, or applicants for admission to, or employment with the University, or former affiliates of the university) may bring complaints of violations of the university’s Anti-Harassment Policy, Policy Against Sexual Harassment and Sexual Violence, Sexual Assault, Relationship Violence and Stalking Policy under these procedures. All academic and administrative units of the university, including all divisions, schools, campuses, departments, and centers, must comply with and ensure that their policies and procedures comply with these procedures. To the extent there is any inconsistency between written unit procedures and these procedures, these procedures control. For more information, please refer to web.jhu.edu/administration/jhuoie/equity_compliance/procedures.html.

Sexual Harassment Prevention and Resolution Policy

Preamble
The Johns Hopkins University is committed to providing its staff, faculty, and students the opportunity to pursue excellence in their academic and professional endeavors. This can only exist when each member of our community is assured an atmosphere of mutual respect, one in which they are judged solely on criteria related to academic or job performance. The university is committed to providing such an environment, free from all forms of harassment and discrimination. Each member of the community is responsible for fostering mutual respect, for being familiar with this policy, and for refraining from conduct that violates this policy. Sexual harassment, whether between people of different sexes or the same sex, is defined to include but is not limited to unwelcome sexual advances, requests for sexual favors, and other behavior of a sexual nature when:

> Submission to such conduct is made implicitly or explicitly a term or condition of an individual’s employment or participation in an educational program

> Submission to or rejection of such conduct by an individual is used as the basis for personnel decisions or for academic evaluation or advancement

> Such conduct has the purpose or effect of unreasonably interfering with an individual’s work or academic performance or creates an intimidating, hostile, or offensive working or educational environment

Fundamental to the university’s purpose is the free and open exchange of ideas. It is not, therefore, the university’s purpose, in promulgating this policy, to inhibit free speech or the free communication of ideas by members of the academic community.

Policy
The university will not tolerate sexual harassment, a form of discrimination, a violation of federal and state law, and a serious violation of university policy. In accordance with its educational mission, the university works to educate its community regarding sexual harassment.

The university encourages reporting of all perceived incidents of sexual harassment, regardless of who the alleged offender may be. Individuals who either believe they have become the victim of sexual harassment or have witnessed sexual harassment should discuss their concerns with the university’s equity compliance director. Complainants are assured that problems of this nature will be treated in a confidential manner, subject to the university’s legal obligation to respond appropriately to any and all allegations of sexual harassment.

The university prohibits acts of reprisal against anyone involved in lodging a complaint of sexual harassment. Conversely, the university considers filing intentionally false reports of sexual harassment a violation of this policy. The university will promptly respond to all complaints of sexual harassment. When necessary, the university will institute disciplinary proceedings against the offending individual, which may result in a range of sanctions,
up to and including termination of university affiliation. Complaints of sexual harassment may be brought to Caroline Laguerre-Brown, vice provost for institutional equity for the university, or Allison J. Boyle, Title IX coordinator and director for equity compliance and education, Wyman 515, 410-516-8075, TTY: dial 711.

University Alcohol and Drug Policy
In keeping with its basic mission, the university recognizes that its primary response to issues of alcohol and drug abuse must be through educational programs, as well as through intervention and treatment efforts. To that end, the university provides appropriate programs and efforts throughout the year. The brochure “Maintaining a Drug-Free Environment: The Hopkins Commitment” is distributed annually to all faculty, students, and staff of Johns Hopkins, and copies are available on request from the offices of the Faculty and Staff Assistance Program, 1101 E. 33rd St., Suite C-100, Baltimore, MD 21218; 443-997-7000; or at the Counseling and Student Development Center located in 3003 N. Charles St., Suite S-200, Baltimore, MD 21218 (near 30th Street in Homewood Apartments); 410-516-8278.

Photography and Film Rights Policy
The Johns Hopkins University reserves the right from time to time to film or take photographs of faculty, staff, and students engaged in teaching, research, clinical practices, and other activities, as well as casual and portrait photography or film. These photographs and films will be used in such publications as catalogs, posters, advertisements, recruitment, and development materials and on the university’s website, for various videos or for distribution to local, state, or national media for promotional purposes. Classes will be photographed only with the permission of the faculty member. Such photographs and film—including digital media—which will be kept in the files and archives of the Johns Hopkins University, will remain available for use by the university without time limitations or restrictions. Faculty, students, and staff are made aware by virtue of this policy that the university reserves the right to alter photography and film for creative purposes. Faculty, students, and staff who do not want their photographs used in the manner(s) described in this policy statement should contact the Office of Communications and Public Affairs. Faculty and students are advised that persons in public places are deemed by law to have no expectation of privacy and are subject to being photographed by third parties. The Johns Hopkins University has no control over the use of photographs or film taken by third parties, including without limitation the news media covering university activities.

Principles for Ensuring Equity, Civility, and Respect for All
The Johns Hopkins University is a leader in research, patient care, and education. Our vision is to continue that leadership by ensuring a university culture that is without illegal discrimination and embraces both equity and diversity. We value all members of our community and their contributions to our mission. We demonstrate that value by ensuring that:

> The Johns Hopkins University is an environment in which all people behave in a manner that engenders mutual respect, treating each other with courtesy and civility regardless of position or status in the academy. Rude, disrespectful behavior is unwelcome and will not be tolerated.

> Our community is one where we demonstrate respect for each other, we accept our individual differences, and we provide opportunities for everyone to maximize his or her potential. Every member of our community will be held accountable for creating a welcoming workplace for all.

> Paths to leadership are clear so that opportunities are not blocked artificially. Leadership positions are filled from inclusive candidate pools established by casting wide nets in nontraditional ways. We will not tolerate exclusion based on gender, marital status, pregnancy, race, color, ethnicity, national origin, age, disability, religion, sexual orientation, gender identity, or expression.

> Salary equity is reviewed on a regular basis. We compensate our employees for the job they do in a manner that is equitable and rewards excellence in performance. We will not pay lower salaries to women and people of color simply because they are women and people of color.

> We support work/life balance by encouraging flexibility in the workplace, establishing supportive human resource policies and practices, and providing employee benefits that encourage healthy work- and lifestyles. We will not sacrifice the health of our employees and their families in the pursuit of excellence.

> We hold our community and its individual members accountable for accomplishing these goals.
Economic analysis is no longer relegated to academicians and a small number of PhD-trained specialists. Instead, economics has become an increasingly ubiquitous and rapidly changing line of inquiry that requires people who are skilled in analyzing and interpreting economic data, and then using it to effect decisions about national and global markets and policy involving everything from health care to fiscal policy, from foreign aid to the environment, and from financial risk to real risk.

The Master of Science in Applied Economics develops skills in economic reasoning and in constructing and estimating economic models through the use of econometrics and other quantitative techniques. This is accomplished by a rigorous and demanding curriculum and a talented and dedicated staff of instructors. This is a 10-course degree program, with classes offered in the evenings at the Washington, DC Center of the Johns Hopkins University (near Dupont Circle) and online. The degree can be pursued at a part-time or a full-time pace, on-site or online, or in both modes. All undergraduate majors are welcome. Admissions are rolling; thus one can begin in summer, fall, or spring semesters.

> Take four core courses (Microeconomic Theory, Macroeconomic Theory, Statistics, and Econometrics).
> Choose at least one advanced econometrics course (Microeconometrics or Macroeconometrics).
> Choose five electives from 31 courses spanning diverse subfields of economics.

**ILLUSTRATIVE CURRICULA**

Applied Economics students tailor their own course of study and can pursue any of the following areas, or mix and match:

**Public Policy** *(on-site only)*
For contributing to any level of government policy formulation and policymaking. Choose from among a rich variety of electives: Economics of Industry and Public Policy, Public Economics, Economics of Health Care, Environmental and Resource Economics, Economics of the Labor Market, Law and Economics, and Political Economy. Cost-Benefit Analysis provides conceptual and quantitative tools essential for contemporary microeconomic policy formulation and evaluation. Both Microeconometrics and Macroeconometrics are germane to the subject, as is Survey Research Methods. Computable General Equilibrium Modeling builds a powerful tool with widespread use in the analysis of taxation, income distribution, and environmental matters.

**Financial Economics and the Macroeconomy** *(on-site and online)*
These are two strongly complementary subjects, and we have a rich set of offerings: Financial Economics lays the foundation for the intertemporal and interstitial (risk) microeconomic analysis, and Financial Intermediation & Financial Markets considers how existing institutions cope with both. Monetary Economics, International Finance (Open Economy Macro), and Economic Growth treat the economic aggregates, while Topics in Macroeconomics and Finance or Finance and the Macroeconomy additionally provide perspective. Further depth is gained through Economics of Derivatives, Economic of Investments & Financial Management, and Behavioral Economics and Finance. Quantitative tools are found in Macroeconometrics, Financial Econometrics, and Macroeconomic Forecasting. Economics of the Labor Market complements Macroeconomics.

**International Economics and Development** *(on-site only)*
For gaining an analytical and quantitative perspective on global matters. Substantive courses include International Finance, International Trade, Development Microeconomics, and Economic Growth. Here too, Cost-Benefit Analysis provides essential conceptual and quantitative tools. Microeconometrics and/or Macroeconometrics, as well as Survey Research Methods, further develop the corresponding quantitative skills. Computable General Equilibrium Modeling builds a powerful tool with widespread applicability in this field. A student can round out the subject in-house.

**Spatial Economics** *(online only)*
For contributing to local economic policy analysis and policymaking. Students choose Regional Economics and
Urban Economics from the Applied Economics Program, and Geographic Information Systems (GIS) and Spatial Analysis from the GIS Program. The MS degree can be earned fully online by students pursuing this subject.

**Environmental Economics (on-site and online)**
For contributing to efficient policy. Students take Environmental and Resource Economics, Cost-Benefit Analysis, and Microeconomics and/or Macroeconomics in the Applied Economics Program. Computable General Equilibrium Modeling builds a powerful tool with widespread use in the field. Up to two courses from the in-house Environmental Science and Policy, Energy and Climate Change, or Geographic Information Systems programs, some of which are available online, can count toward the electives in our program, as can courses from the Johns Hopkins Engineering for Professionals’ Environmental Planning and Management Program, most of which are available online. The MS degree can be earned fully online by students pursuing this subject.

**Health Economics (on-site and online)**
Brings to bear the tools of economics in this burgeoning field. Students take Economics of Health Care, Cost-Benefit Analysis, and Microeconomics in the Applied Economics Program, and choose four or eight credits (equivalent of up to two of our courses) from science, specialized quantitative, and policy courses in the part-time Master of Public Health Program at the Bloomberg School, offered online. The MS Degree can be earned fully online by students pursuing this subject.

**ADMISSION REQUIREMENTS**
In addition to the materials and credentials required for all programs, the Master of Science in Applied Economics also requires:

- A grade-point average of at least 3.0 on a 4.0 scale in undergraduate and prior graduate studies
- One semester of introductory microeconomics, passed with at least a B
- One semester of introductory macroeconomics, passed with at least a B
- One semester of undergraduate calculus or equivalent, passed with at least a B

A grade in a higher level course trumps a grade in a lower level course. A B grade or higher upon repeat is not acceptable.

**Application Documents**
- AAP application and fee
- An official undergraduate transcript, and all graduate transcripts, if any
- A one-page résumé and a statement of purpose not exceeding 250 words
- Two letters of recommendation from colleagues, previous instructors, supervisors, or others

**F-1 Visa Restrictions**
International students on an F-1 visa must take at least three courses in fall and spring semesters to maintain visa status. Such students may have to take Math Methods for Economists and/or Statistics online before entering the United States, unless waived, and can then commence their studies on-site in any semester. However, they may start in summer semesters if they do not need or have already taken Math Methods.

**COURSE REQUIREMENTS**

- Four core courses (see course descriptions on the following pages)
- Either 440.614 Macroeconometrics (3 credits) OR 440.618 Microeconometrics (3 credits)
- Five other elective courses (see course descriptions)

Courses are offered on-site in Washington, D.C. on weekday evenings. Many courses are additionally available online. For information on exact dates, times, fees, and instructors for any term, students should consult the course schedule available several months prior to the beginning of each term (see advanced.jhu.edu). Courses are open only to students who meet enrollment requirements and satisfy the prerequisites.

**DUAL MS IN APPLIED ECONOMICS/MBA**
To allow students to better exploit the strong complementary nature between business and economics, Carey Business School and the Applied Economics Program have eliminated the overlap between the MS in Applied Economics and the MBA. This enables students to earn both the MS degree and the MBA in fewer courses than if pursued separately. Those interested, should apply to the dual MS in Applied Economics/MBA through Advanced Academic Programs. Current students can submit a Change of Program request. Please see page 13 for more information on that process. Dual degree recipients receive both diplomas upon completion of both programs. Course requirements, which can be pursued simultaneously at both schools, are:

**MS in Applied Economic Requirements**

**Prerequisite Math Requirement**
Those entering with only a single calculus course must first take 440.304 Math Methods for Economists, a noncredit, full-length course, at half tuition, as the first of eight program courses. Those entering with two calculus courses may study the extra material on their own.

- Four core courses:
  - 440.601 Microeconomic Theory (3 credits)
  - 440.602 Macroeconomic Theory (3 credits)
  - 440.605 Statistics (3 credits)
  - 440.606 Econometrics (3 credits)
One advanced econometrics course:

- 440.614 Macroeconometrics (3 credits) OR 440.618 Microeconometrics (3 credits)

Three elective courses.

MBA Requirements — Carey Business School
Courses offered in Washington, DC; Columbia, Maryland; Baltimore, Maryland; and Montgomery County, Maryland. All courses are two credits.

Required Courses:
120.601 Business Communication*
121.610 Negotiation*
131.601 Leadership Ethics Seminar*
132.601 Business Law*
142.620 Leadership in Organizations*
142.730 Strategic Human Capital*
210.620 Accounting and Financial Reporting*
231.620 Corporate Finance*
232.701 Investments*
310.620 Information Systems*
410.620 Marketing Management (4 credits)
520.601 Decision Models*
680.620 Operations Management*

Elective Courses:
Eight two-credit courses: Students may elect a concentration in Finance, Marketing, Management, or Real Estate.

MS IN APPLIED ECONOMICS/
GRADUATE CERTIFICATES IN FINANCE
To allow students to better exploit the strong complementary nature between finance and economics, Carey Business School and the Applied Economics Program have eliminated the overlap between the MS in Applied Economics, the Graduate Certificate in Financial Management, and the Graduate Certificate in Investments. This enables students to earn both the MS degree and a graduate certificate for a total of 15 courses, eight at Applied Economics and seven at Carey. Those interested, should apply to the combined MS in Applied Economics/Graduate Certificate in Financial Management or Graduate Certificate in Investments Program through Advanced Academic Programs. Current students can submit a Change of Program request. Please see page 13 for more information on that process. Dual degree recipients receive both diplomas upon completion of both programs. Course requirements, which can be pursued simultaneously at both schools, are:

MS in Applied Economics
1. 440.601 Microeconomic Theory (3 credits)
2. 440.602 Macroeconomic Theory (3 credits)
3. 440.605 Statistics (3 credits)
4. 440.606 Econometrics (3 credits)
5. 440.618 Microeconometrics (3 credits) OR 440.614 Macroeconometrics (3 credits)

Graduate Certificate in Financial Management
1. 210.610 Accounting & Financial Reporting*
2. 230.620 Financial Modeling and Valuation*
3. 231.620 Corporate Finance*
4. 232.701 Investments*
5. 231.720 Corporate Governance*
6. Carey Finance Elective I
7. Carey Finance Elective II

Graduate Certificate in Investments
1. 210.620 Accounting & Financial Reporting*
2. 231.620 Corporate Finance*
3. 232.701 Investments*
4. 232.720 Fixed Income*
5. 232.710 Derivatives*
6. Carey Finance Elective I
7. Carey Finance Elective II

MS IN APPLIED ECONOMICS/
GRADUATE CERTIFICATE IN ENVIRONMENTAL PLANNING AND MANAGEMENT
To considerably ease the study of environmental matters together with economics, the Applied Economics Program of Advanced Academic Programs and the Environmental Engineering, Science and Management Program of Johns Hopkins Engineering for Professionals are mutually recognizing one of each other’s courses for credit. A student can earn the MS in Applied Economics and the Graduate Certificate in Environmental Planning and Management for a total of 14 courses, nine in Applied Economics, and five in Environmental Planning and Management, instead of the separately required 16. The graduate certificate courses are available online; the MS degree is available evenings near Dupont Circle in Washington, D.C. and on-line.

Students applying to the dual degree program should download the application and submit supporting documents and application fee to Advanced Academic Programs. The admissions department will forward the application to Johns Hopkins Engineering for Professionals. Each program decides on admissions separately.

The courses necessary to earn the two diplomas are:

<table>
<thead>
<tr>
<th>Applied Economics</th>
<th>Course 1</th>
<th>440.601 Microeconomic Theory (3 credits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course 2</td>
<td>440.602 Macroeconomic Theory (3 credits)</td>
<td></td>
</tr>
</tbody>
</table>

*Not an AAP course. Please refer to partner JHU school division for credit information.*
Course 3  440.605  Statistics (3 credits)
Course 4  440.606  Econometrics (3 credits)
Course 5  440.618  Microeconometrics (3 credits) or 440.614  Macroeconometrics (3 credits)
Course 6  440.622  Cost-Benefit Analysis (3 credits)
Course 7  440.650  Environmental & Resource Economics (3 credits)
Course 8  440.6XX  Elective
Course 9  440.6XX  Elective

Environmental Planning and Management

Selection of five 575.xxx courses with adviser approval.
- Credit is given for 440.601 Microeconomic Theory, in lieu of 570.493 Economic Foundations for Public Decision Making.
- Science courses from outside the subfield allowed with adviser approval.

Sample Courses
- Ecology
- Principles of Toxicology, Risk Assessment and Management
- Climate Change and Global Environmental Sustainability
- Air Resources Modeling and Management
- Water Resource Planning
- Environmental Law
- Environmental Impact Assessment
- Environmental Project Management

Courses 10-14

INTERNATIONAL INSTITUTE OF FORECASTERS CERTIFICATE IN FORECASTING PRACTICE

The International Institute of Forecasters (IIF/forecasters.org) has approved two sequences of four of our courses as meeting its requirements for awarding its Certificate in Forecasting Practice. Students who have completed Statistics, Econometrics, Microeconometrics or Macroeconometrics, and Macroeconomic Forecasting with at least a B, and who have participated in an additional minicourse on Forecasting in Organizations, will be eligible for the Certificate in Forecasting Practice. Tuition for the minicourse is $400. Those already holding MS degrees in economics from other institutions can typically have Statistics and Econometrics waived. Nondegree seekers are welcome to apply for the IIF certificate as special students.

POST-ASTER’S CERTIFICATE IN QUANTITATIVE METHODS IN APPLIED ECONOMICS

The four-course Post-Master’s Certificate in Quantitative Methods in Applied Economics is intended for those who already hold a master’s degree in economics or statistics, and who wish to expand or update their knowledge. All courses are offered on-site in the evenings at the Washington, DC Center of the Johns Hopkins University (near Dupont Circle) and online.

Admissions requirements are the same as for our MS in Applied Economics degree plus a master’s degree in economics or statistics. Students lacking prerequisite courses can take them with us, on-site or online. Admissions are rolling; one can begin in the summer, fall, or spring semester.

Choose four of the following eight courses:
- 440.614  Macroeconometrics [Time Series Econometrics] (3 credits)
- 440.615  Macroeconomic Forecasting (3 credits)
- 440.617  Financial Econometrics (3 credits)
- 440.618  Microeconometrics [Panel Data Econometrics] (3 credits)
- 440.619  Real Risk (3 credits)
- 440.622  Cost-Benefit Analysis (3 credits)
- 440.624  Computable General Equilibrium Modeling (3 credits)
- 440.629  Survey Research Methods (3 credits)

COURSE DESCRIPTIONS

Prerequisite Course

**440.304  Math Methods for Economists (3 credits)**
This is a nongraduate-credit, full-length course at half tuition, required of those students who have had only a single course in calculus. It covers those parts of integral calculus, multivariable calculus, optimization theory, and linear algebra, which are necessary to pursue economics. Prerequisite: a course in calculus.

Core Courses

**440.601  Microeconomic Theory (3 credits)**
Prerequisite: AS.440.304, Math Methods for Economists. This course offers a systematic presentation of consumer theory, theory of the firm, and market equilibrium. Topics covered include constrained optimization, preferences and utility, exchange, production, pricing, market structures, and welfare economics.

**440.602  Macroeconomic Theory (3 credits)**
Prerequisite: AS.440.304, Math Methods for Economists. This course provides a systematic overview of the theory of aggregate output and employment, the rate of interest, and price level determination. Coverage includes the theories of
consumption and investment, the demand and supply of money, inflation, unemployment, and economic growth. These topics are discussed in the context of contemporary empirical work on aggregative relationships.

440.605 Statistics (3 credits)
This course provides a general survey of statistical methodology. Topics include probability and sampling, distribution theory, hypothesis testing, estimation (maximum likelihood and method of moments), and analysis of variance. It is also designed to provide the requisite background for 440.606 Econometrics. Prerequisite: a course in calculus.

440.606 Econometrics (3 credits)
This course focuses on the application of statistical methods to the testing and estimation of economic relationships. After developing the theoretical constructs of classical least squares, common problems encountered when applying this approach, including serial correlation, heteroscedasticity, and multicollinearity, are discussed. Techniques for dealing with these problems are then examined. Models with lagged variables are considered, as is estimation with instrumental variables and two-stage least squares. Prerequisites: 440.605 Statistics.

Workshops
440.011 Forecasting in Organizations (3 credits)
This course is required to earn the International Institute of Forecasters Certificate in Forecasting Practice. This is a noncredit minicourse, equivalent to a single class meeting but with more homework. It is typically offered during the January Intersession and May Intensive periods. Prerequisites: 440.615 Macroeconomic Forecasting and 440.614 Macroeconometrics or 440.618 Microeconometrics.

440.021 Practicum in Applied Economics (3 credits)
Internships or external projects applicable to the program curriculum qualify for the course. Permission of the student's adviser and of the program director is required before adding this course.

Electives – Quantitative Methods
440.614 Macroeconometrics (3 credits)
This course focuses on the practical uses of time series econometrics in a macroeconomic context. The topics covered include autoregressive-moving average processes, nonstationary time series models, unit root tests, vector autoregression models, and cointegration analysis. Prerequisites: 440.602 Macroeconomic Theory; 440.606 Econometrics.

440.615 Macroeconomic Forecasting (3 credits)
This course examines econometric approaches to forecasting macroeconomic activity. The approaches covered span single-equation time series to large, complex, simultaneous equations systems. Different measures to assess the forecasting accuracy of these approaches are addressed. A discussion of these approaches and their relevance for policy recommendations is also covered. Prerequisites: 440.602 Macroeconomic Theory; 440.606 Econometrics.

440.617 Financial Econometrics (3 credits)
This course introduces students to the methods most commonly used in empirical finance. Key models and methods are ARCH, GMM, regime-switching models, test of CAPM, term structure models, and volatility models (implied, stochastic volatility). Students will also learn aspects of time series econometrics for both stationary and nonstationary variables at different time frequencies, with emphasis on financial variables. Prerequisites: 440.601 Microeconomic Theory and 440.606 Econometrics; 440.614 Macroeconometrics is recommended.

440.616 Bayesian Econometrics (3 credits)
The main goal of this course is to provide the students the alternative viewpoint of the Bayesian approach vis-à-vis the classical econometric approach based on the frequentist perspective. The course will present the basic principles of Bayesian inference, Bayesian Analysis of the linear regression model and extensions of the regression model, and the numerical methods used for Bayesian implementation. Modern Bayesian econometrics relies heavily on numerical simulation methods and computational algorithms. With the advancement of computing power and the advent of new simulation methods, simulation based Bayesian methods have become increasingly popular in practice with a large and growing number of applications. A significant part of the course will be devoted to explaining and demonstrating how numerical Bayesian methods, particularly, Markov Chain Monte Carlo (MCMC) methods, such as the Gibbs sampling and the Metropolis-Hastings algorithm, can be applied to estimate various interesting models in economics and finance. Students will develop practical experience with posterior simulation through hands on computer exercises involving computer programming. Prerequisites: 440.601 Microeconomic Theory, 440.606 Econometrics.

440.617 Financial Econometrics (3 credits)
This course introduces students to the methods most commonly used in empirical finance. Key models and methods are ARCH, GMM, regime-switching models, test of CAPM, term structure models, and volatility models (implied, stochastic volatility). Students will also learn aspects of time series econometrics for both stationary and nonstationary variables at different time frequencies, with emphasis on financial variables. Prerequisites: 440.601 Microeconomic Theory and 440.606 Econometrics; 440.614 Macroeconometrics is recommended.

440.618 Microeconometrics (1 credits)
This course covers a number of advanced techniques frequently encountered in applied microeconometric analysis. Topics include generalized method of moments estimation, nonlinear regression, estimation with panel data, systems of regression equations and simultaneous equation models, maximum likelihood estimation and likelihood ratio tests, and limited dependent variable analysis (i.e. logit, probit, tobit, etc.). Prerequisites: 440.601 Microeconomic Theory; 440.606 Econometrics.
440.619 Real Risk (3 credits)
This course presents an alternative view of risk that emphasizes the probabilistic nature of external events that affect economic actors. Students will learn the theory and practice of probabilistic risk analysis to solve four classes of problems: portfolio allocation (as an introduction), early warning, risk index construction, and real options. We will leverage some familiar and some new analytic tools, including decision trees, Bayesian networks, fault trees, Markov processes, convex optimization, and Monte Carlo simulation. Prerequisites: 440.601 Microeconomic Theory and 440.605 Statistics. Corequisite: 440.606 Econometrics. 440.640 Financial Economics is recommended but not required.

440.622 Cost-Benefit Analysis (3 credits)
The objective of this course is to develop and apply an analytical framework for evaluating projects with an emphasis on publicly funded projects. Coverage includes the evaluation of benefits and costs over time, including in the presence of uncertainty, in the absence of market prices, and when income distribution objectives need to be incorporated into a project's evaluation. Prerequisites 440.601 Microeconomic Theory. Corequisite: 440.606 Econometrics.

440.624 Computable General Equilibrium Modeling (3 credits)
This course will provide an understanding of how to independently develop, modify, run, and interpret computable general equilibrium models. CGE models are widely used in the analysis of international trade, taxation, environmental policy, and other subjects. The specific objectives of this course are as follows: Students will (1) gain an understanding of the underlying economic theory behind CGE modeling, (2) learn how to gather data sources from publicly available information to build CGE models, (3) gain an understanding of the software General Algebraic Modeling Software (GAMS) to run the models, (4) learn how use and modify existing CGE programs for research purposes, (5) be able to write simple CGE programs in GAMS, (6) be able to analyze public policy with CGE models, (7) how to interpret results from CGE models, and (8) understand possible extensions of CGE models for potential future research purposes. Analytical skills developed through this class will assist you in building your careers as researchers, public managers, and policy analysts. Prerequisites: 440.601 Microeconomic Theory. Corequisite: 440.606 Econometrics.

440.630 Monetary Economics (3 credits)
Among the topics covered in this course are money demand and money supply, inflation and the optimal quantity of money, the monetary policy transmission mechanism, the term structure of interest rates, strategies of monetary policy and optimal monetary policy, the time inconsistency problem in monetary policy, and monetary policy targets and rules. For each topic covered, the theory, policy relevance, and empirical evidence are presented and discussed. Prerequisites: 440.601 Microeconomic Theory, 440.602 Macroeconomic Theory, 440.606 Econometrics.

440.631 Finance and the Macroeconomy (3 credits)
This course explores the role of the financial sector in the overall macroeconomy. It begins by reviewing various financial instruments and markets, with a focus on their economic function. The course then examines the challenges to monetary and fiscal policy that arise because of macrofinancial linkages. Further, a number of analytical tools for assessing financial stability and vulnerabilities to macroshocks are presented. Several case studies are used to illustrate real-world situations facing policymakers. Prerequisites: 440.601 Microeconomic Theory, 440.602 Macroeconomic Theory, Corequisites: 440.606 Econometrics; 440.640 Financial Economics, or equivalent.

440.632 Topics in Macroeconomics and Finance (3 credits)
This course aims to develop a better understanding of the linkages between the banking system and the broader macroeconomy. Particular attention will be paid to the role of banks and the banking system in propagating and perpetuating the recent financial crisis. Specific topics include the functioning of the banking system in a basic general equilibrium macro model, the Diamond-Dybvig model of bank runs; an empirical look into the economic cost of banking crises, central bank intervention in the face of a banking failure, the link between sovereign debt and the banking system, and the European debt crisis and the response of the ECB. Prerequisites: 440.601 Microeconomic Theory, 440.602 Macroeconomic Theory. Corequisites: 440.606 Econometrics; 440.640 Financial Economics.

440.634 Economic Growth (3 credits)
Examines contemporary theories of economic growth and empirically applies them to panels of present-day developing and industrialized countries, and to the historical evolution of individual countries and groups of countries. Topics include neoclassical growth models, population and growth, the economics of ideas, endogenous growth models, and policy and growth. Prerequisites: 440.601 Microeconomic Theory, 440.602 Macroeconomic Theory. Corequisite: 440.606 Econometrics.

440.639 International Finance (Open Economy Macro) (3 credits)
This course provides an overview of open economy macroeconomics and international financial markets and policies. The focus is on exchange rate determination, the importance of the balance of payments for both the domestic economy and the economies of other countries, international
Electives – Financial Economics

**440.640 Financial Economics** (3 credits)

Finance treats the transfer of resources across time and the transfer of risk among economic entities. The aim of this course is to develop the microeconomic theory relevant to these types of transactions. A set of underlying economic principles is applied to the determination of the value of basic financial instruments, such as stocks and bonds, as well as to more complicated derivative securities, such as futures and options. Valuation concepts, in turn, allow for the analysis of various issues of interest to policymakers as well as portfolio managers and investors, such as the term structure of interest rates, portfolio theory, the capital structure of the firm, and risk management. Prerequisite: 440.601 Microeconomic Theory. Corequisite: 440.606 Econometrics.

**440.641 Financial Intermediation & Financial Markets** (3 credits)

Examines why financial intermediaries exist, how they co-exist with financial markets, and how they have been forced to switch from accepting deposits and making loans to using derivatives to manage risk. Shows how risk management differs between bank-based and market-based economies. Analyzes the economic consequences of financial market imperfections, especially for credit market equilibrium and rationing; theories of bank runs and systemic risk; and how different financial systems and governments cope with financial crises, financial fragility, and credit market frictions. Prerequisite: 440.601 Microeconomic Theory and Policy. Corequisite: 440.606 Econometrics.

**440.643 Economics of Investments & Financial Management** (3 credits)

This course develops a deeper understanding of financial markets in the context of portfolio theory. In addition to understanding how financial markets operate and relate to the broader economy, students will develop skills to analyze investment decisions and manage investment portfolios. Students will learn the efficient market hypothesis (EMH), criticisms and implications of EMH for investment strategies, modern portfolio theory and practice, and tools for evaluating performance. Throughout the course, several financial models will be analyzed especially as they relate to real-world asset allocation decisions. Prerequisite: 440.601 Microeconomic Theory. Corequisites: 440.606 Econometrics and 440.640 Financial Economics.

**440.645 Behavioral Economics & Finance** (3 credits)

This course treats key topics in behavioral economics and finance. Class time will be divided between lecture and discussion of assigned readings. The first half of the course will focus on behavioral economics, exploring theory, experimental tests, and empirical results that call into question the rational paradigm. The second half of the course will focus on applications in financial economics, including investor behavior, asset pricing, and corporate finance. Prerequisite: 440.601 Microeconomic Theory and Policy. Corequisite: 440.606 Econometrics.

**440.646 Economics of Derivatives** (3 credits)

This course provides students a thorough introduction to the theoretical and practical aspects of forwards, futures, options, and swaps. Derivatives are important tools in financial markets, and students will learn how to price, value, and use them from a practical perspective. This course is particularly important for students seeking to work in finance. Topics covered include no arbitrage-based pricing, the pricing of forwards and futures, interest rate products and commodities, valuation based on market prices, and option pricing and strategies. Prerequisite: 440.601 Microeconomic Theory. Corequisites: 440.606 Econometrics and 440.640 Financial Economics.

Electives – Applied Microeconomics

**440.650 Environmental & Resource Economics** (3 credits)

Beginning with the concept of sustainability, the course develops a framework for an economic assessment of environmental problems, including the notion of market failure, valuation of environmental resources, and policy design issues associated with using alternative economic incentives and instruments. The second part of the course examines principles of the economically efficient management of nondepletable and depletable (e.g., fossil fuels, natural ecosystems) resources. Various applied settings are used to demonstrate the principles developed in the course. Prerequisite: 440.601 Microeconomic Theory. Corequisite: 440.606 Econometrics.

**440.653 Economics of the Labor Market** (3 credits)

This course develops the theory and empirics of labor markets by focusing on several leading institutional structures of both labor supply and labor demand. This theory is then applied to issues such as wage determination, wage rigidity, training and retraining programs, and the skills and wage distribution, as well as government policies that correct inefficiencies in labor markets. Prerequisites 440.601 Microeconomic Theory and 440.602 Macroeconomic Theory. Corequisite: 440.606 Econometrics.

**440.656 Political Economy** (3 credits)

This course examines how rational choice methodology (including game theory and neoclassical economics) can be applied to analyze issues related to political economy. Topics include the origin of state, economic origins of political regimes, different models of voting and their outcomes, and different aspects of federalism. This course also explores how political economy influences economic development and public debt. Prerequisite: 440.601 Microeconomic Theory. Corequisite: 440.606 Econometrics.

**440.658 Industrial Organization** (3 credits)

In this course, the focus is on the study of markets and the laws and regulations used to ameliorate some of their imperfections, especially the problems caused by market structure and market
power. Many economic models used to explain how markets work and what is necessary for market power to exist are investigated. Subsequently, the course explores how regulators and private litigants try to eliminate or control market power, particularly through antitrust law, with respect to price fixing, mergers, and market dominance. Regulatory issues pertaining to such industries as telecommunication, transportation, electrical power, health, safety, and the environment are covered. Prerequisite: 440.601 Microeconomic Theory. Corequisite: 440.606 Econometrics.

440.659 Law and Economics (3 credits)
Techniques of microeconomic theory and game theory are applied to analyze the effects of various laws on individual decisions and on the allocation of resources. Subject areas covered include the theory of public choice, the economics of property rights, contract law, and tort law. Topics include the efficient breach of contract, the determination of damages, the economics of patents and copyrights, optimal liability rules for environmental and other torts, economics of family law, bankruptcy law, zoning law, antitrust law, and the legal process. Prerequisite: 440.601 Microeconomic Theory. Corequisite: 440.606 Econometrics.

440.661 Public Economics (3 credits)
This course analyzes the determinants and properties of government expenditures and social regulation. The first part of the course is generic: It addresses efficiency and equity in income redistribution; the provision of public goods; coping with externalities, addiction and risk; voting and bureaucracy; and taxation. The second part of the course is particular: It examines health policy, education policy, statutory pensions, and welfare policy in a comparative international context. Prerequisites: 440.601 Microeconomic Theory, 440.602 Macroeconomic Theory. Corequisite: 440.606 Econometrics.

440.663 Development Microeconomics (3 credits)
This course analyzes the constraints on households and policymakers in developing countries using econometric tools. Empirical microeconomic studies of behavior and policy outcomes under different types of market failures are drawn upon. Topics include inter alia inequality, fertility, education, health, poverty, nutrition, and failures in land, labor, credit, and insurance markets. Prerequisite: 440.601 Microeconomic Theory. Corequisite: 440.606 Econometrics.

440.665 International Trade (Open Economy Micro) (3 credits)
The first part of the course examines the causes of trade, the sources of the gains from trade, and the domestic and international distribution of those gains. In addition, it introduces the politico-economic causes of trade policy and addresses the theory and empirics of trade and growth. The second part examines in detail the instruments and consequences of trade policy, namely tariffs and quantitative restrictions, and their contemporary manifestation as anti-dumping and safeguard measures. The causes and consequences of trade policy, too, are linked to recently developed empirical evidence. Prerequisites: 440.601 Microeconomic Theory, 440.602 Macroeconomic Theory. Corequisite: 440.606 Econometrics.

440.666 Regional Economics (3 credits)
Regional economics is a relatively new formal branch of economics that recognizes the crucial importance of geography in the workings of a market economy. By incorporating variables of space and geography into traditional economic models, it has great relevance to real-world phenomena and policy questions. We examine the effects of market forces on spatial variables, such as the location choices of households and firms, land use policy, labor market agglomeration, urban poverty, the development of transportation infrastructure, and urban and rural housing markets. The roles of natural resources, demographic base, location of industries, and factors determining regional growth and development will also be considered. Prerequisite: 440.601 Microeconomic Theory. Corequisite: 440.606 Econometrics.

440.667 Urban Economics (3 credits)
In this course, we develop a framework to analyze how cities operate and how to improve them. In the first part of the course, we will address basic questions about cities: Why do cities exist? What makes some cities more costly than others? What determines housing prices? In the second part of the course, we will study specialized topics, including residential segregation, economic development programs, cities and the environment, and suburbanization. Prerequisite: 440.601 Microeconomic Theory. Corequisite: 440.606 Econometrics.

440.672 Economics of Health Care (3 credits)
This course explores the economics of the health care system in the United States by examining the demand for health care services, the behavior of health care providers, the influence of government policies, and the relationship between health care services, the behavior of health care providers, the influence of government policies, and the relationship between health care services and population health levels. Established health care systems and their potential for change in both the United States and other countries are considered in the context of current policy concerns. Prerequisites: 440.601 Microeconomic Theory, 440.606 Econometrics.

Electives – Analytical Methods
440.684 Game Theory (3 credits)
Game theory is a mathematical tool developed for the purpose of understanding not only the interaction of economic market participants, but also observed social phenomena as well. This course provides an introduction to game theory with applications to economics. Moreover, the course presents an approach to modeling a social situation as a game and develops techniques for solving the game in order to gain insight into individual behavior. Topics include repeated games, games with incomplete information, and the experimental testing of hypotheses. Prerequisite: 440.601 Microeconomic Theory.
Center for Biotechnology Education
Graduate Programs, Professional Development, Youth Programs

biotechnology.jhu.edu

The Center for Biotechnology Education, established in 2010, expands the scope of biotechnology education at home and abroad to build a pipeline of students and professionals ready to succeed in graduate school, K-12 education, and the work environment in the fields of biotechnology, bioinformatics, regulatory science, and bioscience business and leadership. The mission of the Center for Biotechnology Education is to increase public awareness and understanding of biotechnology, inform educators of the resources and programs available locally and nationally, become a resource center for biotechnology information, coordinate training workshops for students and professionals, and secure funds in support of biotechnology training and education locally, nationally, and internationally. The goals of the center are to develop partnerships with industry and government organizations to provide community outreach, professional development educational opportunities, workshops, research symposia, and lecture series for academia, industry, and the general public.

Biotechnology, the application of biological systems to solve problems or make useful products, continues to expand with new discoveries and lifesaving products at a breathtaking pace. The biotechnology industry harnesses advances in microbiology, cell biology, molecular biology, genomics, and proteomics to move discoveries and ideas out of the laboratory and into the product development pipeline. This dynamic field demands a multidisciplinary workforce skilled in basic research, drug discovery technologies, bioinformatics, regulatory affairs, and product commercialization.

Johns Hopkins University offers students the ability to learn, advance, and succeed in this exciting field, with a variety of learning opportunities designed to meet the needs of working adults. Classes may be taken at two regional campuses: Rockville and Baltimore, Maryland, and in our cyber campus for our online courses. Students may choose from six different degree options and four certificates offered through the center’s graduate studies programs:

- Master of Science in Bioinformatics (a joint offering of the Krieger School of Arts and Sciences and Whiting School of Engineering)
- Master of Science in Biotechnology
- Master of Science in Biotechnology, with a concentration in biodefense and Certificate in National Security Studies
- Master of Science in Biotechnology/MBA (a dual degree program offered with Carey Business School)
- Master of Biotechnology Enterprise and Entrepreneurship
- Master of Science in Food Safety Regulation
- Master of Science in Individualized Genomics and Health*
- Master of Science in Regulatory Science
- Certificate in Biotechnology Education
- Certificate in Biotechnology Enterprise
- Post-Master’s Certificate in Sequence Analysis and Genomics

*Pending MHEC endorsement

PROGRAM COMMITTEE

Bertrand Garcia-Moreno
Professor; Chair, Center for Biotechnology Education

Kristina Obom
Program Director, Individualized Genomics and Health, Biotechnology; Center Director, Center for Biotechnology Education, Senior Lecturer

Patrick Cummings
Program Director, Biotechnology, Senior Lecturer

Lynn Johnson Langer
Program Director, Enterprise and Regulatory Science, Senior Lecturer

Alexandra Tan
Program Director, Health Science Intensive, Senior Lecturer

Robert Lessick
Associate Program Director, Bioinformatics Senior Lecturer

Thomas E. Colonna
Associate Program Director, Regulatory Science and Food Safety Regulation, Senior Lecturer

FULL-TIME FACULTY AND STAFF

Jonathan Helfgott
Lecturer and Coordinator, Regulatory Science

Beatrice Kondo
Lecturer and Coordinator, Biotechnology, Post-Master’s Certificate in Sequence Analysis and Genomics

Thomas Koval
Senior Lecturer

Sherry Ogg
Senior Lecturer

Meredith Safford
Senior Lecturer and Coordinator, Biotechnology

Olivia Spicer
Lecturer and Coordinator, Biotechnology

Emil Wang
Senior Lecturer and Coordinator, Regulatory Science

Katherine Wellman
Senior Lecturer and Coordinator, Biotechnology Enterprise and Entrepreneurship

Karen Wells
Senior Lecturer
Master of Science in Bioinformatics
Joint Offering with the Whiting School of Engineering for Professionals

bioinformatics.jhu.edu

Johns Hopkins University offers an innovative graduate program that prepares professionals for success in bioinformatics. Drawing from the strengths of the Krieger School of Arts and Sciences and the Whiting School of Engineering, this program fully integrates the computer science, bioscience, and bioinformatics needed to pursue a career in this dynamic field.

Students take 11 courses to complete the degree—five core courses, four concentration courses, an elective from bioscience, and an elective from computer science. After completion of the core and concentration courses, students may choose an independent study project (optional). Students have up to five years to complete the program.

This program is designed for working adults. All classes are offered in the evening, on Saturdays or online. Please note that not every course is available at all on-site locations. The degree can be completed fully online. Some courses are offered at the Montgomery County campus and the Homewood campus.

MS in Bioinformatics with Thesis Option

Students interested in pursuing the MS in Bioinformatics with the thesis are required to take 12 courses. The thesis requires a two-semester research project. Students complete 410.800 Independent Research Project (Biotechnology) first and 410.801 Biotechnology Thesis the following semester. Students interested in this option should consult with the program adviser.

ADMISSION REQUIREMENTS

Credentials and Prerequisite Courses

- An undergraduate degree in the biological sciences or in engineering with at least a 3.0 on a 4.0 scale. All the prerequisites listed below can be taken from the existing Master of Science in Computer Science or the Master of Science in Biotechnology program. Students who have not completed all the prerequisites may be admitted provisionally to complete the admission requirements.
- Two semesters of organic chemistry (or 410.302 Bio-Organic Chemistry)
- One semester of biochemistry (or 410.601 Biochemistry)
- Introduction to programming using Java, C++, or C (or 605.201 Introduction to Programming Using Java)
- Data structures (or 605.202 Data Structures)
- One course in probability and statistics (or 410.645 Biostatistics)
- Calculus
- The admissions committee reserves the right to request additional information from applicants, such as GRE or letters of recommendation, if needed, to assess their candidacy for admission.

Application Documents

- AAP application and fee
- A résumé or curriculum vitae
- Official undergraduate transcript
- 500-word statement of purpose
- TOEFL score for international students (minimum score on Internet-based test is 100)
Admission Status
Please see Student Status for descriptions and criteria of the different categories of student status.

COURSE REQUIREMENTS

Core Courses

Five total
410.602 Molecular Biology (4 credits)
410.610 Epigenetics, Gene Organization & Expression (4 credits)
410.633 Introduction to Bioinformatics (4 credits) OR
605.452 Biological Databases and Database Tools*
410.634 Practical Computer Concepts for Bioinformatics (4 credits) OR
605.441 Principles of Database Systems*
605.421 Foundations of Algorithms OR
605.420 Algorithms for Bioinformatics*

Concentration Courses

Choose four
410.635 Bioinformatics: Tools for Genome Analysis (4 credits)
410.639 Protein Bioinformatics (4 credits)
410.640 Molecular Phylogenetic Techniques (4 credits)
410.661 Methods in Proteomics (4 credits)
410.666 Next Generation DNA Sequencing and Analysis (4 credits)
410.671 Gene Expression Data Analysis and Visualization (4 credits)
410.698 Bioperl (4 credits)
410.712 Advanced Practical Computer Concepts for Bioinformatics (4 credits)
410.713 Advanced Genomics and Genetic Analysis (4 credits)
410.734 Practical Introduction to Metagenomics (4 credits)
410.736 Genomic and Personalized Medicine (4 credits)
605.443 Linked Data and the Semantic Web*
605.451 Principles Bioinformatics*
605.453 Computational Genomics*
605.456 Computational Drug Discovery and Development*
605.457 Statistics for Bioinformatics*
605.716 Modeling and Simulation of Complex Systems*
605.751 Computational Aspects of Molecular Structure*
605.754 Analysis of Gene Expression and High-Content Biological Data*
605.755 Systems Biology*

Electives

Choose one from Computer Science and one from Biotechnology

Computer Science

605.401 Foundations of Software Engineering*
605.444 XML Design Paradigms*
605.462 Data Visualization*
605.481 Principles of Enterprise Web Development*
605.484 Agile Development with Ruby on Rails*
605.486 Mobile Application Development for the Android Platform*
605.701 Software Systems Engineering*
605.741 Large Scale Database Systems*
605.746 Machine Learning*
605.747 Evolutionary Computation*
605.759 Independent Research Project in Bioinformatics*
605.782 Web Applications Development with Java*
605.787 Rich Internet Applications with Ajax*
605.788 Big Data Processing Using Hadoop*

Biotechnology

410.603 Advanced Cell Biology I (4 credits)
410.604 Advanced Cell Biology II (4 credits)
410.612 Human Molecular Genetics (4 credits)
410.613 Principles of Immunology (4 credits)
410.615 Microbiology (4 credits)
410.616 Virology (4 credits)
410.622 Molecular Basis of Pharmacology (4 credits)
410.629 Genes & Disease (4 credits)
410.630 Gene Therapy (4 credits)
410.632 Emerging Infectious Diseases (4 credits)
410.638 Cancer Biology (4 credits)
410.641 Clinical & Molecular Diagnostics (4 credits)
410.648 Clinical Trial Design and Conduct (4 credits)
410.656 Recombinant DNA Laboratory (4 credits)
410.752 High Throughput Screening & Automation Laboratory (4 credits)
410.800 Independent Research Project in Biotechnology (4 credits)

ENGINEERING FOR PROFESSIONALS

COURSE DESCRIPTIONS

See “Biotechnology Studies Course Descriptions” on page 58 for descriptions of 410-courses.

Prerequisites Courses

605.201 Introduction to Programming Using Java*
This course enables students without a background in software development to become proficient programmers who are prepared for a follow-on course in data structures. The Java language will be used to introduce foundations of structured, procedural, and object-oriented programming. Topics include I/O, data types, operators, operands, expressions, conditional statements, iteration, recursion, arrays, functions, parameter passing, and returning values. Students will also be introduced to classes, objects, object references, inheritance, polymorphism, and exception handling. Additional topics include file I/O, searching, sorting, Java Collections, and an introduction to applets. Students will complete several programming assignments to develop their problem-solving skills and to gain experience in detecting and correcting software errors. Prerequisite: one year of college mathematics.
605.202 Data Structures*
This course investigates abstract data types, recursion, algorithms for searching and sorting, and basic algorithm analysis. ADTs to be covered include lists, stacks, queues, priority queues, trees, sets, and dictionaries. The emphasis is on the trade-offs associated with implementing alternative data structures for these ADTs. There will be four or five substantial Java programming assignments. Prerequisites: one year of college mathematics, 605.201 Introduction to Programming Using Java or equivalent.

Core Courses
605.420 Algorithms for Bioinformatics*
This follow-on course to data structures (e.g., 605.202) provides a survey of computer algorithms, examines fundamental techniques in algorithm design and analysis, and develops problem-solving skills required in all programs of study involving computer science. Topics include advanced data structures (red-black and 2-3-4 trees, union-find), algorithm analysis and computational complexity (recurrence relations, big-O notation, introduction to NP completeness), sorting and searching, design paradigms (divide and conquer, greedy heuristic, dynamic programming), and graph algorithms (depth-first and breadth-first search, minimum spanning trees). Advanced topics are selected from among the following: multithreaded algorithms, matrix operations, linear programming, string matching, computational geometry, and approximation algorithms. The course will draw on applications from bioinformatics. This course does not satisfy the foundation course requirement for computer science or cybersecurity. Students cannot earn credit for both 605.420 and 605.421. Prerequisite: 605.202 Data Structures or equivalent. 605.203 Discrete Mathematics or equivalent is recommended.

605.421 Foundations of Algorithms*
This follow-on course to data structures (e.g., 605.202) provides a survey of computer algorithms, examines fundamental techniques in algorithm design and analysis, and develops problem-solving skills required in all programs of study involving computer science. Topics include advanced data structures (red-black and 2-3-4 trees, union-find), recursion and mathematical induction, algorithm analysis and computational complexity (recurrence relations, big-O notation, NP-completeness), sorting and searching, design paradigms (divide and conquer, greedy heuristic, dynamic programming, amortized analysis), and graph algorithms (depth-first and breadth-first search, connectivity, minimum spanning trees, network flow). Advanced topics are selected from among the following: randomized algorithms, information retrieval, string and pattern matching, and computational geometry. Prerequisite: 605.202 Data Structures or equivalent. 605.203 Discrete Mathematics or equivalent is recommended.

605.441 Principles of Database Systems*
This course examines the underlying concepts and theory of database management systems. Topics include database system architectures, data models, query languages, conceptual and logical database design, physical organization, and transaction management. The entity-relationship model and relational model are investigated in detail, object-oriented databases are introduced, and legacy systems based on the network and hierarchical models are briefly described. Mappings from the conceptual level to the logical level, integrity constraints, dependencies, and normalization are studied as a basis for formal design. Theoretical languages, such as the relational algebra and the relational calculus, are described, and high-level languages, such as SQL and QBE, are discussed. An overview of file organization and access methods is provided as a basis for discussion of heuristic query optimization techniques. Finally, transaction-processing techniques are presented, with a specific emphasis on concurrency control and database recovery.

605.452 Biological Databases and Database Tools*
The sequencing of the human genome and intense interest in proteomics and molecular structure have resulted in an explosive need for biological databases. This course surveys a wide range of biological databases and their access tools and enables students to develop proficiency in their use. Databases introduced include genome and sequence databases, such as GenBank and Ensemble, as well as protein databases, such as PDB and SWISS-PROT. Tools for accessing and manipulating sequence databases, such as BLAST, multiple alignment, Perl, and gene-finding tools, are covered. Specialized databases such as KEGG and HapMap, are surveyed for their design and use. The course also focuses on the design of biological databases and examines issues related to heterogeneity, interoperability, complex data structures, object orientation, and tool integration. Students will create their own small database as a course project and will complete homework assignments using biological databases and database tools. Prerequisite: 605.205 Molecular Biology for Computer Scientists or equivalent. 605.441 Principles of Database Systems or 410.634 Practical Computer Concepts for Bioinformatics recommended.

Concentration Courses
605.443 Linked Data and the Semantic Web*
The World Wide Web Consortium (W3C) is endeavoring to create standards and technology that support a distributed “Web of data.” Collectively, these advances allow the systems we develop to work and interact more effectively, through the use of XML-based languages, and information on how various tags relate to real-world objects and concepts. This course covers a range of Semantic Web technologies, including RDF (Resource Description Framework - a model for data interchange) and OWL (Web Ontology Language), as well as domain-specific standards and ontologies (formal specifications of how to represent objects and concepts). Representative applications of RDF, OWL, and ontologies to various problems will be discussed. Students will apply course concepts to an in-depth project in an area of personal or professional interest.

605.451 Principles of Bioinformatics*
This course is an interdisciplinary introduction to computational methods used to solve important problems in DNA and protein sequence analysis. The course focuses on algorithms but includes material to provide the necessary biological background for science and engineering students. Algorithms to be covered include dynamic programming.

*Not an AAP course. Please refer to partner JHU school/ division for credit information.
for sequence alignment, such as Smith-Waterman, FASTA, and BLAST; hidden Markov models, such as the forward, Viterbi, and expectation maximization algorithms; a range of gene-finding algorithms; phylogenetic tree construction; and clustering algorithms. Prerequisites: Familiarity with probability and statistics; working knowledge of Java, C++, or C; 605.205 Molecular Biology for Computer Scientists or a course in molecular biology; and either a course in cell biology or biochemistry.

605.453 Computational Genomics*
This course focuses on current problems of computational genomics. Students will explore bioinformatics software, discuss bioinformatics research, and learn the principles underlying a variety of bioinformatics algorithms. The emphasis is on algorithms that use probabilistic and statistical approaches. Topics include analyzing eukaryotic, bacterial, and viral genes and genomes; genome sequencing and assembling; finding genes in genomes and identifying their biological functions; predicting regulatory sites; and assessing gene and genome evolution. Prerequisites: 605.205 Molecular Biology for Computer Scientists or equivalent; familiarity with probability and statistics.

605.456 Computational Drug Discovery and Development*
Recent advances in bioinformatics and drug discovery platforms have brought us significantly closer to the realization of rational drug design and development. Across the pharmaceutical industry, considerable effort is being invested in developing experimental and translational medicine, and it is starting to make a significant impact on the drug discovery process itself. This course examines the major steps of the evolving modern drug discovery platforms, the computational techniques and tools used during each step of rational drug discovery, and how these techniques facilitate the integration of experimental and translational medicine with the discovery/development platforms. The course will build on concepts from a number of areas, including bioinformatics, computational genomic/proteomics, in silico systems biology, computational medicinal chemistry, and pharmaceutical biotechnology. Topics covered in the course include comparative pharmacogenomics, protein/antibody modeling, interaction and regulatory networks, QSAR/pharmacophores, ADME/toxicology, and clinical biomarkers. Relevant mathematical concepts are developed as needed in the course. Prerequisite: 605.205 Molecular Biology for Computer Scientists or equivalent.

605.457 Statistics for Bioinformatics*
This course provides an introduction into the statistical methods commonly used in bioinformatics and biological research. The course briefly reviews basic probability and statistics including events, conditional probabilities, Bayes theorem, random variables, probability distributions and hypothesis testing and then proceeds to topics more specific to bioinformatics research, including Markov chains, hidden Markov models, Bayesian statistics and Bayesian networks. Students will learn the principles behind these statistical methods and how they can be applied to analyze biological sequences and data. Course prerequisites: 410.645 Biostatistics or another statistics course.

605.716 Modeling and Simulation of Complex Systems*
This course focuses on the application of modeling and simulation principles to complex systems. A complex system is a large-scale, nonlinear system consisting of interconnected or interwoven parts, such as a biological cell, the economy, or an ecological system. The course begins with an overview of complex systems, followed by modeling and simulation techniques based on nonlinear differential equations, networks, stochastic models, cellular automata, and swarmlike systems. Existing software systems will be used to illustrate systems and provide practical experience. During the semester, each student will complete a modeling project of a complex system. While this course is intended for computer science or engineering students interested in modeling any complex system, it may also be taken by bioinformatics students interested in modeling complex biological systems. Students interested in bioinformatics will study a parallel track exposing them to existing whole-cell modeling tools, such as E-Cell, COPASI, and BioSpice. Prerequisites: Knowledge of elementary probability and statistics, and previous exposure to differential equations. Students applying this course to the MS in Bioinformatics should also have completed at least one bioinformatics course prior to enrollment.

605.751 Computational Aspects of Molecular Structure*
This course focuses on computational methods for studying protein and RNA structure, protein-protein interactions, and biological networks. Algorithms for prediction of RNA secondary structure, protein-protein interactions, and annotation of protein secondary/tertiary structure and function are studied in depth. Students will apply various computer programs and structure-visualization software to secondary and tertiary protein structure prediction, structure-structure comparison, protein domain classification, annotation of functionally important sites, and protein design. Interesting aspects of protein interaction and metabolic networks are also discussed. Prerequisite: 605.205 Molecular Biology for Computer Scientists or equivalent. 605.451 Principles of Computational Biology is recommended.

605.754 Analysis of Gene Expression and High-Content Biological Data*
The development of microarray technology, rapid sequencing, protein chips, and metabolic data has led to an explosion in the collection of “high-content” biological data. This course explores the analysis and mining of gene expression data and high-content biological data. A survey of gene and protein arrays, laboratory information management systems, data normalization, and available tools is followed by a more in-depth treatment of differential gene expression detection, clustering techniques, pathway extraction, network model building, biomarker evaluation, and model identification. Both clinical and research data will be considered. The student will develop skills in statistical analysis and data mining, including statistical detection theory, nonlinear and multiple regression, entropy measurement, detection of hidden patterns in data, heuristic search, and learning algorithms. Applied mathematical concepts and biological principles will be introduced, and students will focus on algorithm design and software application for designing and implementing novel ways of analyzing
gene, protein, and metabolic expression data. Students will complete data analysis assignments individually and in small teams. Prerequisites: 605.205 or equivalent or a prior course in bioinformatics, a course in probability and statistics, and ability to program in a high-level language.

605.755 Systems Biology
During the last decade, systems biology has emerged as an effective tool for investigation of complex biological problems, placing emphasis on the analysis of large-scale data sets and quantitative treatment of experimental results. In this course, students will explore recent advances in systems biology analysis of intracellular processes. Examples of modeling and experimental studies of metabolic, genetic, signal transduction, and cell cycle regulation networks will be studied in detail. The classes will alternate between consideration of network-driven and network element (gene, metabolite, or protein)-driven approaches. Students will learn to use Boolean, differential equations, and stochastic methods of analysis, and will become acquainted with several powerful experimental techniques, including basics of microfabrication and microfluidics. For their course projects, students will develop models of a signal transduction or metabolic pathway. Prerequisites: courses in molecular biology (605.205 Molecular Biology for Computer Scientists or 410.602 Molecular Biology) and differential equations.

Computer Science Electives

605.401 Foundations of Software Engineering
Fundamental software engineering techniques and methodologies commonly used during software development are studied. Topics include various life cycle models, project planning and estimation, requirements analysis, program design, construction, testing, maintenance and implementation, software measurement, and software quality. Emphasized are structured and object-oriented analysis and design techniques, use of process and data models, modular principles of software design, and a systematic approach to testing and debugging. The importance of problem specification, programming style, periodic reviews, documentation, thorough testing, and ease of maintenance are covered.

605.444 XML Design Paradigms
The course explores understanding the trade-offs among XML grammars and XML technologies to solve different classes of problems. Topics include optimization of XML grammars for different XML technologies; benefits of using different XML schema languages; trade-offs in using different parsing approaches; benefits of parsing technology versus XML query; the role of Web 2.0 to deliver functionality through various web services approaches; exploiting XML to drive audio, visual, and tactile displays; the role of XML in multiplexing the power of standard web browser technologies; and the role of Web 3.0 to deliver Semantic Web functionality. XML technologies that will be covered include XML Schema, XPath, XSLT, SAX, DOM, XQuery, SOAP, WSDL, JAX-B, JAX-WS, REST, RDF, and OWL. Prerequisite: 605.481 Principles of Enterprise Web Development or equivalent Java experience.

605.462 Data Visualization
This course explores the underlying theory and practical concepts in creating visual representations of large amounts of data. It covers the core topics in data visualization: data representation, visualization toolkits, scientific visualization, medical visualization, information visualization, flow visualization, and volume-rendering techniques. The related topics of applied human perception and advanced display devices are also introduced. Experience with data collection/analysis in data-intensive fields or background in computer graphics (e.g., 605.467 Computer Graphics) is recommended.

605.481 Principles of Enterprise Web Development
This course examines three major topics in the development of applications for the World Wide Web. The first is website development using HTML and related standards. The second is the implementation of client-side applications using the Java programming language, including user interface development, asynchronous event handling, multithreaded programming, and network programming. Distributed object protocols via RMI or CORBA and distributed database access via JDBC may also be introduced. The third topic is the design of server-side Web applications, for which students will examine the underlying Web protocol (HTTP), the development of client-side interfaces (e.g., via HTML forms), and the implementation of server-side programs (e.g., via Java servlets or traditional CGI).

605.484 Agile Development with Ruby on Rails
Modern Web applications are expected to facilitate collaboration, with user participation being a significant facet of the system. Components, such as wikis, blogs, and forums, are now commonplace. While feature sets continue to expand, there is a continuing pressure to develop and deploy capabilities more quickly to enable organizations to remain competitive. This pressure has led to the development of languages and frameworks geared toward rapid prototyping, with Ruby on Rails being the most popular. Ruby on Rails is a Model-View-Controller framework that enables efficient application development and deployment. Techniques such as convention over configuration and object-relational mapping with ActiveRecord, along with enhanced AJAX support, offer a simple environment with significant productivity gains. This code-intensive course introduces Ruby on Rails, the patterns it implements, and its applicability to the rapid development of collaborative applications. Prerequisite: 605.481 Principles of Enterprise Web Development or equivalent.

605.486 Mobile Application Development for the Android Platform
This project-oriented course will investigate the issues surrounding application development for mobile platforms. First, we will look at techniques for building applications that adapt to the ways in which mobile apps differ from traditional desktop or Web-based apps: constrained resources, small screen sizes, varying display resolutions, intermittent network connectivity, specialized sensors, security restrictions, and so forth. Second, we will look at best practices for making mobile applications flexible: using XML-based layouts, managing multimedia, storing user data, networking via Bluetooth and

*Not an AAP course. Please refer to partner JHU school/division for credit information.
Wi-Fi, determining device location and orientation, deploying applications, and gracefully handling shutdowns and restarts to the application. Optional topics may include embedding Web components with WebKit, showing maps with the Google Maps plug-in, and storing local data with SQLite. Students will provide links to download free tools for building and testing Android apps; there is no requirement that students own a physical Android device. Prerequisite: 605.481 Principles of Enterprise Web Development or equivalent Java experience.

605.701 Software Systems Engineering*  
Software systems engineering applies engineering principles and the system view to the software development process. The course focuses on the engineering of complex systems that have a strong software component. This course is based on the philosophy that the key to designing and developing a good software system lies just as much in the process that is followed as in the purely technical regime. The course will show how good a software development process is and how to make a software process better by studying successful techniques that have been employed to produce correct software systems within budget. Topics are explored in a sequence designed to reflect the way one would choose to implement process improvements. These topics include steps to initiate process changes, methods to establish control over the software process, ways to specify the development process, methods for quantitative process control, and how to focus on problem prevention. Students will prepare term projects. Prerequisite: One software engineering course beyond 605.401 Foundations of Software Engineering.

605.741 Large-Scale Database Systems*  
This course investigates the architecture, design, and implementation of massive-scale database systems. The course discusses foundational concepts of distributed database theory including design and architecture, security, integrity, query processing and optimization, transaction management, concurrency control, and fault tolerance. It then applies these concepts to both large-scale data warehouse and cloud computing systems. Cloud computing topics include MapReduce, massive-scale cloud databases, and cloud analytics. Course prerequisites: 605.441 Principles of Data Base Systems or equivalent. Familiarity with big-O concepts and notation is recommended.

605.746 Machine Learning*  
How can machines improve with experience? How can they discover new knowledge from a variety of data sources? What computational issues must be addressed to succeed? These are questions that are addressed in this course. Topics range from determining appropriate data representation and models for learning, understanding different algorithms for knowledge and model discovery, and using sound theoretical and experimental techniques in assessing performance. Specific approaches covered include statistical techniques (e.g., k-nearest neighbor and Bayesian learning), logical techniques (e.g., decision tree and rule induction), function approximation (e.g., neural networks and kernel methods), and reinforcement learning. The topics are discussed in the context of current machine learning and data mining research. Students will participate in seminar discussions and will complete and present the results of an individual project. 605.445 Artificial Intelligence is recommended but not required.

605.747 Evolutionary Computation*  
Recently, principles from the biological sciences have motivated the study of alternative computational models and approaches to problem-solving. This course explores how principles from theories of evolution and natural selection can be used to construct machines that exhibit nontrivial behavior. In particular, the course covers techniques from genetic algorithms, genetic programming, and artificial life for developing software agents capable of solving problems as individuals and as members of a larger community of agents. Specific topics addressed include representation and schemata; selection, reproduction, and recombination; theoretical models of evolutionary computation; optimal allocation of trials (i.e., bandit problems); search, optimization, and machine learning; evolution of programs; population dynamics; and emergent behavior. Students will participate in seminar discussions and will complete and present the results of an individual project. 605.445 Artificial Intelligence is recommended but not required.

605.759 Independent Research Project in Bioinformatics*  
This course is for students who would like to carry out a significant project in bioinformatics as part of their graduate program. The course may be used to conduct minor research, an in-depth literature survey, or a software implementation related to recent developments in the field. Students who enroll in this course are encouraged to attend at least one industry conference in bioinformatics that is related to their area of study. To enroll in this course, the student must be within two courses of degree completion and must obtain the approval and support of a sponsoring faculty member.

605.782 Web Applications Development with Java*  
This project-oriented course will enable the students to use various techniques for building browser-based applications for dynamically generated websites, e-commerce, Web-enabled enterprise computing, and other applications that require Web access to server-based resources. Particular attention will be paid to methods for making Web-based applications efficient, maintainable, and flexible. The course will use at least two sets of tools: servlets/JSP and a higher-level Java-based framework, such as JSF 2.0. Major topics will include handling HTTP request information, generating HTTP response data, tracking sessions, designing custom tag libraries or components, page templating, asynchronous page updates with Ajax, and separating content from presentation through use of the MVC architecture. Additional topics may include HTML5, database access techniques for Web apps, Web app security, and dependency injection in Web apps (e.g., with the Spring framework). Prerequisite: 605.481 Principles of Enterprise Web Development or equivalent Java experience.

605.787 Rich Internet Applications with Ajax*  
Using a Web browser to access online resources is convenient because it provides universal access from any computer on any operating system in any location. Unfortunately, it often results in a poor user experience because HTML is a weak and noninteractive display language, and HTTP is a weak and inefficient protocol. Full-fledged browser-embedded programs (e.g., ActiveX components, Java applets) have not succeeded in penetrating the market adequately, so a new class of applications has grown up that uses only the capabilities
already available in most browsers. These applications were first popularized by Google but have since exploded in popularity throughout the developer community. The techniques to implement them were based on a group of technologies collectively known as Ajax, and the resultant applications were richer than the relatively static, pure HTML-based Web applications that preceded them. These applications have become known as Ajax applications, rich Internet applications, or Web 2.0 applications. This course will examine techniques to develop and deploy Ajax applications. We will look at the underlying techniques, then explore client-side tools (e.g., scriptaculous), server-side tools (e.g., Direct Web Remoting), and hybrid tools (e.g., the Google Web Toolkit) to simplify the development process. We will also examine closely related technologies, such as Flash/Flex and OpenLaszlo, along with the accompanying issues of usability, efficiency, security, and portability. Prerequisite: 605.782 Web Application Development with Java or equivalent servlet and JSP experience.

605.788  Big Data Processing Using Hadoop*  
Organizations today are generating massive amounts of data that are too large and too unwieldy to fit in relational databases. Organizations and enterprises are turning to massively parallel computing solutions, such as Hadoop, for help. The Apache Hadoop platform, with Hadoop Distributed File System and MapReduce framework at its core, allows for distributed processing of large data sets across clusters of computers using the map and reduce programming model. It is designed to scale up from a single server to thousands of machines, offering local computation and storage. The Hadoop ecosystem is sizable in nature and includes many subprojects, such as Hive and Pig for big data analytics, HBase for real-time access to big data, Zookeeper for distributed transaction process management, and Oozie for workflow. This course breaks down the walls of complexity of distributed processing of big data by providing a practical approach to developing applications on top of the Hadoop platform. By completing this course, students will gain an in-depth understanding of how MapReduce and Distributed File Systems work. In addition, they will be able to author Hadoop-based MapReduce applications in Java and also leverage Hadoop subprojects to build powerful data processing applications. Prerequisite: 605.481 Principles of Enterprise Web Development or equivalent Java experience.

*Not an AAP course. Please refer to partner JHU school/ division for credit information.
Master of Science in Biotechnology

biotechnology.jhu.edu

ADMISSION REQUIREMENTS

Credentials and Prerequisite Courses
An undergraduate degree in the natural sciences or in engineering with at least a 3.0 on a 4.0 scale in undergraduate studies (relevant work experiences are also considered); applicants with degrees in other disciplines may be able to enroll if their undergraduate work included the prerequisite courses that follow:

> Two semesters of biology
> Two semesters of college chemistry, preferably with laboratories
> Two semesters of organic chemistry, preferably with laboratories; students without adequate organic chemistry may be admitted provisionally to take 410.302 Bio-Organic Chemistry

The admissions committee reserves the right to request additional information, such as a GRE score or letters of recommendation, from applicants to assess their candidacy for admission.

Application Documents

> AAP application and fee
> Résumé or curriculum vitae
> Official undergraduate transcript
> 500-word statement of purpose
> TOEFL score for international students
> Three letters of recommendation are required only for the fellowship applications

Admission Status
Please see Student Status for descriptions and criteria of the different categories of student status.

COURSE REQUIREMENTS

> Four core courses:
  410.601 Biochemistry (4 credits)
  410.602 Molecular Biology (4 credits)
  410.603 Advanced Cell Biology I (4 credits)
  410.604 Advanced Cell Biology II (4 credits)
> Six elective courses (see course descriptions; must include at least two science electives)
> Course requirements differ for the certificate and concentration programs

FELLOWSHIP PROGRAMS

The Johns Hopkins University Center for Biotechnology Education, with our partner at the Center for Cancer Research/National Cancer Institute (CCR/NCI) has developed an innovative graduate fellowship that prepares the next generation of scientists in the
emerging field of drug discovery. The fellowship in molecular targets and drug discovery technologies fully integrates the didactic training and hands-on laboratory experience required for graduates to contribute to the advancement of knowledge and research in the field. Fellows earn an MS in Biotechnology with a concentration in Molecular Targets and Drug Discovery Technologies, participate in important basic and applied research, work in CCR/NCI labs, and receive paid tuition for up to two years plus an annual stipend. Fellows receive the stipend only if they are accepted into the Master of Science in Biotechnology and the fellowship program.

**DEGREE AND FELLOWSHIP REQUIREMENTS AND PREREQUISITES**

**Degree**
- An undergraduate degree in the natural sciences or in engineering with at least a 3.0 on a 4.0 scale
- Two semesters of organic chemistry with labs

**Fellowship**
- One course in probability and statistics or biostatistics
- Graduate of an accredited university/college
- A U.S. citizen or permanent resident

For information about concentration requirements, see Concentration in Biodefense or Concentration in Molecular Targets and Drug Discovery Technologies. Consult program adviser.

**MS IN BIOTECHNOLOGY CONCENTRATIONS (OPTIONAL)**

Students wishing to focus on a specialized discipline within the MS in Biotechnology program may enroll in one of six concentrations: Biodefense (with an optional combined credential of a Certificate in National Security Studies), Bioinformatics, Biotechnology Enterprise, Molecular Targets and Drug Discovery Technologies, Bioscience Regulatory Affairs, or Health Science Intensive (HSI). The Molecular Targets and Drug Discovery Technologies and the HSI concentrations are only offered at JHU’s Montgomery County Campus in Rockville, Maryland.

**Concentration in Biodefense**

The biodefense concentration integrates basic and translational science to train the next generation of professionals for employment in academia, industry, and government. The curriculum provides students with a solid foundation in basic science, and investigates the various applications of medical science and biotechnology for detection, identification, and response to bio threats.

Specific disciplines of study include molecular biology, infectious diseases, bioinformatics, immunology, epidemiology, molecular diagnostics, and policy. Three courses, 410.692, 410.693 and the lab course must be completed onsite.

**Core Science Courses**
Core requirements differ for this concentration.

410.601 Biochemistry (4 credits)
410.602 Molecular Biology (4 credits)
410.603 Advanced Cell Biology I (4 credits)
410.633 Introduction to Bioinformatics (4 credits)
410.692 Biological & Chemical Threat Response & Forensics (4 credits)
410.693 Science, Medicine and Policy in Biodefense (4 credits)

One laboratory course (410.652, 410.656, 410.657, 410.658, 410.659, 410.660, 410.731 or 410.752) (4 credits each)

**Biodefense Electives**
Choose three.

410.604 Advanced Cell Biology II (4 credits)
410.611 Vaccinology (4 credits)
410.613 Principles of Immunology (4 credits)
410.614 Pathogenic Bacteriology (4 credits)
410.615 Microbiology (4 credits)
410.616 Virology (4 credits)
410.618 Parasitology (4 credits)
410.621 Agricultural Biotechnology (4 credits)
410.631 Infectious Diseases (4 credits)
410.632 Emerging Infectious Diseases (4 credits)
410.639 Protein Bioinformatics (4 credits)
410.640 Molecular Phylogenetic Techniques (4 credits)
410.641 Clinical and Molecular Diagnostics (4 credits)
410.645 Biostatistics (4 credits)
410.652 Cell Culture Techniques (4 credits)
410.655 Radiation Biology (4 credits)
410.656 Recombinant DNA Laboratory (4 credits)
410.658 Biodefense and Infectious Disease Laboratory Methods (4 credits)
410.659 Advanced Recombinant DNA Lab (4 credits)
410.660 Immunological Techniques in Biotechnology (4 credits)
410.661 Methods in Proteomics (4 credits)
410.662 Epidemiology: Diseases in Populations (4 credits)
410.666 Next Generation DNA Sequencing and Analysis (4 credits)
410.667 Theory/Application of Immunoassays (4 credits)
410.669 Immunology of Infectious Diseases (4 credits)
410.671 Gene Expression Data Analysis and Visualization (4 credits)
410.696 Bioassay Development (4 credits)
410.731 Bioprocessing and Scale-Up Laboratory (4 credits)
410.752 High Throughput Screening & Automation Lab (4 credits)
MS in Biotechnology, Concentration in Biodefense/National Security Studies (NSS) Certificate

Students pursuing a biodefense concentration with an interest in international security policy can obtain an additional credential by completing three additional courses offered by the Science, Technology and International Security Certificate Program in AAP. This combined credential will provide professionals with the policy language of international security along with the scientific expertise garnered through the MS in Biotechnology with a biodefense concentration. This combined credential will require students to complete 15 courses.

One course in each of the following areas:

Security Studies
- 470.606 American National Security (On the ground fall and spring semesters. Online Summer seminars.)
- 470.692 Military Strategy & National Policy (On the ground every semester. Online Spring seminars.)

Electives
- 406.688 Intelligence and Counter-Terrorism (3 credits)
- 406.673 Cyber Operations: Introduction to Foundational Elements (3 credits)
- 406.676 The Politics of Cybersecurity (3 credits)
- 406.693 Constitutional Issues in National Security (3 credits)

Science and Technology Policy
- 406.676 The Politics of Cybersecurity
- 425.603 Climate Change Policy Analysis
- 425.604 Energy and Climate Finance
- 470.601 Climate Change and National Security
- 470.657 Energy, Security and Defense
- 406.680 Science, Technology and National Security (If not used to satisfy the above requirement. Offered on the ground spring semesters.)
- 470.696 Ethics and Privacy in Intelligence Operations (Online and on the ground)
- 470.731 Privacy in a Data-driven Society
- 470.740 Cyber Policy, Strategy, Conflict and Deterrence
- 470.752 Intelligence Analysis (Online)
- 470.773 Energy and Environmental Security

Other courses as they are developed.

Electives
One additional elective from Science, Technology, and International Security, Global Security Studies, or the Intelligence programs (470 prefix courses). Consult with your Science, Technology and International Security adviser.

Concentration in Bioinformatics

Given the vast amount of information generated from studies on humans and other organisms, and the need for scientists and researchers to access and manipulate these data, the biotechnology program offers courses that can either be sampled individually or taken together to complete a concentration in bioinformatics.

In addition to the four core courses (Biochemistry, Molecular Biology, Advanced Cell Biology I, and Advanced Cell Biology II), degree candidates must complete any four of these courses to satisfy the bioinformatics concentration requirements:

Bioinformatics Courses
- 410.633 Introduction to Bioinformatics (4 credits)
- 410.634 Practical Computer Concepts for Bioinformatics (4 credits)
- 410.635 Bioinformatics: Tools for Genome Analysis (4 credits)
- 410.639 Protein Bioinformatics (4 credits)
- 410.640 Molecular Phylogenetic Techniques (4 credits)
- 410.645 Biostatistics (4 credits)
- 410.661 Methods in Proteomics (4 credits)
- 410.666 Next Generation DNA Sequencing and Analysis (4 credits)
- 410.671 Gene Expression Data Analysis and Visualization (4 credits)
- 410.68 Introducing Biocomputation (4 credits)
- 410.68 Advanced Practical Concepts for Bioinformatics (4 credits)
- 410.673 Advanced Genomics and Genetic Analysis (4 credits)
- 410.734 Practical Introduction to Metagenomics (4 credits)
- 410.736 Genomic and Personalized Medicine (4 credits)

Concentration in Biotechnology Enterprise

For research discoveries to reach the public, an understanding of the overall enterprise of biotechnology is essential. Success in this industry requires two distinct sets of skills and perspectives: understanding the science and understanding the business. Students in this concentration must complete four core science courses, four core enterprise courses, and two science electives.

Biotechnology Enterprise Concentration Courses

Choose four
- 410.607 Proseminar in Biotechnology (4 credits)
- 410.627 Translational Biotechnology: From Intellectual Property to Licensing (4 credits)
- 410.637 Bioethics (4 credits)
- 410.642 Economic Dynamics of Change in Biotechnology (4 credits)
- 410.643 Managing and Leading Biotechnology Professionals (4 credits)
- 410.644 Marketing Aspects of Biotechnology (4 credits)
- 410.645 Biostatistics* (4 credits)
- 410.646 Creating a Biotechnology Enterprise (4 credits)
- 410.647 Research Ethics (4 credits)
- 410.649 Introduction to Regulatory Affairs (4 credits)
- 410.650 Legal Aspects of Biotechnology (4 credits)
- 410.651 Clinical Development of Drugs and Biologics* (4 credits)
- 410.665 Bioscience Communication (4 credits)
- 410.678 Marketing in a Regulated Environment (4 credits)
- 410.680 Finance for Biotechnology (4 credits)
- 410.681 Commercializing Biotechnology (4 credits)
- 410.684 Technology Transfer and Commercialization (4 credits)
- 410.685 Emerging Issues in Biotechnology (4 credits)
These courses count toward science elective requirement

Concentration in Molecular Targets and Drug Discovery Technologies
This concentration is open to MS in Biotechnology students who meet the standard admission requirements. The fellowship, however, is limited to recent post-baccalaureates who meet both the CCR/NCI Fellowship and MS degree requirements. This concentration is offered only at JHU's Montgomery County Campus in Rockville, Maryland.

Concentration Courses
410.666 Bioassay Development (4 credits)
410.750 Molecular Targets and Cancer (4 credits)
410.751 Chemical Libraries and Diversity (4 credits)
410.752 High Throughput Screening & Automation Lab (4 credits)

Elective Courses
Two required
410.613 Principles of Immunology (4 credits)
410.622 Molecular Basis of Pharmacology (4 credits)
410.633 Introduction to Bioinformatics (4 credits)
410.638 Cancer Biology (4 credits)
410.639 Protein Bioinformatics (4 credits)
410.645 Biostatistics (4 credits)
410.652 Cell Culture Techniques (4 credits)
410.663 Current Topics in Molecular and Cellular Biology (4 credits)
410.671 Gene Expression Data Analysis and Visualization (4 credits)
410.697 Microfluidics and Biosensors (4 credits)

Concentration in Regulatory Affairs
Developed in consultation with representatives from the Food and Drug Administration, the Regulatory Affairs Professional Society, and the biotechnology industry, this concentration in the Master of Science in Biotechnology provides students with the knowledge and understanding required for companies and organizations to comply with federal and state regulatory statutes for the development, approval, and commercialization of drugs, biologics, foods, and medical devices.

Students in this concentration must complete four core science courses, four core regulatory affairs courses, and two science electives.

Regulatory Affairs Concentration Courses
Choose four.
410.606 Clinical Trial Management (4 credits)
410.627 Translational Biotechnology: From Intellectual Property to Licensing (4 credits)
410.648 Clinical Trial Design and Conduct (4 credits)
410.649 Introduction to Regulatory Affairs (4 credits)
410.651 Clinical Development of Drugs and Biologics (4 credits)
410.673 Biological Processes in Regulatory Affairs (4 credits)
410.675 International Regulatory Affairs (4 credits)
410.676 Food and Drug Law (4 credits)
410.677 Preparing a Successful Submission (4 credits)
410.678 Marketing in a Regulated Environment (4 credits)
410.682 Validation in Biotechnology (4 credits)
410.683 Introduction to cGMP Compliance (4 credits)
410.686 Regulation of Good Food Production practices (4 credits)
410.687 Ethical, Legal, and Regulatory Aspects of the Biotechnology Enterprise (4 credits)
410.690 International Food Regulation (4 credits)
410.701 Introduction to Food Safety (4 credits)
410.702 Biomedical Software Regulation (4 credits)
410.715 Medical Device Regulation (4 credits)
410.727 Regulatory Strategies in Biopharmaceuticals (4 credits)
410.802 Independent Studies in Regulatory Science (4 credits)
410.803 Regulatory Science Thesis (4 credits)

Students may choose any two science electives for which they have met the prerequisites. For a complete list of electives, visit biotechnology.jhu.edu.

Concentration in Health Science Intensive
Through this unique post-baccalaureate program, students enroll full time in an innovative curriculum specifically created to help students build a more competitive medical school application. In addition to the six required courses, students work with their adviser to choose four elective courses that meet their professional goals. Students must also attend at least 80 percent of an advising seminar series.

Core Science Courses
Core requirements differ for this concentration.
410.601 Biochemistry (4 credits)
410.602 Molecular Biology (4 credits)
410.603 Advanced Cell Biology I (4 credits)

Core Nonscience Courses
410.705 Communication for Health Care Professionals (4 credits)
410.706 Building and Leading Teams in Health Care (4 credits)
410.707 The Psychosocial Determinants of Health, Implications on Diagnostics (4 credits)
Elective Courses
Below is a potential list of elective courses. Not all courses are available every semester. Contact your adviser for course selection options. Online courses will not be accepted toward required or elective course requirements.

Choose four

410.604 Advanced Cell Biology II (4 credits)
410.612 Human Molecular Genetics (4 credits)
410.613 Principles of Immunology (4 credits)
410.614 Pathogenic Bacteriology (4 credits)
410.615 Microbiology (4 credits)
410.616 Virology (4 credits)
410.618 Parasitology (4 credits)
410.620 Advanced Topics in Immunology (4 credits)
410.623 Molecular and Cellular Physiology (4 credits)
410.628 Neurobiology (4 credits)
410.629 Genes and Disease (4 credits)
410.631 Infectious Diseases (4 credits)
410.632 Emerging Infectious Diseases (4 credits)
410.636 Biology of HIV and AIDS (4 credits)
410.638 Cancer Biology (4 credits)
410.655 Radiation Biology (4 credits)

ONLINE COURSES
The Johns Hopkins University Center for Biotechnology Education offers a wide range of online courses that can conveniently fit into your schedule. Designed for busy bioscience professionals, our online courses provide in-depth coverage of theoretical, applied and specialized subjects, and are taught by expert faculty members from academia, the private sector, and government.

You may complete the degree requirements completely online for the Master of Science in Biotechnology, Master of Science in Bioinformatics, Master of Biotechnology Enterprise and Entrepreneurship, Master of Science in Food Safety Regulation, Master of Science in Individualized Genomics and Health, Master of Science in Regulatory Science, Certificate in Biotechnology Enterprise, and the Post-Master’s Certificate in Sequence Analysis and Genomics. (Note that not all concentrations for the MS in Biotechnology can be completed online.)

For course descriptions, see page 59.
Master of Science in Biotechnology/MBA
Dual Degree Program with the Carey Business School

Johns Hopkins University offers a dual degree graduate program that prepares bioscience professionals for success in both the science and business of biotechnology. Drawing from the strengths of the Krieger School of Arts and Sciences and the Carey Business School, this innovative program allows students to earn two advanced degrees in less time than it takes to earn them separately. Dual degree recipients receive both diplomas upon completion of both programs: one from the Krieger School of Arts and Sciences, and one from the Carey Business School.

For more information on the dual degree program at JHU, visit the website at advanced.jhu.edu/biomba or call 202-452-1940.

Applicants must meet the following criteria to be considered and should review the admissions requirements for the specific biotechnology master’s degrees. In addition, students must provide two letters of recommendation and have a minimum of two years of full-time progressive work experience after completion of their undergraduate studies.

Documents Required

- Completed application form: advanced.jhu.edu/admissions
- Nonrefundable application fee: $75
- Official transcripts from all college studies
- GMAT or GRE recommended for those students who do not hold a degree beyond a baccalaureate
- Current résumé or curriculum vitae
- Two letters of recommendation: advanced.jhu.edu/admissions
- Typed essay (see application form for directions)

International Applicants

Applicants whose native language is not English and who have graduated from a college or university where English is not the language of instruction must take the TOEFL and achieve a minimum score of 250 on the computer-based test, 600 on the paper-based test, or 100 on the Internet-based test.

Currently, international applicants to the MS in Biotechnology/MBA are not eligible for the I-20 form (certificate of eligibility) needed to obtain an F-1 student visa. In order to qualify for the F-1 visa, a student is required to be enrolled full time. Full-time status/full course of study is defined at the Carey Business School as enrolled in minimally nine credits each fall and nine credits each spring semester for graduate study. At the present time, the maximum number of credits offered per semester in this degree program is eight or less. Consequently, F-1 students would not be able to meet their full-time requirements as defined by the U.S. Citizenship and Immigration Services regulations. If an international is interested in obtaining a nonimmigrant visa type other than an F-1 visa, he/she should contact the U.S. embassy in his/her home country. Students who have visa- or immigration-related questions may contact the International and Disability Services Office at ids@jhu.edu or 202-452-0983/410-516-1013, option 6.

Course Descriptions

Contact businessbiotech@jhu.edu for the Carey Business School course descriptions.

For MS in Biotechnology course requirements, see page 45.

For MS in Biotechnology course descriptions, see page 59.
Master of Biotechnology Enterprise and Entrepreneurship

For a biotechnology enterprise to be successful, it requires trained professionals who understand science and are also skilled in the complexities of biotechnology commercialization. This program brings together a strong science foundation with biotechnology enterprise and entrepreneurship. The program is intended for biotechnology professionals who seek a career beyond the laboratory, either within an existing biotechnology group or organization, or for those who seek to start a new biotechnology enterprise. The curriculum is designed to prepare the next generation of interdisciplinary professionals to address the enterprise and regulatory challenges organizations face in the biotechnology industry.

Students will complete 10 graduate courses, including a final practicum course to gain real-world experience. Students may choose three electives across a broad range of science, enterprise, and regulatory courses, or they may choose a concentration in or Legal/Regulatory Affairs.

Students entering this program will have completed the prerequisite courses in biochemistry and cell biology. Students take seven required core courses, including a practicum.

This degree program is designed for full-time working adults and should take approximately two years to complete, although students may accelerate completion of the program if they wish. The entire 10-course curriculum may be completed fully online or a combination of online and on-site. The faculty members teaching the program work in industry for both private, biomedical science organizations and the federal government, including the Food and Drug Administration.

Important notice for international students regarding visa requirements: While the program may be completed online or by a combination of online and on-site, the degree may not be completed fully on-site.

ADMISSION REQUIREMENTS

> One semester of biochemistry and cell biology at the undergraduate or graduate level, or 410.303 Foundations of Bioscience
> An undergraduate degree in the life sciences or engineering from a four-year college with at least a 3.0 on a 4.0 scale
> Application documents
> Current résumé
> 500-word statement of purpose
> Official transcripts

The Admissions Committee reserves the right to request additional information from applicants, if needed, to assess their candidacy for admission.

DEGREE REQUIREMENTS

Core courses  Six
Practicum One
Electives Three

Choose three electives from the Advanced Biotechnology Studies Program for which you have met the prerequisites or have received permission from the program committee. See course descriptions in the MS in Biotechnology for a list of courses.
Foundations of Bioscience (4 credits)
Prerequisite for provisional students accepted in the program who have not previously taken biochemistry or cell biology

Required Courses
410.607 Proseminar in Biotechnology (4 credits)
410.627 Translational Biotechnology: From Intellectual Property to Licensing (4 credits)
410.643 Managing and Leading Biotechnology Professionals (4 credits) OR
410.689 Leading Change in Biotechnology (4 credits)
410.644 Marketing Aspects of Biotechnology (4 credits)
410.680 Finance for Biotechnology (4 credits)
410.687 Ethical, Legal and Regulatory Aspects of the Biotechnology Enterprise (4 credits)
410.804 Practicum in Biotechnology Enterprise and Entrepreneurship (4 credits)

MASTER OF BIOTECHNOLOGY ENTERPRISE AND ENTREPRENEURSHIP CONCENTRATION (OPTIONAL)

Students wishing to focus on a specialized discipline within the Master of Biotechnology Enterprise and Entrepreneurship program may enroll in a concentration in MBEE Legal/Regulatory Affairs.

Concentration in MBEE Legal/Regulatory Affairs
In addition to the six core courses and practicum, degree candidates must complete any three of these courses to satisfy the MBEE Legal/Regulatory Affairs concentration requirements:

410.606 Clinical Trial Management (4 credits)
410.648 Clinical Trial Design and Conduct (4 credits)
410.650 Legal Aspects of Biotechnology (4 credits)
410.651 Clinical Development of Drugs and Biologics (4 credits)
410.673 Biological Processes in Regulatory Affairs (4 credits)
410.676 Food and Drug Law (4 credits)
410.683 Introduction to cGMP Compliance (4 credits)
410.684 Technology Transfer & Commercialization (4 credits)

*This list is subject to change. See program director regarding eligibility of course to count as concentration course.

For course descriptions, see page 59.
Master of Science in Food Safety Regulation
advanced.jhu.edu/foodsafety

The new Master of Science in Food Safety Regulation is designed to provide students with an understanding of the legal and regulatory complexities of food production, labeling, and distribution. The program will provide students with the knowledge required for companies and organizations that grow, process, distribute, or sell foods and beverages while complying with federal and state regulatory statutes for the production, distribution, and commercialization of food products. Students will complete 10 graduate-level courses within a five-year timeline.

On completion of the Master of Science in Food Safety Regulation, you will be able to do the following:

> Demonstrate a mastery of technical and critical thinking skills in food safety regulation submissions and statutes.
> Design, develop, and implement food safety regulatory submissions.
> Analyze and evaluate food safety regulatory statutes, regulations, guidance documents, and submissions.

The curriculum offers hands-on, real-life food safety regulatory experience through case studies and other assignments. Students will research, evaluate, and present scientifically and legally justifiable positions on case studies from different perspectives of advanced regulatory topics.

Designed for Working Adults

The Master of Science in Food Safety Regulation program offers all courses conveniently online. Most of your highly interactive course work consists of courses taught by professionals in the field of food safety, from the FDA and the food industry. You have up to five years to complete the degree, which typically students complete in two years.

ADMISSION REQUIREMENTS

> One semester of biochemistry and one semester of organic chemistry at the undergraduate or graduate level, or 410.303 Foundations of Bioscience (available to students admitted provisionally only)
> An undergraduate degree in the life sciences or engineering from a four-year college with at least a 3.0 on a 4.0 scale in the latter half of undergraduate studies
> Application documents
> Current résumé
> 500-word statement of purpose
> Official transcripts

The Admissions Committee reserves the right to request additional information from applicants, if needed, to assess their candidacy for admission.

PROGRAM COMMITTEE

Bertrand Garcia-Moreno
Chair, Center for Biotechnology Education

Kristina Obom
Program Director, Individualized Genomics and Health, Biotechnology; Center Director, Center for Biotechnology Education

Patrick Cummings
Program Director, Biotechnology

Lynn Johnson Langer
Program Director, Enterprise and Regulatory Sciences

Robert Lessick
Program Director, Bioinformatics

Thomas E. Colonna
Associate Program Director, Regulatory Science and Food Safety Regulation

DEGREE REQUIREMENTS

Core courses Seven
Electives Three

The three electives can be chosen from any of the Center for Biotechnology Education program courses for which you have met the prerequisites or have received permission from the program committee.

410.303 Foundations of Bioscience (4 credits)
Prerequisite for provisional students accepted in program who have not previously taken biochemistry or cell biology
The landscape of food safety regulation is currently undergoing extensive changes. As the field continues to change, the proposed program is designed to change with it. While the seven required courses will remain constant, the content will adapt to new discoveries and changes in understanding of the covered topics. Similarly, the approved list of elective courses will be a living document that will include newly created courses as appropriate. Furthermore, new courses will be considered based on student feedback and changes in the industry. In addition, students may request course substitutes from other JHU courses that are appropriate and for which they are qualified.

**REQUIRED COURSES**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.674</td>
<td>Food Microbiology</td>
<td>4 credits</td>
</tr>
<tr>
<td>410.686</td>
<td>Regulation of Good Food Production Practices</td>
<td>4 credits</td>
</tr>
<tr>
<td>410.700</td>
<td>Food Labeling and Packaging Regulation</td>
<td>4 credits</td>
</tr>
<tr>
<td>410.701</td>
<td>Introduction to Food Safety Regulation</td>
<td>4 credits</td>
</tr>
<tr>
<td>410.716</td>
<td>Food Toxicology</td>
<td>4 credits</td>
</tr>
<tr>
<td>410.717</td>
<td>Risk Assessment and Management</td>
<td>4 credits</td>
</tr>
<tr>
<td>410.718</td>
<td>Food Safety Audits and Surveillance</td>
<td>4 credits</td>
</tr>
</tbody>
</table>

**SAMPLE ELECTIVE COURSES**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.621</td>
<td>Agricultural Biotechnology</td>
<td>4 credits</td>
</tr>
<tr>
<td>410.645</td>
<td>Biostatistics</td>
<td>4 credits</td>
</tr>
<tr>
<td>410.649</td>
<td>Introduction to Regulatory Affairs</td>
<td>4 credits</td>
</tr>
<tr>
<td>410.665</td>
<td>Bioscience Communication</td>
<td>4 credits</td>
</tr>
<tr>
<td>410.675</td>
<td>International Regulatory Affairs</td>
<td>4 credits</td>
</tr>
<tr>
<td>410.676</td>
<td>Food and Drug Law</td>
<td>4 credits</td>
</tr>
</tbody>
</table>

For course descriptions, see page 59.
As the biomedical industry continues to grow, more companies are developing and commercializing new products. There are thousands of biomedical products in the development pipeline that require regulatory oversight. Many of the companies providing reagents and supplies to the industry must also provide stringent quality controls to ensure compliance with the Food and Drug Administration's Current Good Manufacturing Practices and Quality Systems Regulations. These companies will continue to require trained and educated staffing in regulatory science.

Students entering this program will have completed the prerequisite courses in biochemistry and cell biology, and must undertake six required core regulatory courses. Students then may specialize in an aspect of regulatory science of their choice through three elective courses, including advanced regulatory and science courses. Our students receive practical, hands-on, real-life regulatory science experience through case study assignments and a unique practicum course at the end of the program, which distinguishes this program as a leader in graduate, regulatory science education. Students completing this regulatory science program are expected to become regulatory science leaders in government and industry.

This degree program is designed for full-time working adults and should take approximately two years to complete, although students may accelerate completion of the program if they wish. The entire 10-course curriculum may be completed fully online or by combining online classes with instruction on-site in the classroom. The faculty members teaching the program are all leaders in the field of regulatory sciences. They work in industry for both private biomedical science organizations and the federal government, including the FDA.

NOTE: The Master of Science in Regulatory Science program is almost completely online- we typically only run one or two on-site courses per year. Therefore, it is not possible to comply with student visa requirements for on-site course loads in the program. It is recommended that the student stay in her/his country of origin and take the degree program completely online to avoid student visa compliance issues.

ADMISSION REQUIREMENTS

> One semester of biochemistry and one semester of cell biology at the undergraduate or graduate level
> An undergraduate degree in the life sciences or engineering from a four-year college with a GPA of at least a 3.0 on a 4.0 scale
> Application documents
> Current résumé
> 500-word statement of purpose
> Official transcripts

The Admissions Committee reserves the right to request additional information from applicants, if needed, to assess their candidacy for admission.

DEGREE REQUIREMENTS

| Core courses | Six |
| Practicum    | One |
| Electives    | Three |

The three electives can be chosen from any of the Advanced Biotechnology Studies program courses for which you have met the prerequisites or have received permission from the program committee.

410.303 Foundations of Bioscience (4 credits)
Prerequisite for provisional students accepted in program who have not previously taken biochemistry or cell biology.
REQUIRED COURSES

410.627  Translational Biotechnology: From Intellectual Property to Licensing (4 credits)
410.649  Introduction to Regulatory Affairs (4 credits)
410.651  Clinical Development of Drugs and Biologics (4 credits)
410.673  Biological Processes in Regulatory Affairs (4 credits)
410.676  Food and Drug Law (4 credits)
410.679  Practicum in Regulatory Science (4 credits)
410.683  Introduction to CGMP Compliance (4 credits)

For course descriptions, see page 59.
Certificate in Biotechnology Education

The Certificate in Biotechnology Education incorporates the fundamental and emerging ideas in biology and biotechnology, as well as issues related to teaching and learning of bioscience at the middle and high school levels. Middle and secondary teachers, as well as curriculum and instructional leaders, will strengthen their own content knowledge and pedagogic techniques in bioscience, and develop ways to teach bioscience effectively in their classrooms. This Certificate consists of five graduate-level courses. The Independent Research Project course will emphasize inquiry-oriented approaches and integrating technology in bioscience education. Moreover, teachers will analyze recent research on bioscience education, reflect on their learning and practice, and develop teaching tools and assessment strategies to engage students in bioscience-related problems and inquiries.

Students who complete the Certificate in Biotechnology Education are eligible to count three science course credits toward a Master of Science in Biotechnology in Krieger School of Arts and Sciences Advanced Academic Programs. For more information, please contact biotechnology@jhu.edu.

For more information about the certificate or how to apply, contact the Center for Biotechnology Education at 410-516-7769 or biotechnology@jhu.edu.

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.303</td>
<td>Foundations of Bioscience</td>
<td>(4 credits)</td>
</tr>
<tr>
<td>410.601</td>
<td>Biochemistry</td>
<td>(4 credits)</td>
</tr>
<tr>
<td>410.602</td>
<td>Molecular Biology</td>
<td>(4 credits)</td>
</tr>
<tr>
<td>410.800</td>
<td>Independent Research Project in Biotechnology</td>
<td>(4 credits)</td>
</tr>
</tbody>
</table>

At least one laboratory course*

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.652</td>
<td>Cell Culture Techniques</td>
<td>(4 credits)</td>
</tr>
<tr>
<td>410.656</td>
<td>Recombinant DNA Laboratory</td>
<td>(4 credits)</td>
</tr>
<tr>
<td>410.658</td>
<td>Biodefense and Infectious Disease Laboratory Methods</td>
<td>(4 credits)</td>
</tr>
<tr>
<td>410.660</td>
<td>Immunological Techniques in Biotechnology</td>
<td>(4 credits)</td>
</tr>
</tbody>
</table>

*Students must enroll in one laboratory courses offered at the Homewood or Montgomery County campuses. Laboratory courses are not offered online.

For course descriptions, see page 59.
Certificate in Biotechnology Enterprise

Students who want a solid understanding of the biotechnology enterprise and are well-versed in the scientific aspects can apply to the Certificate in Biotechnology Enterprise program.

A bachelor’s degree is required, and a degree in the life sciences is recommended. For consideration, students submit the standard application form and official transcripts. A grade-point average of 3.0 on a 4.0 scale is expected.

Certificate requirements consist of five courses chosen from the list below. Students may take either two or three of the required courses listed below and then complete two to three of the elective courses listed below for a total of five courses. (While most courses have no science prerequisites, students should not enroll in 410.627 Translational Biotechnology: From Intellectual Property to Licensing or 410.651 Clinical Development of Drugs and Biologics unless they have a strong background in molecular biology, or have taken the core courses 410.601 Biochemistry and 410.602 Molecular Biology.)

Students who successfully complete the certificate and subsequently decide to seek admission to the master’s degree program in biotechnology will receive credit for three of the courses taken in the certificate. All time limit restrictions as noted in the admissions section of this catalog will apply.

Required Courses

Choose two of the following.

410.643 Managing and Leading Biotechnology Professionals (4 credits)
410.644 Marketing Aspects of Biotechnology (4 credits)
410.680 Finance for Biotechnology* (4 credits)
410.689 Leading Change in Biotechnology (4 credits)
410.645 Biostatistics* (4 credits)
410.646 Creating a Biotechnology Enterprise (4 credits)
410.647 Research Ethics (4 credits)
410.649 Introduction to Regulatory Affairs (4 credits)
410.650 Legal Aspects of Biotechnology (4 credits)
410.651 Clinical Development of Drugs and Biologics* (4 credits)
410.665 Bioscience Communication (4 credits)
410.678 Marketing in a Regulated Environment (4 credits)
410.681 Commercializing Biotechnology (4 credits)
410.684 Technology Transfer and Commercialization (4 credits)
410.685 Emerging Issues in Biotechnology (4 credits)
410.687 Ethical, Legal & Regulatory Aspects of the Biotechnology Enterprise (4 credits)
410.688 Project Management in Biotechnology (4 credits)
410.703 Strategic Planning for the Biotechnology Enterprise (4 credits)
410.704 Social Entrepreneurship in Bioscience (4 credits)
410.728 Managing Innovation in the Life Sciences (4 credits)
410.732 Funding a New Venture (4 credits)
410.756 Grants and Federal Funding for Biotechnology Enterprises (4 credits)

Electives

Choose two to three of the following for a total of five courses.

410.607 Proseminar in Biotechnology (4 credits)
410.627 Translational Biotechnology: From Intellectual Property to Licensing* (4 credits)
410.637 Biosethics (4 credits)
410.642 Economic Dynamics of Change in Biotechnology (4 credits)
410.643 Managing and Leading Biotechnology Professionals (4 credits)
410.645 Biostatistics* (4 credits)
410.646 Creating a Biotechnology Enterprise (4 credits)
410.647 Research Ethics (4 credits)
410.649 Introduction to Regulatory Affairs (4 credits)
410.650 Legal Aspects of Biotechnology (4 credits)
410.651 Clinical Development of Drugs and Biologics* (4 credits)
410.665 Bioscience Communication (4 credits)
410.678 Marketing in a Regulated Environment (4 credits)
410.681 Commercializing Biotechnology (4 credits)
410.684 Technology Transfer and Commercialization (4 credits)
410.685 Emerging Issues in Biotechnology (4 credits)
410.687 Ethical, Legal & Regulatory Aspects of the Biotechnology Enterprise (4 credits)
410.688 Project Management in Biotechnology (4 credits)
410.703 Strategic Planning for the Biotechnology Enterprise (4 credits)
410.704 Social Entrepreneurship in Bioscience (4 credits)
410.728 Managing Innovation in the Life Sciences (4 credits)
410.732 Funding a New Venture (4 credits)
410.756 Grants and Federal Funding for Biotechnology Enterprises (4 credits)

Note: This list is subject to change. Please contact the program director to determine if an elective will count toward the certificate.

For course descriptions, see page 59.

* Also counts as science elective.
Post-Master’s Certificate in Sequence Analysis and Genomics

The field of bioinformatics is continually expanding and challenging our ability to bridge the gap between molecular biology and computer technology. Specifically, the revolution in sequencing technology has resulted in vast quantities of data that require storage and analysis. The analysis of nucleic acid and protein data requires specialized bioinformatics tools and an understanding of genomics. The emerging sequencing technologies and accompanying bioinformatics tools will advance personalized medicine, pharmacogenomics, and molecular diagnostics methods. The advancement of these tools will open new avenues of research on many fronts.

This certificate is targeted at scientists who already have grounding in biochemistry, molecular biology, and cell biology, and do not need advanced computer skills; thus, they do not require all the core requirements of the other two master’s programs. It introduces students to the foundations of bioinformatics through the core bioinformatics courses, and then the students take upper-level courses that are required for understanding and performing sequence and genomic analysis. The program is offered both online and on-site.

Admission Requirements

- Master’s or doctoral degree in the biological sciences or engineering from an accredited institution
- One semester of biochemistry or equivalent, or 410.601 Biochemistry
- One semester of molecular biology or equivalent or 410.602 Molecular Biology

Required Courses

410.633 Introduction to Bioinformatics (4 credits)
410.634 Practical Computer Concepts for Bioinformatics (4 credits)
410.666 Next Generation Sequencing and Analysis (4 credits)

Elective Courses

Choose two.

410.635 Bioinformatics: Tools for Genomic Analysis (4 credits)
410.639 Protein Bioinformatics (4 credits)
410.640 Molecular Phylogenetic Techniques (4 credits)
410.645 Biostatistics (4 credits)
410.671 Gene Expression Data Analysis and Visualization (4 credits)
410.712 Advanced Practical Computer Concepts for Bioinformatics (4 credits)
410.713 Advanced Genomics and Genetic Analysis (4 credits)
410.734 Practical Introduction to Metagenomics (4 credits)
410.736 Genomic and Personalized Medicine (4 credits)

For course descriptions, see page 59.
Biotechnology Studies Course Descriptions

Bioinformatics, Biotechnology, Biotechnology Enterprise and Entrepreneurship, Food Safety Regulation, Regulatory Science, Biotechnology Education, Biotechnology Enterprise, Sequence Analysis and Genomics

Below is a cumulative list of course descriptions for the degree and certificate programs (listed above) of the Center for Biotechnology Education. Note that the categories in which a course is listed below may not reflect the categories in which a course is listed in a specific program. For course requirements for a specific program, consult the individual program’s pages in this catalog.

PREREQUISITE COURSES

410.302  Bio-Organic Chemistry (4 credits)
This course provides a foundation in structural organic chemistry, acid base chemistry, chemical thermodynamics, and reaction mechanisms. Subjects include Lewis structures, atomic and hybridized orbitals, stereochemistry, inter- and intramolecular forces of attraction, nucleophilic reaction mechanisms, functional groups, and the organic chemistry of biological molecules. Please note that this course does not count toward requirements for the master's degree in biotechnology. Prerequisite: two semesters of college chemistry.

410.303  Foundations in Bioscience (4 credits)
This course examines the fundamental underlying scientific concepts utilized in the creation and development of biomedical products. Topics to be covered include the structure and function of biomolecules, such as proteins, enzymes, carbohydrates, lipids, and DNA, as well as the structure and function of cellular components, such as membranes, vesicles, organelles, and the cytoskeleton. In addition, students will examine the complexities of metabolism, DNA replication, transcription, translation, signal transduction mechanisms, apoptosis, the cell cycle, and cancer. Please note that this course does not count toward requirements for the master's degree in biotechnology.

CORE COURSES FOR MS IN BIOTECHNOLOGY

410.601  Biochemistry (4 credits)
This course explores the roles of essential biological molecules focusing on protein chemistry, while covering lipids and carbohydrates. It provides a systematic and methodical application of general and organic chemistry principles. Students examine the structure of proteins, their function, their binding to other molecules, and the methodologies for the purification and characterization of proteins. Enzymes and their kinetics and mechanisms are covered in detail. Metabolic pathways are examined from thermodynamic and regulatory perspectives. This course provides the linkage between the inanimate world of chemistry and the living world of biology.

410.602  Molecular Biology (4 credits)
This course provides a comprehensive overview of the key concepts in molecular biology. Topics to be covered include nucleic acid structure and function, DNA replication, transcription, translation, chromosome structure, and remodeling and regulation of gene expression in prokaryotes and eukaryotes. Extended topics to be covered include methods in recombinant DNA technology, microarrays, and microRNA. Prerequisite: 410.601 Biochemistry

410.603  Advanced Cell Biology I (4 credits)
This course covers cell organization and subcellular structure. Students examine the evolution of the cell, chromosome, and plasma membrane structures and behaviors; mechanisms of cell division; sites of macromolecular synthesis and processing; transport across cell membranes; cell dynamics; organelle biogenesis; and cell specialization. Students are also introduced to the experimental techniques used in cell biology to study cell growth, manipulation, and evaluation.

410.604  Advanced Cell Biology II (4 credits)
This course is a continuation of 410.603 Advanced Cell Biology I and further explores cell organization and subcellular structure. Students examine cell-to-cell signaling that involves hormones and receptors, signal transduction pathways, second messenger molecules, cell adhesion, extracellular matrix, cell cycle, programmed cell death, methylation of DNA and modification of chromatic structure, and mechanisms of the cell. The involvement of abnormalities in signal transduction pathways to oncogenesis and other disease states will be stressed. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I.
BIO SCIENCE ELECTIVE COURSES

**410.606 Clinical Trial Management (4 credits)**
The goal of this course is to provide students with a functional understanding of all the operational aspects of a clinical study. At the end of the course, students will be able to think about a study from the point of view of the Study Manager (primary focus of the course), and also from that of different team members, understand how regulations affect and guide a study, and be exposed to common issues and mistakes made during clinical trial management. Students will learn what happens at the site level and how and why sites are monitored, emphasizing potential site issues and what a study manager and team could do to resolve/prevent problems. An example study protocol will be used throughout the study and students will be required to write and review clinical site monitoring reports. Prerequisites: 410.648 Clinical Trial Design and Conduct.

**410.607 Proseminar in Biotechnology (4 credits)**
The Biotechnology Proseminar introduces students to issues and challenges facing leaders of public and private-sector organizations, and communities seeking to achieve shared goals within the biotechnology industry. The course brings together diverse academic science and business disciplines (science, regulatory affairs, marketing, finance, legal, ethics, communications, etc.). It explores how these disciplines can be used as powerful tools to create effective leadership and productive collaborations within the industry, while improving managerial decision-making. The proseminar frames and integrates the combined MS/MBA Biotechnology content, methods, and tools of inquiry and analysis.

**410.610 Epigenetics, Gene Organization & Expression (4 credits)**
Students use genetic analysis and molecular biology techniques to investigate chromosome organization, chromatin structure, functional genomics, and mechanisms of differential gene expression. Other topics include DNA methylation, silencers, enhancers, genomic imprinting, and microarray analysis. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology.

**410.611 Vaccinology (4 credits)**
This course will cover the biological development, immunologic concepts, and methods for vaccine delivery. Specific topics include new technologies for vaccine development, such as DNA vaccines, recombinant mucosal vaccines, dendritic cells for antigen delivery, novel adjuvants, and methods to increase vaccine stability. Delivery systems for vaccines, both time tested and new methodologies, such as lipid-based systems, needle-free injection systems, and novel methods, such as the use of genetically modified foods, will be discussed. The underlying biological role of the innate and adaptive immune systems will be explored in light of new types of vaccines and delivery systems. Finally, the process of bringing vaccines to market will be covered, including government oversight and licensure. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I, 410.613 Principles of Immunology, or undergraduate immunology course.

**410.612 Human Molecular Genetics (4 credits)**
In this course, students learn to use the tools of modern genomics to elucidate phenotypic variation within populations. The course uses human disease (from simple Mendelian disorders to common, complex disorders) to exemplify the types of studies and tools that can be used to characterize cellular pathophysiology as well as to provide genetic diagnostics and therapies. Students become facile with linkage analysis, cancer genetics, microarray analysis (oligo and DNA arrays), gene therapy, SNP studies, imprinting, disequilibrium mapping, and ethical dilemmas associated with the Human Genome Project. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology.

**410.613 Principles of Immunology (4 credits)**
This course covers molecular and cellular immunology, including antigen and antibody structure and function, effector mechanisms, complement, major histocompatibility complexes, B and T cell receptors, antibody formation and immunity, cytotoxic responses, and regulation of the immune response. Students are also introduced to the applied aspects of immunology, which include immunoassay design and flow cytometry. Special topics include immunomodulation, immunosuppression, immunotherapy, autoimmunity, and vaccination. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I.

**410.614 Pathogenic Bacteriology (4 credits)**
Lecture and discussion augmented by guided readings on pathogenic bacteria, with special attention to microorganism that cause human disease. The course is designed to impart to the student an appreciation and knowledge of the history, epidemiology, cultivation, morphology, serology, biochemistry and clinical description of the major disease-producing bacteria. Discussion of therapeutic considerations and vaccination will also be included in this course. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, undergraduate microbiology course, or permission of program committee.

**410.615 Microbiology (4 credits)**
This course is an overview of microorganisms important in clinical diseases and biotechnology. Students are introduced to the general concepts concerning the morphology, genetics, and reproduction of these microbial agents. Lectures focus on individual organisms, with emphasis on infectious diseases, biotechnology applications, molecular and biochemical characteristics, and molecular and serological identification methods. Students will also discuss the impact biotechnology and particularly genomics, will have on the development of antibiotics and vaccines as treatment and preventive measure. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I.

**410.616 Virology (4 credits)**
This course covers the advanced study of viruses with regard to the basic, biochemical, molecular, epidemiological, clinical, and biotechnological aspects of animal viruses primarily, and bacteriophage, plant viruses, viroid, prions, and unconventional agents secondarily. Specific areas of virology, including viral structure and assembly, viral replication, viral recombination and evolution, virus-host interactions, viral
transformation, gene therapy, antiviral drugs, and vaccines, are presented. The major animal virus families are discussed individually with respect to classification, genomic structure, viroid structure, virus cycle, pathogenesis, clinical features, epidemiology, immunity, and control. The viral vectors and their application in biotechnology are discussed. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I.

410.617 Marine Biotechnology (4 credits)
This course covers the application of molecular techniques to study the marine environment and obtain useful products from marine systems. Students examine recent progress in discovery of drugs and enzymes from marine microbes and microorganisms, biodiversity, bioremediation, molecular approaches in aquaculture, the role of marine microbes in global carbon cycling, and genomics of marine organisms. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I.

410.618 Parasitology (4 credits)
The field of parasitology is immense. It covers a plethora of organisms and a multitude of disciplines. This course focuses on the parasites of medical importance that cause human morbidity and mortality throughout the world. It also introduces the student to the general aspects of parasitology. The developmental biology, natural history, and cell and molecular biology of the major eukaryotic parasites will be discussed. Also, the fundamental mechanisms of host-parasite relationships, diagnosis, pathogenesis, epidemiology, and control strategies will be emphasized. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I.

410.620 Advanced Topics in Immunology (4 credits)
This course is literature based and requires a foundation in immunology. Students will be presented with current topics in immunology through literature reviews and basic science papers from the premier journals. Topic areas may include but are not limited to Toll-like receptors, NK cells and their receptors, microRNAs in immunology, cytokine signaling, epigenetics, T regulatory cells, tumor immunology and cancer immunotherapies, T cell subsets (memory T cells, Th1, Th2, Th9, Th17, Th22, TFH), dendritic cells, negative and positive costimulation, viral immunity (including AIDS), mouse models in immunology, Fc receptors, B cell subtypes and antibodies, and allergy and asthma. Students will be required to present a paper of choice during class in one of these major topics areas. Students will be also introduced to methods predominately used in science papers, such as flow cytometry, confocal microscopy, gene arrays, ELISAs, western blots, immunohistochemistry, in vivo mouse models, and microRNA arrays. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cellular Biology I, and 410.613 Principles of Immunology or an undergraduate immunology course.

410.621 Agricultural Biotechnology (4 credits)
In this course, students are introduced to the application of recombinant DNA technology to agriculture. Studied are methods for the introduction of foreign DNA into plant and animal cells and generation of stably transformed plants and animals. Students consider specific examples of the use of transgenic plants and animals in biotechnology, which can provide protection against insects, diseases, and tolerance to specific herbicides. They also investigate how recombinant growth hormones can result in leaner meat, greater milk yield, and better feed utilization, and how transgenic plants and animals can serve as bioreactors for the production of medicinals or protein pharmaceuticals. Because recombinant agricultural products are released into the environment or consumed as foods, students also need to become familiar with environmental safety issues. Prerequisites: 410.601 Biochemist 410.602 Molecular Biology, 410.603 Advanced Cell Biology I.

410.622 Molecular Basis of Pharmacology (4 credits)
This course begins by reviewing receptor binding and enzyme kinetics. Various cellular receptors and their physiology are discussed, as well as the pharmacological agents used to define and affect the receptor’s function. Students study the pharmacology of cell surface receptors and intracellular receptors. Also considered are the drugs that affect enzymes. Prerequisites: All four core courses.

410.623 Molecular & Cellular Physiology (4 credits)
Students in this course gain an understanding of how coordinated regulation of bodily function occurs at the molecular and cellular levels of organization. The focus is on neurons, muscles, and hormones. Specific areas covered for excitable tissue include bioelectric properties of excitable membranes, Hodgkin-Huxley ion currents, voltage-gated ion channels and their structures, synaptic transmission, excitation-contraction coupling, and contractile properties of skeletal, cardiac, and smooth muscle cells. The biotechnological connection is the pharmacological interventions to modulate functioning of excitable tissues. For endocrine physiology, this is an overview of hypothalamic, pituitary, reproductive, and other hormones. The class uses leptin and obesity as a model hormone and pathology, respectively, and examines in detail its action as a putative fat-burning hormone. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I.

410.624 System and Integrative Physiology (4 credits)
This course is the second half of the physiology sequence and involves the study of organ systems and how they are regulated by the central nervous and endocrine systems. Students will learn the structure and function of the cardiovascular, respiratory, digestive, renal, and reproductive systems, as well as their pathophysiology during disease processes. We will also study metabolic physiology in the context of exercise and diet. The biotechnological connection will be how the drug interventions modulate functioning of many of these system Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology 410.603 Advanced Cell Biology I; 410.622 Molecular and Cellular Physiology is recommended but not required.

410.625 Industrial Microbiology (4 credits)
This course covers the principles of various processes associate with the production and recovery of different bio products derived from prokaryotes and eukaryotes. Topics include the classification of microorganisms, media development,
instrumentation, fermentation principles, mammalian and insect cell propagation, product recovery, protein purification and the principles of Current Good Manufacturing Practices. Emphasis is on large-scale production methods and production of recombinant proteins for diagnostic and clinical application. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology and 410.603 Advanced Cell Biology I.

410.626 Molecular Development (4 credits)
This course covers the molecular and cellular bases of development in a variety of experimental organisms with special emphasis on mammalian and human models. From the formation of germ cells, fertilization, and early embryonic development to the final formation of organs and tissues, developmental processes are considered in the context of biotechnological applications. Application possibilities include creation of transgenic animals and drug design to combat specific types of cancer. The molecular mechanisms of developmental processes and the identification of targets for therapeutic purposes are central themes. Prerequisites: All four core courses.

410.627 Translational Biotechnology: From Intellectual Property to Licensing (4 credits)
This course provides an extensive overview of a process for development of a pharmaceutical by a biotechnology company or pharmaceutical company. The course emphasizes the importance of intellectual property, the basic sciences underpinning the development of a product, and the importance of the interaction between a company and the Food and Drug Administration. Students learn to appreciate the importance of quality control and assurance, good manufacturing practices, preclinical and clinical testing, and the lengthy regulatory processes that govern the development, manufacture, and eventual sale of biotechnological products. Hands-on solving of practical problems and guest lecturers who are experts in the field familiarize students with the intricacies of the process. Prerequisites: 410.303 Bioscience for Regulatory Affairs, OR 410.601 Biochemistry and 410.603 Advanced Cell Biology or admission to the MS in Regulatory Science OR Master of Biotechnology Enterprise and Entrepreneurship programs.

410.628 Neurobiology (4 credits)
This course provides a framework for understanding the molecular physiology of neuronal structure, signaling, and circuitry, and how this cellular design is ultimately integrated to achieve higher cognitive functions, such as perception, control of movement, learning, and memory. The course introduces the students to various current neuroscience topics, including but not limited to membrane physiology and electrical excitability of neurons, neurotransmitters and synaptic transmission, signaling at the neuromuscular junction, cellular and higher-order aspects of perception and motor control, molecular mechanisms of neural development, and the molecular basis of learning and memory. This course places particular emphasis on the genetic and molecular bases of a wide variety of neurocognitive and neurodegenerative diseases, such as multiple sclerosis, amyotrophic lateral sclerosis, Parkinson’s, and Alzheimer’s. Prerequisites: All four core courses.

410.629 Genes & Disease (4 credits)
Because of recent advances, powerful diagnostic tests now detect genetic diseases, and there is promise of gene replacement therapy. In this course, students cover general genetic principles, DNA tools for genetic analysis, cytogenetics, gene mapping, the molecular basis of genetic diseases, animal models, immunogenetics, genetics of development, genetics of cancer, and treatment of genetic diseases. Molecular methods of analysis are emphasized. Prerequisites: All four core courses.

410.630 Gene Therapy (4 credits)
Students are introduced to gene transfer, its technical evolution and its testing through clinical studies. Gene therapy holds promise for both genetic diseases and acquired diseases, such as cancer and AIDS. The health, safety, and ethical issues surrounding gene therapy are discussed, together with the review and oversight systems established to regulate this therapy. Students also consider how industry is developing these techniques, both in new startup companies as well as in established biotechnology and pharmaceutical companies. An overview of proprietary and patent issues in gene therapy is part of the course. Prerequisites: 410.601 Biochemistry, 410.60 Molecular Biology, 410.603 Advanced Cell Biology I.

410.631 Infectious Diseases (4 credits)
This course focuses on infectious diseases of mankind, presented in a system-by-system format. Basic principles of host defense and microbial virulence will be discussed. Practical, up-to-date information on the clinical presentation, symptoms, physical findings, laboratory diagnosis, treatment and prevention of the general array of diseases caused by bacteria and viruses will be presented. The use of antibiotics, prophylactic agents, and vaccines along with selected aspects pathogenesis and epidemiology will be covered. More cursor coverage will be given to the fungal and parasitic agents of human disease. The student will develop a broad understanding of the many different kinds of infectious processes to which our bodies are subjected to on an ongoing basis. Prerequisites 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I.

410.632 Emerging Infectious Diseases (4 credits)
This course focuses on emerging infectious diseases from many different perspectives. The maladies addressed range from diseases that have reappeared in altered genetic forms, such as the influenza virus and West Nile virus, to the lethal hemorrhagic fever caused by the Ebola virus. Also discussed is the threat of recombinant and ancient infectious agents, such as Bacillus anthracis, causative agent of anthrax, which can be used in biological warfare weapons. Opinions from noted scientists and leaders concerning emerging diseases and the prospects for battling them successfully provide scientific and social perspective. Prerequisites: 410.601 Biochemistry, 410.60 Molecular Biology, 410.603 Advanced Cell Biology I.

410.633 Introduction to Bioinformatics (4 credits)
Retrieval and analysis of electronic information are essential today’s research environment. This course explores the theory and practice of biological database searching and analysis. In particular, students are introduced to integrated systems where a variety of data sources are connected through World
Wide Web access. Information retrieval and interpretation are discussed, and many practical examples in a computer laboratory setting enable students to improve their data mining skills. Methods included in the course are searching the biomedical literature, sequence homology searching and multiple alignment, protein sequence motif analysis, and several genome analytical methods. Classes are held in a computer laboratory. Acquaintance with computers is required. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology.

410.634 Practical Computer Concepts for Bioinformatics (4 credits)
This course introduces students with a background in the life sciences to the basic computing concepts of the UNIX operating system, relational databases, structured programming, object-oriented programming, and the Internet. Included is an introduction to SQL and the Python scripting language. The course emphasizes relevance to molecular biology and bioinformatics. It is intended for students with no computer programming background but with a solid knowledge of molecular biology. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology.

410.635 Bioinformatics: Tools for Genome Analysis (4 credits)
Several large-scale DNA sequencing efforts have resulted in megabase amounts of DNA sequences being deposited in public databases. As such, the sequences are of less use than those sequences that are fully annotated. Assigning annotations, such as exon boundaries, repeat regions, and other biologically relevant information, accurately in the feature tables of these sequences requires a significant amount of human intervention. This course instructs students on computer analytical methods for gene identification, promoter analysis, and introductory gene expression analysis using software methods. Additionally, students are introduced to comparative genomics and proteomic analysis methods. Students will become proficient in annotating large genomic DNA sequences. Students complete two large sequence analysis projects during the course. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.633 Introduction to Bioinformatics; or all bioinformatics core courses.

410.636 Biology of HIV & AIDS (4 credits)
This course includes an overview of the biology and life cycle of the immunodeficiency virus, including the simian viruses. Specific areas of HIV immunopathogenesis are emphasized, to include HIV diagnosis, HIV-induced immune dysfunction, and therapeutic breakthroughs in the treatment of HIV-1 disease. Students become familiarized with current methods in biotechnology that have advanced our understanding of the biology of retroviruses. Special topics include international genetic variation (subtypes and clades), HIV vaccine development, and global economic impact. Prerequisites: 410.601 Biochemistry 410.602 Molecular Biology 410.603 Advanced Cell Biology 1.

410.637 Bioethics (4 credits)
Students in this course analyze and discuss traditional philosophical theories regarding the nature of the moral good. They then apply these theories to critical issues and selected cases involving experiments with human subjects, organ transplantation, in vitro fertilization, the use of animals in research, the collection and publication of research data, peer review, conflicts of interest, and other topics of current concern.

410.638 Cancer Biology (4 credits)
This course provides students with knowledge of the fundamental principles of the molecular and cellular biology of cancer cells. Lectures and demonstrations explain the role of growth factors, oncogenes, tumor suppressor genes, angiogenesis, and signal transduction mechanisms in tumor formation. Discussion of aspects of cancer epidemiology, prevention, and principles of drug action in cancer management is part of the course. Prerequisites: All four core courses.

410.639 Protein Bioinformatics (4 credits)
Because the gap between the number of protein sequences and the number of protein crystal structures continues to expand protein structural predictions are increasingly important. This course provides a working knowledge of various computer-based tools available for predicting the structure and function of proteins. Topics include protein database searching, protein physicochemical properties, secondary structure prediction, a statistical verification. Also covered are graphic visualization the different types of three-dimensional folds and predicting 3-D structures by homology. Computer laboratories complement material presented in lectures. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.633 Introduction to Bioinformatics.

410.640 Molecular Phylogenetic Techniques (4 credits)
This course will provide a practical, hands-on introduction to the study of phylogenetics and comparative genomics. Theoretical background on molecular evolution will be provided only as needed to inform the comparative analysis of genomic data. The emphasis of the course will be placed squarely on the understanding and use of a variety of computational tools designed to extract meaningful biological information from molecular sequences. Lectures will provide information on the conceptual essence of the algorithms that underlie various sequence analysis tools and the rationale behind their use. Only programs that are freely available, as either downloadable executables or as Web servers, will be used in this course. Students will be encouraged to use the programs and approaches introduced in the course to address questions relevant to their own work. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.633 Introduction to Bioinformatics.

410.641 Clinical & Molecular Diagnostics (4 credits)
This course covers basic concepts and practical applications of modern laboratory diagnostic techniques. Topics include the principles of testing methodology, quality assurance, and the application of molecular methods to the clinical and research laboratory. The test methods to be covered include nucleic
acid-based methods, such as hybridization, amplification, and sequencing; non-nucleic acid methods, such as HPLC, GLC, a protein analysis; and technologies, such as PFGE, ribotyping, RFLP, and serological testing methodologies. In addition to the test procedures, students are exposed to aspects of statistics, quality control, regulatory issues, and applications of these methods to the diagnosis and prognosis of human disease. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology.

410.645 Biostatistics (4 credits)
This course introduces statistical concepts and analytical methods as applied to data encountered in biotechnology and biomedical sciences. It emphasizes the basic concepts of experimental design, quantitative analysis of data, and statistical inferences. Topics include probability theory and distributions; population parameters and their sample estimates; descriptive statistics for central tendency and dispersion; hypothesis testing and confidence intervals for means, variances, and proportions; the chi-square statistic; categorical data analysis; linear correlation and regression model; analysis of variance; and nonparametric methods. The course provides students a foundation to evaluate information critically to support research objectives and product claims and a better understanding of statistical design of experimental trials for biological products/devices. Prerequisites: Basic mathematics (algebra), scientific calculator.

410.648 Clinical Trial Design and Conduct (4 credits)
Through a case study approach, this course will cover the basic design issues of clinical trials, specifically targeting the protocol, case report forms, analysis plan, and informed consent. The design of a specific trial will be studied to illustrate the major issues in the design of a study, such as endpoint definition, control group selection, and eligibility criteria. The course will also cover the analysis plan for a study, including approaches that are central to clinical trials, such as stratified analysis, adjustment factors, and “intention-to-treat” analysis. The planned analytical techniques will include the analysis of correlated data (i.e., clustered data, longitudinal data), survival analysis using the proportional hazards (Cox) Regression model, and linear models. A semester-long project will include the creation of a protocol, case report forms, and informed consent. Prerequisites: 410.645 Biostatistics or equivalent (required), 410.651 Clinical Development of Drugs and Biologics (recommended).

410.651 Clinical Development of Drugs and Biologics (4 credits)
This course introduces students to the planning and work required to develop new drugs and biologics efficiently. Students gain a thorough appreciation of FDA and International Council for Harmonisation regulations and guidelines. Because the course emphasizes the importance of planning before the execution of any of the necessary steps, lectures use a “backward” approach, discussing the final analysis and report before developing protocols. Topics also include an overview of preclinical investigations; NDA/BLA format and content; clinical development plans; product and assay development; the IND; and trial design, implementation, and management. Prerequisites: 410.303 Foundations of Bioscience OR 410.601 Biochemistry and 410.603 Advanced Cell Biology OR admission to the MS in Regulatory Science Program OR Master of Biotechnology Enterprise and Entrepreneurship programs.

410.653 Tissue Engineering (4 credits)
Tissue engineering is a highly multidisciplinary field that involves cell biology, chemistry, materials science, engineering, and medicine. This course will be a survey that introduces students to the field from scientific, clinical, manufacturing, and regulatory perspectives. Roughly the first half of the course will be devoted to background material, and the second half will focus on applications. Readings will be drawn from books and journals. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I.

410.655 Radiation Biology (4 credits)
This course will review types of ionizing radiation and their differences, physical and chemical interactions of radiation with biological molecules, and effects on living matter beginning with molecular and cellular interactions and proceeding to tissue, organ, and organism levels, emphasizing the human system. Radiation’s beneficial effects in cancer therapy and medicine as well as detrimental and carcinogenic effects will be discussed. Specific units will consider food irradiation, nuclear power plant accidents, radiation terrorism, everyday sources of exposure to the U.S. population, and other practical situations involving radiation. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I.

410.661 Methods in Proteomics (4 credits)
This course covers the analytical methods used to separate and characterize pharmaceutical compounds (predominantly proteins) derived through biotechnology. While emphasis is placed on the general principles and applicability of the methods, current protocols are discussed and problem sets representing realistic developmental challenges are assigned. Topics include chromatography (HPLC, SEC, IEC), electrophoretic techniques (2-D gel electrophoresis), spectroscopic methods (UV/Vis, fluorescence, CD), analytical ultracentrifugation, microarrays, mass spectroscopy, amino acid analysis, sequencing, and methods to measure protein–protein interactions. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology.

410.662 Epidemiology: Diseases in Populations (4 credits)
Epidemiology is the study of the patterns and determinants of disease in populations. It constitutes a basic science for public health and biomedical sciences, and its influence can be felt daily through the presentation of data by government, academic, and industry sources. The goal of this course is to present an introduction to epidemiological methods and inferences to biotechnology professionals with little prior experience in public health. Issues in epidemiological inference and the assessment of causal relationships from epidemiological studies will be discussed, introducing the issues of bias and confounding. Throughout the course, emphasis will be on the practical use of epidemiology, and lectures will be complemented by case studies and published literature. Examples will be drawn from contemporaneous issues in
chronic and infectious diseases. At the conclusion of the course, students should have a greater appreciation for the role of the epidemiologic method and be able to evaluate a basic epidemiologic study, including how the study goals and research questions relate to the design, measures, and inferences. Recommended prerequisites: undergraduate statistics course or 410.645 Biostatistics.

410.663 Current Topics in Molecular & Cellular Biology (4 credits)

This course is a literature-driven exploration of current topics and methodologies employed in cell biology research. By closely examining both fundamental and innovative experimental approaches, as well as cutting-edge technologies we will explore a broad range of cell biology topics, many of which most students have previously encountered, at least at some level, in the core courses. The particular subjects and technologies discussed may vary widely from semester to semester; topics may include but are not limited to expression profiling (microarray analysis), “knock-down” with RNAi, the use of transgenic and knockout mice, proteomics and mass spectrometry, microscopy applications (epifluorescence, confocal, and/or EM), characterizing protein/protein interactions, and detection methods for the movement of small molecules and ions. Students enrolling in this course are expected to already have some experience in critical reading and evaluation of the primary scientific literature. Prerequisites: All four core courses.

410.666 Next-Generation DNA Sequencing and Analysis (4 credits)

The recent revolution in DNA sequencing technologies has transformed biology within a few short years, dropping the cost and ease of sequencing dramatically to the point where the “$1,000 human genome” is in sight. Armed with complete genome sequences, biologists need to identify the genes encoded within and the variation in these genes between individuals, assign functions to the genes, and put these into functional and metabolic pathways. This course will provide an overview of next-generation sequencing technologies in the historical context of DNA sequencing, the pros and cons of each technology, and the bioinformatics techniques used with this sequence information, beginning with quality control assessment, genome assembly, and annotation. Prerequisites: 410.602 Molecular Biology, 410.633 Introduction to Bioinformatics, 410.634 Practical Computer Concepts for Bioinformatics.

410.667 Theory and Application of Immunoassays (4 credits)

Antibodies are useful as molecular tools in a variety of applications in biotechnology. They can be produced quickly, inexpensively, and in very large quantities. Students will examine how antibodies can be configured as a measurement tool called an immunoassay. Students design immunoassays for their own laboratory applications, such as radio- and enzyme-immunoassays, and competitive and immunometric immunoassays. They learn how to modify antibodies chemically for conjugation of reporter molecules and become aware that various immunoassay performance issues can affect results.

Students also investigate immunoassay formats, such as configuration of antibodies as biosensors and surface plasmon resonance signaling. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I. Prior completion of 410.613 Principles of Immunology is strongly recommended or approval of program committee.

410.669 Immunology of Infectious Diseases (4 credits)

This course is a lecture-based, advanced topics course designed for students who have a background in immunology and medical microbiology. The course provides a detailed description of specific pathogens (bacterial, viral, parasitic, and fungal) and their interactions with the human immune system, including innate and acquired immunity. Pathogens covered in detail may include mycobacterium (tuberculosis), gram-negative enteric bacteria (bacillary dysentery), paramyxovirus (measles virus), enterovirus (poliovirus), plasmid parasites (malaria), intestinal protozoa (amoebiasis), trichinella, and candidiasis (thrush) and other opportunistic mycoses. Immunology topic covered in detail include mucosal immune responses, the role of PRR and PAMPs, pathogen regulation of host immune response, pathogen evasion of immune effector mechanisms, polarization of CD4+ T helper cell subsets, mechanisms of immunopathogenesis, and vaccine design. Lectures will be supplemented with talks from scientific experts from the field. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology 410.603 Advanced Cell Biology I.

410.670 Biology of Stress (4 credits)

This course explores stress from a multidisciplinary perspective beginning with a history of stress research, which began in the early 20th century. Because of the interdisciplinary nature of the subject matter, a detailed consideration of anatomy and functioning of the central and peripheral nervous systems will be discussed. In addition, students will examine how stress affects the endocrine, cardiovascular, reproductive, digestive, and immune systems. Students will also learn the role of stress in cognition and complex behaviors, such as memory, mood, appetite, sleep, and sexual desire. Animal and human studies will be discussed as well as current pharmacological treatment. Prerequisites: 410.601 Biochemistry, 410.603 Advanced Cell Biology I.

410.671 Gene Expression Data Analysis and Visualization (4 credits)

This course will introduce students to various methods for analyzing and interpreting transcriptomics data generated from technologies such as oligonucleotide or two-channel microarrays, qRT-PCR, and RNA sequencing. Topics will include scaling/normalization, outlier analysis, and missing value imputation. Students will learn how to identify differentially expressed genes and correlate their expression with clinical outcomes such as disease activity or survival with relevant statistical tests; methods to control for multiple testing will also be presented. An introduction to linear and nonlinear dimensionality reduction methods and both supervised and unsupervised clustering and classification approaches will be provided. Open source tools and databases for biological interpretation of results will be introduced. Assignments and concepts will make use of publicly available datasets and
students will compute and visualize results using the statistical software R. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.645 Biostatistics, 410.634 Practical Computer Concepts for Bioinformatics, or an undergraduate computer programming course.

410.673 Biological Processes in Regulatory Affairs (4 credits)
This course provides an overview of the biological processes and laboratory techniques utilized for the discovery, development, and evaluation of therapeutic drugs. Students investigate drug development processes, such as gene cloning, culture scale-up downstream processing, and product purification. Emphasis is placed on the theory and application of laboratory methods in drug development, such as recombinant DNA techniques, antibody technology, protein purification, immunoassays, high throughput drug screening, chromatography, electrophoresis, cell receptor characterization, pharmacokinetics, drug toxicity testing, and evaluation of therapeutic drugs, diagnostics, and vaccines. Prerequisites: 410.303 Bioscience for Regulatory Affairs OR 410.601 Biochemistry and 410.603 Advanced Cell Biology OR admissions to the MS in Regulatory Science OR Master of Biotechnology Enterprise and Entrepreneurship programs.

410.674 Food Microbiology (4 credits)
Food microbiology encompasses the study of microorganisms that have both beneficial and deleterious effects on the quality and safety of raw and processed meat, poultry, and egg products. Food microbiology focuses on the general biology of the microorganisms that are found in foods, including their growth characteristics, identification, and pathogenesis. Specifically, areas of interest that concern food microbiology are food poisoning, food spoilage, food preservation, and food legislation. Pathogens in product, or harmful microorganisms, result in major public health problems in the United States and worldwide, and are the leading causes of illnesses and death.

410.692 Biological & Chemical Threat Response & Forensics (4 credits)
This course introduces the methods and techniques used for biological and chemical threat agent characterization; methods of detection, identification, medical intervention, and forensic attribution are also discussed. Lectures cover a broad variety of topics pertaining to the use of biological and chemical agents, including historical background of biological and chemical agents in classic and discretionary warfare, the introduction of scientific evidence in criminal proceedings and chain of custody for evidentiary materials in crimes and terrorism, quality assurance in laboratory operations, threat containment, decontamination and remediation, health and safety of responders and analysts, and risk assessments. Laboratory methods employed in the characterization and forensic analysis of biological (bacterial, viral, biological toxins, agricultural threats) and chemical agents (classic military chemical agents, toxic industrial chemicals, and materials) will also be discussed. General overviews of techniques and sample collection for classical biological and chemical agents (PCR, DNA sequencing methods, immunological analyses), and for chemical agents (gas chromatography and mass spectrometry). Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I, undergraduate microbiology or 410.615 Microbiology.

410.693 Science, Medicine & Policy in Biodefense (4 credits)
This course provides a comprehensive introduction to the concentration in biodefense. Biological warfare is introduced in its historical context, followed by the properties of the most important biological threat agents, their medical consequences and treatment, diagnostics, and forensics. Relevant international and domestic policy issues are explored, along with defense strategies and the nature of existing dangers to national security. Students should leave the class with a deep understanding of biological warfare and terror agents, the consequences of their potential use, and the available means of protection. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I, undergraduate microbiology or 410.615 Microbiology.

410.695 Applied Molecular Biology (4 credits)
This course covers both basic and applied concepts in molecular biology. It is designed for students with a good working knowledge of molecular biology who want to study more advanced concepts and how they may be applied in biotechnology. Topics for discussion include DNA/RNA structure, DNA replication, transcription, translation, posttranslational modifications, restriction enzymes, general recombinant DNA techniques (DNA ligations, bacterial transformation, DNA/RNA isolation), DNA sequencing, plasmids, and polymerase chain reaction. Prerequisites: 410.6 Biochemistry, 410.602 Molecular Biology, and 410.603 Advance Cell Biology I.

410.696 Bioassay Development (4 credits)
This course will cover methodological approaches to bioassay development for high-throughput screening. Both cell-based (cytotoxicity; cytoprotection, high content imaging, and reporter systems) and cell-free assay systems (enzyme, FRET, time resolved fluorescence, quenching assays, and immunological assays) will be included with discussion of the potential prom and pitfalls associated with each assay system. Various assay formats, visualization techniques, and current developments in assay technology will be discussed. Project management techniques will be utilized to aid in the process of assay development. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I.

410.697 Microfluidics and Biosensors (4 credits)
Microfluidics (lab-on-a-chip technology) is the miniaturization of laboratory operations for microscale chemistry, high-throughput drug screening, environmental sensors, bio threat detectors, forensics, clinical diagnostics, and proteomics. This course will cover microfluidic implementations of bioassay development, such as sample dilution, cell lysis, chromatography, solid-phase extraction, electrophoresis, nucleic acid amplification and sequencing, analytic detection, single-cell analysis, microarray design and mass spectrometry sample preparation. The materials, design, fabrication, and testing of microfluidic chips and biosensors will be discussed with emphasis on the applications of this technology to detect microbial pathogens and cancer markers. In addition, the
course will include case studies from the literature to introduce students to intellectual property issues related to microfluidic technology. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, or approval of program committee.

410.698 Bioperl (4 credits)
This course builds on the Perl concepts taught in 410.634 Practical Computer Concepts for Bioinformatics. Perl has emerged as the language of choice for the manipulation of bioinformatics data. Bioperl, a set of object-oriented modules that implements common bioinformatics tasks, has been developed to aid biologists in sequence analysis. The course will include an overview of the principal features of Bioperl and give students extensive opportunity to use Perl and the tools of Bioperl to solve problems in molecular biology sequence analysis. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.634 Practical Computer Concepts for Bioinformatics.

410.699 Nanobiotechnology (4 credits)
The emerging field of nanobiotechnology utilizes developments in nanotechnology and molecular biology for applications to biomedical science and clinical practice, as well as fundamental cell biology research and industrial biotechnology. Nanobiotechnology is an interdisciplinary field that exploits the unique functional properties of natural and synthetic biomolecular-sized (nanometer-scale) constructs, such as quantum dots, carbon nanotubes, nanostructured surfaces, liposomes, artificial membranes, and molecular machines for biotechnology and medicine. This course is designed for biotechnology majors and will survey the research, development, and applications of nanobiotechnology to medical diagnostics, imaging, and therapeutics (including drug delivery and anti-cancer treatments); cell biology and single-cell analysis; nanofluidics; bioassays; biosensors; and bio-inspired engineering. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I; 410.604 Advanced Cell Biology II.

410.700 Food Labeling and Packaging Regulations (4 credits)
The Nutrition Labeling and Education Act of 1990, which amended the FD&C Act, requires most foods to bear nutrition labeling and requires food labels that bear nutrient content claims and certain health messages to comply with specific requirements. The NLEA and the final regulations to implement the NLEA provide for a number of fundamental changes in how food is labeled, including requiring that nutrition labeling be placed on most foods, requiring that terms that characterize the level of nutrients in a food be used in accordance with definitions established by the FDA, and providing for the use of claims about the relationship between nutrients and diseases or health-related conditions. These changes apply to virtually all foods in the food supply, including, in large measure, to foods sold in restaurants. Food labeling is required for most prepared foods, such as breads, cereals, canned and frozen foods, snacks, desserts, drinks, etc. Nutrition labeling for raw produce (fruits and vegetables) and fish is voluntary.

410.709 Cancer Genomics (4 credits)
Alterations to the genome are the basis of cancer development, but not all mutations cause cancer. Cancer genomics is the study of cancer cell genomes to elucidate how changes in the genome drive cancer development, and how these changes can be targeted for better prevention, diagnosis and treatment of cancer. In this course, students learn about the multi-step process of tumorigenesis and the confounding development of passenger mutations. Students will use bioinformatics tools to analyze human cancer genomic data sets to understand the genetic basis of cancer and how to identify genetic signatures that differentiate one type of cancer from another. Activities include the identification of actionable mutations and biomarkers in hypothetical patients and their assignment to appropriate individualized cancer therapies. Topics also include the development of drug resistance, combinatorial therapies, and understanding the laboratory tests used to inform cancer therapy. Discussions about the ethical challenges raised by the use of genomic information to make personal care decisions is included in the course. Prerequisites: All four core courses or equivalent; 410.633 Introduction to Bioinformatics; 410.638 Cancer Biology is recommended.

410.712 Advanced Practical Computer Concepts for Bioinformatics (4 credits)
This intermediate-to-advanced-level course, intended as a follow-on to 410.634 Practical Computer Concepts for Bioinformatics (a prerequisite for this new class), will integrate and expand on the concepts from that introductory class to allow students to create working, Web-based bioinformatics applications in a project-based course format. After a review of the concepts covered in 410.634, students will learn how to create functional Web applications on a UNIX system, using Python and CGI to create forms that can be acted upon, and using the Perl DBI module to interface with MySQL relational databases that they will create and populate to retrieve and present information. This will be demonstrated by building an in-class, instructor-led project. More advanced SQL concepts and database modeling will also be covered, as well as introductions to HTML5, CSS3, and JavaScript/JSON. Class time in the latter weeks of the class will be devoted to individual assistance on student projects and to short lectures on advanced topics. Once again, whenever possible, this course will emphasize relevance to solving problems in molecular biology and bioinformatics. Prerequisites: 410.601 Biochemistry; 410.602 Molecular Biology; 410.634 Practical Computer Concepts.

410.713 Advanced Genomics and Genetics Analysis (4 credits)
The next generation of array and sequencing technologies provides the ability to investigate large quantities of genomics information with higher sensitivity, greater throughput, and lower costs. This also introduces new challenges in data management, novel algorithmic approaches, and general interpretation. This course builds on the topics in 410.616 Gene Expression Data Analysis and Visualization to address analysis of both genetic variation and genomics content including: splice variants, single nucleotide polymorphisms (SNPs) with family-based and case/control genome-wide association, copy number variation, somatic and germline single nucleotide variants,
tumor clonality and ploidy estimates, and transcription factor binding sites. Data types will include array, RNA sequencing, and DNA sequencing (targeted and whole exome) with sequence assembly methods presented such as de novo and reference-based. Prerequisites: Molecular Biology, Introduction to Bioinformatics, gene expression data analysis and visualization.

410.716 Food Toxicology (4 credits)
Food toxicology is the study of the nature, properties, effects, and detection of toxic substances in food, and their disease manifestation in humans. This course will provide a general understanding of toxicology related to food and the human food chain. Fundamental concepts will be covered, including dose-response relationships, absorption of toxicants, distribution and storage of toxicants, biotransformation and elimination of toxicants, target organ toxicity, teratogenesis, mutagenesis carcinogenesis, food allergy, and risk assessment. The course will examine chemicals of food interest, such as food additive mycotoxins, and pesticides, and how they are tested and regulated.

410.733 Comparative Animal Physiology (4 credits)
This class examines animal physiology from an evolutionary and comparative viewpoint. The goal is to examine the commonalities, and unique differences in how various animal organisms address the necessary life functions. Topics will include homeostatic mechanisms as an overarching theme, integrating the following systems: nervous, endocrine, muscle, circulatory, defense, respiratory, excretory, fluid and acid-base balance, digestive, energy balance and thermal, and reproductive.

410.734 Practical Introduction to Metagenomics (4 credits)
The emerging field of metagenomics allows for the study of entire communities of microorganisms at once, with far-reaching applications in a wide array of fields, such as medicine, agriculture, and bioremediation. Students will learn the principles of metagenomics through exploration of published project data and guided readings of recent literature. Using d from the Human Microbiome Project, students will explore practical analysis tasks, including sequence assembly, gene prediction and annotation, metabolic reconstruction, taxonomic community profiling, and more. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.633 Introduction to Bioinformatics.

410.736 Genomic and Personalized Medicine (4 credits)
This integrative course will be of interest to a wide variety of students in different concentration areas. Applying knowledge from their core courses and introductory bioinformatics, students will examine the current applications of whole-genome sequencing and genome-wide association studies in clinical medicine, and explore evolving applications and their impact on future medical diagnoses and treatments. Students will review both established and emerging sequencing platforms in detail. This course will closely examine whole-genome sequencing applications in inherited and heritable diseases and cancer, among others. Class discussions will include ethical, legal, regulatory, and economic implications of genomic medicine. Students and faculty members will regularly report on new developments in the field as they emerge throughout the course. Prerequisites: 410.601 Biochemistry; 410.602 Molecular Biology; 410.633 Introduction to Bioinformatics

410.750 Molecular Targets & Cancer (4 credits)
This course will investigate current and potential molecular targets in cancer including kinases, DNA repair pathways, epigenetic modifications, immunotherapy approaches, hormonal, metastasis and angiogenesis targets. Discussion will also include topics on what defines a molecular target and the methods by which they are evaluated. Prerequisites: All four core courses.

410.751 Chemical Libraries & Diversity (4 credits)
Chemical diversity and “pharmacological space” will be studied, with an emphasis on disciplines related to drug discovery. Medicinal chemistry, natural product chemistry, focused synthetic libraries, and combinatorial chemistry will be covered. Lipinski’s rules for drug like molecules will be discussed in detail, as well as methods for chemical analysis, in silicon drug design, molecular modeling, and compound storage and handling. In addition, techniques used for assessing and harnessing chemical diversity for drug discovery will be discussed. Prerequisites: All four core courses or approval of program committee.

410.753 Stem Cell Biology (4 credits)
This course will involve discussion and debate on current topics concerning stem cell biology and the use of stem cells in biotechnology and therapeutics. Topics will include review and discussion of developmental and cell biology, stem cell characteristics, stem cell preparation and therapeutic uses, tissue engineering, global regulatory and ethical issues, and commercialization of stem cell therapy. Current peer-reviewed literature and guest experts in the field will provide up-to-date information for discussion. Prerequisites: All four core courses.

410.754 Comparative Microbial Genomics: From Sequence to Significance (4 credits)
Hundreds of bacterial and archaeal genomes have been completely sequenced, and thousands more will follow in the near future. In this course we will learn how to make sense of this vast sea of information in order to understand the diversity of microbial life on earth: transforming DNA data into knowledge about the metabolism, biological niche, and lifestyle of these organisms. The use and development of bioinformatics platforms for the sensible comparison of genetic function and context are essential for work in modern microbiology. Topics covered will include methods for sequencing, gene finding, functional prediction, metabolic pathway and biological system reconstruction, phylogenomics, ontologies, and high-throughput functional genomics. Particular attention will be paid to publicly available bioinformatics resources and their proper use. Examples will be drawn from microbes of importance to human health, industry, ecology, agriculture, and biodefense. Lectures and discussions are integrated with computer exercises where appropriate. Prerequisites: 401.601 Biochemistry, 410.602 Molecular Biology, 410.633 Introduction to Bioinformatics.
410.761 Pharmacogenomics (4 credits)
This course will explore the relationship between an individual's genetics, epigenetics and microbiome and the efficacy of drugs and biologics. Through the use of case studies from disease states such as cancer, immunological deficiencies, metabolic issues students will understand the interplay of genetics and treatment. Students will be introduced to concepts and assays, including prognostic genotyping and diagnostic expression used to determine an individual's treatment options including individual genetic profiling. Pre-requisites: 410.602 Molecular Biology, 410.610 Epigenetics Gene Organization and Expression.

410.777 BioFuels (4 credits)
In this course, students are introduced to the current technologies used in the production of biofuels. These technologies include ethanol distillation using a variety of biomass raw materials, such as corn, sugar cane, cellulosic waste materials, and beer waste. Students will also study the method used to produce biodiesel using agricultural products, such as soybeans and canola, used vegetable oil, and algae. They will also investigate the production of hydrogen from algae and bacterial sources. Students will also study the biodigester and how it can be used to transform waste into energy. In addition, studying the techniques used to produce biofuels, students will also discuss the economic and environmental impacts of using agricultural biomass sources, since many of these are also food sources. Prerequisites: 410.601 Biochemistry, 410.602 Molecule Biology, 410.603 Advanced Cell Biology I.

410.800 Independent Research in Biotechnology (4 credits)
Students in the biotechnology program have the opportunity to enroll in an independent research course. This elective course is an option after a student has completed at least eight-level courses and has compiled a strong academic record. Prior to proposing a project, interested students must have identified a research topic and a mentor who is familiar with their prospective inquiry, and who is willing to provide guidance and oversee the project. The research project must be independent of current work-related responsibilities as determined by the project mentor. The mentor may be a faculty member teaching in the biotechnology program, a supervisor from the student's place of work, or any expert with appropriate credentials. Students are required to submit a formal proposal for review and approval by the biotechnology program committee. The proposal must be received by the Advanced Academic Programs office no later than one month prior to the beginning of the term in which the student wants to enroll in the course. Students must meet with a member of the program committee periodically for discussion of the project's progress and a written document must be completed and approved by the program committee and project mentor for the student to receive graduate credit. Additional guidelines can be obtained from the AAP administrative office. Prerequisite: All four core courses and four elective courses.

410.801 Biotechnology Thesis (4 credits)
Students wishing to complete a thesis may do so by embarking on a two-semester thesis project, which includes 410.800 Independent Research Project and 410.801 Biotechnology Thesis courses. This project must be a hypothesis-based, original research study. The student must complete 410.800 Independent Research Project and fulfill the requirements of that course, including submission of project proposal, final paper, and poster presentation, before enrolling in the subsequent thesis course. For the thesis course, students are required to submit a revised proposal (an update of the 410.800 proposal) for review and approval by the faculty adviser and biotechnology program committee one month prior to the beginning of the term. Students must meet the faculty adviser periodically for discussion of the project's progress. Graduation with a thesis is subject to approval by the thesis committee and program committee, and requires the student to present his/her project to a faculty committee both orally and in writing. Prerequisites: All four core science courses and six elective courses, which must include 410.800 Independent Research Project and 410.645 Biostatistics.

ENTERPRISE AND REGULATORY COURSES

410.606 Clinical Trial Management (4 credits)
The goal of this course is to provide students with a functional understanding of all the operational aspects of a clinical study. At the end of the course, students will be able to think about a study from the point of view of the Study Manager (primary focus of the course), and also from that of different team members, understand how regulations affect and guide a study, and be exposed to common issues and mistakes made during clinical trial management. Students will learn what happens at the site level and how and why sites are monitored, emphasizing potential site issues and what a study manager and team could do to resolve/prevent problems. An example study protocol will be used throughout the study and students will be required to write and review clinical site monitoring reports. Prerequisites: 410.648 Clinical Trial Design and Conduct.

410.607 Proseminar in Biotechnology (4 credits)
The Biotechnology Proseminar introduces students to issues and challenges facing leaders of public and private-sector organizations, and communities seeking to achieve shared goals within the biotechnology industry. The course brings together diverse academic science and business disciplines (science, regulatory affairs, marketing, finance, legal, ethics, communications, etc.). It explores how these disciplines can be used as powerful tools to create effective leadership and productive collaborations within the industry, while improving managerial decision-making. The proseminar frames and integrates the combined MS/MBA Biotechnology content, methods, and tools of inquiry and analysis.

410.637 Bioethic (4 credits)
Students in this course analyze and discuss traditional philosophical theories regarding the nature of the moral good. They then apply these theories to critical issues and selected cases involving experiments with human subjects, organ transplantation, in vitro fertilization, the use of animals in research, the collection and publication of research data, peer review, conflicts of interest, and other topics of current concern.
410.642 Economic Dynamics of Change in Biotechnology (4 credits)
Governments around the world are beginning a long-term process that reviews and redesigns its health care systems addressing concerns of innovation, cost, equitable access, and sustained quality of health care. As a result, health care is undergoing significant changes globally in R&D, marketing, pricing, sales, and distribution. This course helps students to understand these processes and the new business opportunities and new business models they will create. It provides some of the basics of macro and microeconomics to clarify how economic and social forces drive changes in the pharmaceutical, biotech, and genetic industry. Emphasis will be placed on the application of economics.

410.643 Managing and Leading Biotechnology Professionals (4 credits)
The roles of managers and leaders within biotechnology companies undergo constant change. Biotechnology manager and leaders must engage in new and innovative problem-solving strategies; lead a diverse and global workforce; develop partnerships with other businesses, customers, and competitors manage horizontally and across teams; and utilize technology a competitive advantage. The student is able to address core challenges in his/her own organization and learn methods of implementing change, such as negotiation techniques and motivation. The course includes in-depth discussions of leadership skills, communication, conflict resolution, and goa integration. Students research a biotechnology organization, analyze what is working and not working within the management systems, and suggest alternatives.

410.644 Marketing Aspects of Biotechnology (4 credits)
This course introduces students to the strategic and tactical approaches used in the marketing of biotechnological produce and services. Students gain a thorough understanding of the research and planning necessary to develop a marketing plan the relationship between the marketing and sales functions, the difference between marketing a scientific product and a scientific service, pricing strategies, distribution alternatives, communications, promotion, and the importance of perception Knowledge of marketing terminology and techniques prove helpful to anyone in the industry.

410.646 Creating a Biotechnology Enterprise (4 credits)
This course provides a foundation to start or help grow a young biotechnology company from inception through early growth. Topics include market assessment of innovative technology, patents and licensing, corporate law, preparing a business plan, raising money from angels and venture capitalists, government grants, strategic alliances, sales and marketing, real estate, human resources, and regulatory affairs. The course provides survey and overview of the key tasks and challenges typically faced by biotech entrepreneurs, their management team, and directors. Students will prepare a business plan for a biotech startup and present the plan to a panel of industry experts and financiers. Leaders from our local bioscience community will guest lecturers for many of the classes.

410.647 Research Ethics (4 credits)
This course covers the basic ethical notions in the conduct of biomedical research with animals and human subjects that make up the core values of scientific integrity. Students explore issues central to these areas, such as the appropriate use of animals in research, informed consent for human subjects, authorship, peer review, and the ethics of the business of science.

410.649 Introduction to Regulatory Affairs (4 credits)
Regulatory affairs comprise the rules and regulations govern product development and post-approval marketing. In the U.S. the FDA establishes and oversees the applicable regulations under several statutes, many regulations, and partnership with legislators, patients, and customers. Biotechnology products may be classified as drugs, biologics, or medical devices. Each type is regulated by a different center within the FDA. This course provides an overview of RA and its effect on product development. Topics include RA history, regulatory agencies, how to access regulatory information, drug submissions, biologics submissions, medical device submissions, GLP, GCP, GMP, and FDA inspections.

410.650 Legal Aspects of Biotechnology (4 credits)
This course is a survey of legal topics relevant to a biotech enterprise as it is established, conducts research, and brings innovative products to market. These include property, contracts, regulatory compliance, and patents. Students will be able to analyze common business situations and understand how associated legal risks are managed. Students who have taken 410.687 Ethical, Legal and Regulatory Aspects of the Biotechnology Enterprise will also benefit from this course, as they will analyze contracts, patents, and various statutes and court decisions that impact the biotechnology sector.

410.665 Bioscience Communication (4 credits)
Researchers must communicate effectively so their discoveries can be shared with others. In this course, students learn how to communicate their ideas to other researchers, their scientific peers, and investment communities. Students master both written and verbal communication skills, hone their expertise at making both formal and informal oral presentations, prepare poster presentations, and develop their own public speaking strategies. The course also presents personal strategies for improving daily communications, cross-cultural communications, and nonverbal skills. Students improve their written communication, editing, and informal writing skills. Participants also learn effective email strategies for getting their message across and learn how effective writing can improve their chances of getting grant applications approved. Class assignments include preparation of scientific papers, general science writing, oral presentations, PowerPoint presentations, and scientific posters.

410.675 International Regulatory Affairs (4 credits)
Pharmaceutical/biotechnology product approval and marketing requires a good understanding of international regulatory affairs in order to successfully compete in today’s global marketplace. It is important for tomorrow’s leaders to understand and follow the regulatory differences to ensure
optimum product development strategies, regulatory approvals, and designs for exports conforming to the foreign regulatory bodies. There are various product development strategies that industry is using to shorten the product development time by conducting preclinical programs outside the U.S., but the strategy requires careful planning and interaction with the U.S. and foreign regulatory agencies. With the increase in globalization of economy and exports, international regulations will have a bigger impact on the biotechnology business in the future. The course provides a review and analysis of the pharmaceutical/biotechnology product approval processes within the world’s major markets. The key strategies required in preclinical product development to marketing approval of the products in Europe, Japan, and the U.S. will be compared and discussed. Students will explore the European Union regulations and their overall importance on international markets. The course will cover the salient features of common technical and regulatory documents required for submission and approval to the leading regulatory bodies in the world, general guidance documents, international harmonization, and the General Agreement on Tariffs and Trade.

410.676 Food and Drug Law (4 credits)
The Food, Drug, and Cosmetic Act governs the regulatory approval process for bringing a drug, biologic, medical device, food, or cosmetic to market. The class will discuss administrative procedures followed by the FDA. The course includes an overview of the drug, biologic, and medical device approval processes, and the regulation of food and dietary supplements. Students then will be exposed to the enforcement activities of the FDA, including searches, seizure actions, injunctions, criminal prosecutions, and civil penalties authorized under the FD&C Act, as well as other statutes, like the Public Health Service Act which regulates the development and approval of biologics.

410.677 Preparing a Successful Submission (4 credits)
This course provides a comprehensive overview of the U.S. Food and Drug Administration’s (FDA’s) regulation of the research and development, and marketing of new drugs, biologics, and medical devices. The regulatory requirements for investigational (Investigational New Drug (IND) and Investigational Device Exemption (IDE)) and premarket approval (New Drug Application (NDA), Abbreviated New Drug Application (ANDA), Biologics License Application (BLA), premarket notification (510(k)), Premarket Approval (PMA)) applications will be addressed. The content and format requirements for the preparation, submission, and maintenance of these applications will be covered.

410.678 Marketing in a Regulated Environment (4 credits)
This course is designed to help students understand how companies can effectively achieve their marketing goals while complying with the laws, regulations, and policy guidance documents governing marketing, advertising, and promotion of products regulated by the FDA. The course provides an overview of marketing, in a context of FDA regulations. We offer perspectives and real-world discussions of the FDA’s advertise and promotion oversight and enforcement responsibilities. The course focuses on types of marketing and promotion activities that are commonly used in the industry for marketing drugs and diagnostics. We cover strategies and activities that can be effectively incorporated into overall marketing, including reimbursement, pricing, distribution, social media, channel management, and others, using current industry best practice. The course introduces students to advertising guidelines associated with regulated products. It provides insights on effective marketing research approaches, including analysis to current markets, patient profiles, competition, pricing, the value of comparative data, and issues associated with unapproved investigational products and unapproved research products.

410.679 Practicum in Regulatory Science (4 credits)
This integrative, case-based course will focus on applying knowledge gained from previous courses in the Master of Science in Regulatory Science program to actual cases from the FDA. For each case, students will assume the role of regulatory specialist, an FDA reviewer or senior-level policy-maker, or other involved stakeholders, such as a consumer group or an advocacy group. Students will be expected to research, evaluate, and present scientifically and legally justifiable positions on case studies from the perspective of their assigned roles. Students will present their perspectives to the class and be asked to debate the issues with the other students from the perspective of their assigned roles. The major responsibility of the students in this course will be to make scientifically and legally defensible recommendations and to justify them through oral and written communication. Please note this course is only open to students in the Master of Science in Regulatory Science and should only be taken after all required courses are completed.

410.680 Finance for Biotechnology (4 credits)
Students will build an understanding of the basics of contemporary global monetary systems and the essentials of financial management. This course will include a means to develop a working knowledge of the critical financial factors for decision-makers from the perspectives of key stakeholders. The syllabus is designed to provide students with limited or no background in finance an opportunity to establish a means to understand financial basics and communicate clearly in financial terms when conducting business. This course is uniquely designed to meet the current needs of those leading the global life science industry.

410.681 Commercializing Biotechnology (4 credits)
This advanced course provides an integrated and practical approach to considering the principal areas of concern an entity faces when commercializing biotechnology, from creating or obtaining the technology through partnering with others to further develop and commercialize the technology, and finally selling the business or business line that incorporates that technology. The focus of this course is to highlight key junctures in a biotechnology company’s evolution; help students identify key financial, management, and business issues at those junctures; and present practical alternatives for students to consider to resolve those issues. This course builds upon 410.650 Legal Aspects of Biotechnology and 410.646 Creating a Biotechnology Enterprise, but they are not prerequisites for the course.
410.682 Validation in Biotechnology (4 credits)
Understanding validation and applying a comprehensive validation philosophy are essential in today's biotechnology industry. First and foremost, validation allows a company to operate in compliance with the regulations and guidance set forth by FDA. Perhaps more importantly, it results in equipment assays and processes that are well-understood and robust, less prone to failure, and more cost-effective. This course will introduce the fundamentals of validation, validation master planning, resource management, types of validation and the associated documentation, departmental roles and interaction and the differences between commissioning and validation. Students will have an opportunity to solve real-world problems generate actual validation documents, and develop validation program elements that balance regulatory requirements, operational needs, and business expectations.

410.683 Introduction to CGMP Compliance (4 credits)
Current Good Manufacturing Practice regulations are the minimum standards for the design, production, and distribution of drugs, biologics, and medical devices in the U.S. and internationally. In the U.S., they are codified at the federal level, in the FD&C Act and the Code of Federal Regulations, and actively enforced by FDA. These regulations, however, only begin to describe the practices used in the pharmaceutical and biotech industries. Additional sources of insight and guidance include the FDA's guidance documents and training manuals, industry trade publications, international compendia and standards-setting organizations. Students will learn the scope and history of the regulations, industry-standard implementation strategies and “best-practices” approaches, and the FDA's current expectations. Students will also learn to apply practical solutions to the regulatory issues faced in the pharmaceutical and biotech industries today.

410.684 Technology Transfer & Commercialization (4 credits)
This course is an introduction to the multidisciplinary aspect involved in the process of translating innovations in technology into commercial use, particularly research discoveries emanating from universities and other nonprofit organizations.

410.685 Emerging Issues in Biotechnology (4 credits)
Biotechnology impacts the world and our social, political, and physical environment in ways many both inside and outside the industry may not fully understand or appreciate. It is critical to ensure that advances in biotechnology be accompanied by important public, political, and social considerations and discussions. This course will cover issues including domestic and global public perception of biotechnology, its benefits and risks, advances in bioagriculture and genetically modified food, the impact of recombinant therapeutics on the healthcare and health care industry, ways in which advances in biotechnology have and will continue to change our views of what life is, and how the political climate impacts advances in biotechnology discoveries. This highly interactive course will include thought-provoking debate and discussion with industry leaders, both proponents and opponents of biotechnology.

410.686 Regulation of Good Food Production (4 credits)
Good Food Production Practices are production and farm level approaches to ensure the safety of food for human consumption. Good food production and post-harvest guidelines are designed to reduce the risk of foodborne disease contamination. These good food production procedures can be tailored to any production system and are directed toward the primary sources of contamination: soil, water, hands, and surfaces. Good food production protocols were developed in response to the increase in the number of outbreaks of foodborne diseases resulting from contaminated food. Students will learn to develop good food production regulatory protocols using case studies.

410.687 Ethical, Legal & Regulatory Aspects of the Biotechnology Enterprise (4 credits)
This course provides an overview of the important ethical, legal, and regulatory issues that are critical to the biotechnology industry. The course shares current trends and essential elements of ethics, legal issues, and regulations in a way that allows for an appreciation of how each influences the others. Students will examine core ethical values that guide the practice of science in the biotechnology industry. The course will provide an overview of legal issues, such as protecting inventions and intellectual property and licensing, and the range of regulatory oversight mechanisms with which the biotech industry must comply. This course will review the implications of strategic ethical, legal, and regulatory choices that add value to the biotechnology firm, customers, and society.

410.688 Project Management in Biotechnology (4 credits)
Today, many organizations use the approach called project management to handle activities that have a limited life span, as opposed to routine, ongoing operations. This course will answer the question, “What do I do to be successful?” The units will provide guidance for project management success by considering each phase in the life of a typical project, from concept to closeout. We will discuss the nature of project management, the structure of projects, working with teams of technical experts, and all the other activities that make project management different from any other discipline. The course will rely heavily on group discussions. Topics will include deciding what to do, developing a project plan, risk management, team leadership, monitoring and controlling during the project, scope change control, and traditional and modern approaches to project closeout. Concepts presented will be consistent with the Project Management Institute’s “Guide to the Project Management Body of Knowledge,” the U.S. standard for project management.

410.689 Leading Change in Biotechnology (4 credits)
As bioscience companies grow and mature, leadership needs to evolve. Students will learn how to identify their company's position in the “Leadership Life Cycle” and learn how to select the right leadership capabilities based on their current organizational needs. Research shows that the right leaders at the right time dramatically improve organizational success. Discussions will address the leadership needs of organizations from early-stage, research-based companies through fully
410.690 International Food Regulations (4 credits)
As the U.S. food industry expands into international markets, the same companies hoping to sell their products abroad find themselves forced to source ingredients and finished products from foreign suppliers to reduce costs and remain competitive; and to do so, they must comply with a myriad of rules and regulations in both the United States and elsewhere. The most visible enforcement agency at any U.S. border is Customs and Border Protection. However, food importers must also comply with regulations enacted by a host of other government agencies, most notably FDA, USDA Food Safety and Inspection Service, USDA Animal and Plant Health Inspection Service, and U.S. Fish & Wildlife Service. Food exporters have an even tougher burden, as they need to comply with Customs and food safety, quality, and labeling regulations and certification requirements in both U.S. and the country that is receiving the goods; and this is to mention nothing of the international regulatory infrastructure to which manufacturers must adhere when shipping food internationally. This course will cover each step of the importing and exporting process in detail, and explain where to go for key information and guidance.

410.701 Introduction to Food Safety (4 credits)
This course is designed to understand the legal and regulatory complexities of the regulation of food products in the United States. The prone issues, including regulatory compliance in food safety and Hazard Analysis and Critical Control points (HACCP), are among major issues to control the food-supply. The FDA and the U.S. Department of Agriculture (USDA) have primary responsibility for safety of meat and food products. Based on the principles of HACCP, FDA-issued seafood regulations effective in December 1997. However, the regulation of food additives, labeling, dietary supplements, genetic modifications, and the protection of the food supply will provide the in-depth food regulation in the United States. The FDA and USDA regulate the safe practice of primary and secondary food products to the American public. Depending upon the source and nature of food product, the method of shipment, advertisement of nutritional values, etc., are being governed by FDA and USDA jurisdictions. The Food Safety Modernization Act overhauls the FDA in food surveillance, enforcing regulations on specific targets, inspection records examination, and exemptions. In this course, students will learn the existing food regulations and safety net by examining the product tracing, performance standards, and preventive control plans toward food safety, security, genetic modifications, dietary supplements, and food labeling. Students will have option to design projects to propose an effective food safety net that can assist in the supply chain of the nation's food safety and security.

410.702 Biomedical Software Regulation (4 credits)
Software continually grows more complex and is becoming relied upon by health care professionals in the treatment of patients. This course describes how the U.S. government regulates software used in delivering health care, including the regulations utilized by the FDA, and the Centers for Medicare and Medicaid Services. This course covers a wide range of topics, including FDA regulation of software as a medical device and software validation, medical imaging software regulation, electronic record keeping and software used in clinical trials, laboratory information management systems, and HIPAA privacy rules and security standards.

410.703 Strategic Planning for the Biotechnology Enterprise (4 credits)
This course is an overview of the strategic planning process of a biotechnology enterprise. It focuses on creating value through strategy formulation and implementation. Topics covered include leadership and technology competencies, performance indicators, intellectual property, corporate governance, regulatory strategy, and appropriating value. The thesis of the course is that effective strategic planning and implementation is critical to success, and that it provides a valuable, structured process to create enterprise value and manage business risks. Best practices in strategic planning and managing the planning process are also provided.

410.704 Social Entrepreneurship in Bioscience (4 credits)
This course will explore how biotechnology innovators are solving social issues, including developing medical diagnostics, discovering effective and safer medicine, producing cleaner energy, remediating environmental contamination, and improving crop yields. Students will think broadly in terms of roles required in tackling these social, economic, health, and environmental issues, and how they can add value to society. This course will cover social entrepreneurship principles and practices in a range of sectors, including corporate social responsibility and public value missions in emerging markets. Students will have opportunities to define their role in advancing biotechnology as it relates to the top global challenges.

410.708 Medical Product Reimbursement (4 credits)
Medical products brought to market need to have a sound payment, coding, and coverage strategy. Medicare covers over 100 million Americans and it leads the way in all United States insurance policies. This course will provide insight into how medical product reimbursement works and allow students to understand how the Centers for Medicare & Medicaid Services (CMS) considers medical products for coverage, coding, and payment. We’ll review the history of Medicare coverage and the regulations. We’ll focus primarily on strategies used to get reimbursement for medical products—both at the national and local levels.

410.710 Economic Policy and Support Structures the Bio Entrepreneur (4 credits)
This course will explore how key actors are establishing support and advocating legislative priorities for biotechnology innovations. Students will review economic development of biotechnology clusters and local, state and federal policy factors that impact the biosciences and public views on this sector. Students will have opportunities to explore the services and support available in advancing biotechnology.
410.715 Medical Device Regulation (4 credits)
This course provides a comprehensive introduction to medical devices and how they are regulated by the FDA. Topics that will be covered include an overview of the laws and regulations that govern medical devices, the FDA’s organizational structure and responsibilities for medical device regulation, and administrative and legal requirements for medical devices throughout the full product life cycle. Particular focus will be placed on the premarket review, post-market programs enforcement (e.g., Quality Systems Regulation, and FDA inspectional programs). Included will be discussions on the responsible offices and major program requirements and resources. Students will be given various case studies to examine the application of regulations, and participate in a 510(k)/PMA workshop, mock inspectional audit, and a mock enforcement action. Upon completion of this course, the student will have a working knowledge of the requirements and policies of FDA regulation of medical devices.

410.717 Risk Assessment and Management (4 credits)
Risk analysis is composed of three separate but integrated elements, namely risk assessment, risk management and risk communication. Risk communication is an interactive process of exchange of information and opinion on risk among risk assessors, risk managers, and other interested parties. Risk management is the process of weighing policy alternatives in the light of the results of risk assessment and, if required, selecting and implementing appropriate control options, including regulatory measures. Students will learn how to integrate risk assessment, risk management, and risk communication using case studies.

410.718 Food Safety Audits and Surveillance (4 credits)
Food safety audits provide a credible verification system to the entire food processing industry including retail environment meat, fish, and poultry, vegetable and produce suppliers. Having a HACCP plan in place is often a first step to a successful food safety program, but is not entirely enough to ensure that food safety standards are being adhered to on a consistent basis. In this course, students will learn how to adequately plan for a food crisis situation.

410.721 In Vitro Diagnostic Regulation (4 credits)
This course provides a comprehensive overview of in vitro diagnostic (IVD) devices and how they are regulated by the U.S. Food and Drug Administration (FDA) and internationally, including the European Union (EU). Topics that will be covered include: (1) a summary of the U.S. and international laws, regulations, and policies that govern IVD devices, (2) administrative and legal requirements and resources for IVD devices throughout the full product life-cycle, (3) types of IVD devices, (4) coverage and reimbursement of laboratory tests, and (5) current issues and developments. Upon completion of this course, the student will have a working knowledge of the requirements and policies of the regulation of IVD devices.

410.727 Regulatory Strategies in Biopharmaceuticals (4 credits)
Given the costly drug development process and the limited resources of emerging biopharmaceutical companies, developing an early regulatory strategy-starting well before clinical trials are initiated is extremely important for the success of a company. This course will discuss different regulatory strategies that several players of the U.S. biopharmaceutical industry have employed. Students will learn about interacting with regulatory agencies, the orphan drug development, accelerated approval, fast track, priority review, and other regulatory mechanisms, pharmacogenomics and biomarkers, adaptive clinical trials, animal rule, generic drug development and biosimilar. Using case studies, the impact of these regulatory strategies on drug development, and how these strategies have helped many biopharmaceutical companies will be discussed. At the end of this course, students will better understand federal regulations and the aspects involved in developing efficient regulatory strategies.

410.728 Managing Innovation in the Life Sciences (4 credits)
Innovation is the creation of value from new ideas, concepts, methods, materials, and organizational structures. Life sciences organizations that seek to create value for their stakeholders must do so using available capital resources: financial capital, human capital, intellectual capital, and physical capital. They should manage those resources to gain leverage and maximize value realized. They then seek to defend and control the value created. Why, then, do most organizations treat innovation (and innovators) in ways similar to the body’s immune system (i.e., by identifying the innovators, isolating them, “killing” them, and ejecting them from the organization? This course will explore innovation, invention, and value creation as a driving force in the biotechnology or life sciences enterprise, and the ways in which managers should plan to take full advantage of innovation as the only true competitive weapon for long-term success. A special emphasis will be placed on innovation as applied to life science applications (biotechnology, medical devices, health care delivery, drug discovery, development and packaging, bioinformatics, etc.). Topics include invention, ROI, disruption, creative destruction, types of innovation, technology brokering, organizational structures that foster innovation, planning, and managing for innovation. Students are required to read extensively, participate actively in discussions, do case studies, and develop a convincing pitch for an innovation project.

410.732 Funding a New Venture (4 credits)
This course is designed to help students working for life sciences companies understand the fundamentals of obtaining government funding for product/technology research and development. While the emphasis will be on grant funding from the National Institutes of Health, other federal and state funding mechanisms will also be covered. Students will learn how to search for funding opportunities and receive an overview of the NIH funding mechanisms, as well as the background and history of the Small Business Innovation Research (SBIR) program. The course will provide insights on preparing an SBIR proposal and submission procedure. Fundamentals of government contracting law will also be covered.
Grants and Federal Funding for Biotechnology Enterprises (4 credits)
This course is designed to help students working for life sciences companies understand the fundamentals of obtaining government funding for product/technology research and development. While the emphasis will be on grant funding from the National Institutes of Health, other federal and state funding mechanisms will also be covered. Students will learn how to search for funding opportunities and receive an overview of the NIH funding mechanisms, as well as the background and history of the Small Business Innovation Research (SBIR) program. The course will provide insights on preparing an SBIR proposal and submission procedure. Fundamentals of government contracting law will also be covered.

Ethical, Legal and Regulatory Aspects of Personalized Medicine (4 credits)
This course provides an overview of the important ethical, legal and regulatory issues that are critical to development and implementation of personalized medicine technologies. The course reviews current trends and issues with these interrelated disciplines. Ethical issues will cover how personalized medicine challenges the bioethics foundations of medicine and its implications for enabling personalized medicine treatment. Key and emerging ethical issues such as confidentiality, informed consent, direct to consumer marketing, access to treatment and conveying results to the patient will be explored. Legal issues as it applies to the public policies of privacy, discrimination, and intellectual property will be evaluated. Finally, the regulatory oversight and reimbursement policies of personalized medicine, including targeted therapies, in vitro diagnostics, and laboratory developed tests by the FDA and CMS and other organizations will be discussed.

Ethics in Personalized Medicine (4 credits)
Examines the ethical aspects of individualized genomics and health that have emerged as the science has shaped personalized medicine and companion diagnostics. Key ethical issues such as confidentiality, informed consent, direct to consumer marketing, access to treatment and conveying results to the patient will be explored.

Legal Aspects of Personalized Medicine (4 credits)
Currently, federal and state laws offer only a patchwork of protection against the misuse of genetic information. This course will cover a number of key acts of federal legislation which provide the foundation for the protection of medical and genetic information in the United States, including the Privacy Act of 1974 (5 U.S.C. § 552a), the Electronic Communications Privacy Act (ECPA) of 1986 (18 U.S.C. §2510-2521, 2701-2710), the Americans with Disabilities Act (ADA) of 1990 (42 U.S.C. § 12101 et seq), and the Health Insurance Portability and Accountability Act (HIPAA) of 1996 (42 U.S.C. § 1320d et seq). Furthermore, in the absence of uniform federal regulations around genetics privacy and discrimination, many states have established their own regulations, resulting in an uneven landscape of protection.

Healthcare Economics (4 credits)
This course studies basic health economic concepts such as opportunity cost, production of good health, the demand for medical care, production and cost theory, cost-benefit analysis, and healthcare systems and institutions. Other topics of interest include analysis of the behavior of healthcare providers, profit maximization, competition, and the role of government in health matters and medical care markets.

Current Topics in Regulatory Policy (4 credits)
The ability to successfully navigate the intersections of law, regulation, guidance, and policy has never been more critical to the success of entities engaged in the medical product development and commercial marketing. The entities that make up this industry are very sophisticated in their abilities to innovate at a blazing speed. In contrast, regulators must use a regulatory model that evolves and adapts much slower than their industry counterparts. As a result, regulators are relying more heavily on policy to drive their strategy, actions, and outcomes. Therefore, a clear understanding of regulatory policy is an essential consideration for individuals engaged in the medical product development industry. This course provides an introduction into several key areas of government regulatory policy (both old and new) and regulatory science. The topics covered in this course will serve as a road map for students who want to successfully navigate within this complex and changing regulatory model.

Independent Studies in Regulatory Science (4 credits)
This course is open only to students in the MS in Regulatory Science program or the MS in Biotechnology with a concentration in Regulatory Affairs and may be taken only after the student has completed 5 courses and has compiled a strong academic record. Prior to proposing a project, interested students must have identified a study topic and a mentor who is familiar with their prospective inquiry and who is willing to provide guidance and oversee the project. The study project must be independent of current work-related responsibilities as determined by the project mentor. The mentor may be a faculty member, a supervisor from the student’s place of work, or any expert with appropriate credentials. The goal of the study project should be a “publishable” article. Students are required to submit a formal proposal for review and approval by the regulatory science program committee. The proposal must be received by the Advanced Academic Programs office no later than one month prior to the beginning of the term in which the student wants to enroll in the course. Students must interact with a member of the program committee periodically for discussion of the project’s progress, and a written document must be completed and approved by the program committee and project mentor for the student to receive graduate credit. Additional guidelines can be obtained from the AAP administrative office.

Regulatory Science Thesis (4 credits)
Students wishing to complete a thesis may do so by embarking on a two-semester thesis project, which includes 410.802 Independent Studies in Regulatory Science Project and 410.803 Biotechnology Thesis courses. This project must be either a hypothesis-based or research question-based original research study. The student must complete 410.802 Independent Research Project and fulfill the requirements of that course, including submission of project proposal, final paper, and poster presentation, before enrolling in the subsequent thesis.
course. For the thesis course, students are required to submit a revised proposal (an update of the 410.802 proposal) for review and approval by the faculty adviser and biotechnology program committee one month prior to the beginning of the term. Students must meet the faculty adviser periodically for discussion of the project’s progress. Graduation with a thesis is subject to approval by the thesis committee and program committee, and requires the student to present his/her project to a faculty committee both orally and in writing. Prerequisites: All required regulatory science courses and three elective courses, which must include 410.802 Independent Studies in Regulatory Science and, if hypothesis driven, 410.645 Biostatistics.

410.804 Practicum in Biotechnology Enterprise & Entrepreneurship (4 credits)
This course synthesizes the knowledge and skills acquired in the Masters of Biotechnology Enterprise and Entrepreneurship program, while offering a real-world examination of a bioscience organization and the issues it faces. Students will form interdisciplinary teams and work with faculty and industry professionals on an authentic and current project from a local bioscience public or private company, an entrepreneurial startup, or a nonprofit organization. This course is open to students completing the Certificate in Biotechnology Enterprise and Entrepreneurship program.

410.805 Practicum in Project Management (4 credits)
This course synthesizes the knowledge and skills acquired in the Certificate in Biotechnology Enterprise Project Management Focus. It offers students a real-world examination of a bioscience organization as it develops and implements project management solutions and addresses related problems and issues. Students will work with faculty and industry professionals on an authentic and current project from a local bioscience public or private company, an entrepreneurial startup, or a nonprofit organization. This course is open to students completing the Certificate in Biotechnology Enterprise, Project Management Focus.

410.806 Independent Studies in Biotechnology Enterprise and Entrepreneurship (4 credits)
This course is open only to students in the MBEE or the MS in Biotechnology with a concentration in Enterprise and may be taken only after the student has completed 5 courses and has compiled a strong academic record. Prior to proposing a project, interested students must have identified a study topic and a mentor who is familiar with their prospective inquiry and who is willing to provide guidance and oversee the project. The study project must be independent of current work-related responsibilities as determined by the project mentor. The mentor may be a faculty member, a supervisor from the student’s place of work, or any expert with appropriate credentials. The goal of the study project should be a “publishable” article. Students are required to submit a formal proposal for review and approval by the enterprise/regulatory program committee. The proposal must be received by the Advanced Academic Programs office no later than one month prior to the beginning of the term in which the student wants to enroll in the course. Students must interact with a member of the program committee periodically for discussion of the project’s progress, and a written document must be completed and approved by the program committee and project mentor for the student to receive graduate credit. Additional guidelines can be obtained from the AAP administrative office.

HEALTH SCIENCE INTENSIVE COURSES

410.705 Communication for Health Care Professionals (4 credits)
In this course, students will practice both oral and written communication techniques and learn how to effectively communicate in formal and informal arenas. Students will work together to improve daily communications with peers, colleagues, and potential patients. Course work will focus on specific oral competencies, including interviewing and being interviewed and cross-culture communications, as well as specific written competencies, including application essays, email communications, and interview summaries. In all communications, emphasis will be given to getting their message across through logical and concise writing technique. Additionally, students will discuss how communication strategies can be used to encourage or hinder changes in patient behavior and incite changes in public health.

410.706 Building and Leading Teams in Health Care (4 credits)
In order to provide the best care possible, health care professionals are working together more now than ever before. As a result, strong leadership and teamwork skills are becoming necessities in joining the health care field. This course will provide hands-on activities to help students develop problem-solving skills, learn basic negotiation and mediation strategies and understand their own tendencies as leaders and team members. Using real-world examples, students will explore how strong leadership and teamwork can drive innovative solutions to public health issues.

410.707 The Psychosocial Determinants of Health, Implications on Diagnostics (4 credits)
In this capstone course, students will learn basic diagnostic techniques and use case studies to explore the relationship between physiological illnesses and diagnostic output. Through discussions and guided interviews, students will explore the role of psychology and sociology in patient care choices, as well as physician recommendations to patients. Students will practice cultural sensitivity through group activities and discussion of pressing public health issues. Students will undertake final group projects that identify needs in the local community and attempt to create solutions that could feasible be completed with limited resources.
LABORATORY ELECTIVE COURSES

410.652  Cell Culture Techniques  (4 credits)
This laboratory course illustrates the use of basic cell culture techniques for bioscience research and commercial applications. Students are introduced to cell cultivation methods, including proper use of a biological safety cabinet, sterile technique, cell enumeration and media preparation, cultivation of cell lines, detection of contamination, cryopreservation, transfection, cell culture scale-up, and an introduction to bioassays. This course is designed for students with no prior knowledge or with limited knowledge of cell culture methods. Prerequisites: 410.601 Biochemistry, 410.603 Advanced Cell Biology I.

410.656  Recombinant DNA Laboratory  (4 credits)
This laboratory course introduces students to methods for manipulating and analyzing nucleic acids. Students gain extensive hands-on experience with plasmid purification, restriction mapping, ligation, bacterial transformations, gel electrophoresis, and applications of the polymerase chain reaction. This course is not recommended for students with substantial experience in these methodologies. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology.

410.657  Recombinant Protein Expression, Production, and Analysis  (4 credits)
This laboratory course introduces students to the construction, production, processing, and analysis of recombinant proteins from prokaryotic and eukaryotic sources. Concepts include the design, construction, and delivery of recombinant expression clones, expression of recombinant genes in host cells, protein purification, and protein analysis. Laboratory exercises use current techniques and approaches for the cloning, expression, production, purification, and analysis of recombinant proteins in bacteria and mammalian cells. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.656 Recombinant DNA Laboratory, or consent of program committee.

410.658  Biodefense & Infectious Disease Laboratory Methods  (4 credits)
This laboratory course introduces students to the methods and techniques used for bio threat detection, surveillance, and identification. Using bio simulators and demonstrations, various bio detection platforms will be discussed and presented, such as point-of-detection devices and methods, laboratory-based screening and identification technologies (culture, quantitative PCR, immunoassays, biosensors), and high-throughput environmental surveillance methods. Statistical methods for determining diagnostic sensitivity and specificity and assay validity will be discussed. Laboratory practices and procedures for working in simulated Biosafety Level 2 and 3 environments will be practiced. Students will be introduced to the current bioinformatics genomic and proteomic databases used for select agent (category A, B, and C) identification and characterization. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I, undergraduate microbiology or 410.615 Microbiology, or approval of program committee.

410.659  Advanced Recombinant DNA Lab  (4 credits)
This course is a continuation of 410.656 Recombinant DNA Laboratory, intended for those who have completed the introductory course or who have extensive molecular biology laboratory experience. This second course consists of a series of integrated laboratory exercises designed to give students hands-on experience with a variety of advanced recombinant DNA techniques. Exercises include molecular cloning, PCR optimization, site-directed mutagenesis, mutation detection, measuring gene expression by quantitative real-time PCR (qRT-PCR), and control of gene expression by RNA interference. Students will be introduced to high-throughput/high-content screening procedures, such as robotic liquid handling, microarray analysis, and utilization of bioinformatic technique. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.656 Recombinant DNA Laboratory, or consent of program committee.

410.660  Immunological Techniques in Biotechnology  (4 credits)
This laboratory course introduces students to methods for analyzing the immune system. Participants gain experience with various immunologic techniques used in research and biotechnology laboratories, such as immunoassays, immunofluorescence, western blot analysis, SDS-PAGE, antibody purification (protein A), and cytokine assays. Additional topics for discussion include hybridism technology (phage antibody libraries, therapeutic monoclonal antibodies, and flow cytometry). Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I, 410.613 Principles of Immunology or undergraduate immunology course highly recommended, or consent of program committee.

410.731  Bioprocessing and Scale-Up Laboratory  (4 credits)
This course will provide students with hands-on experience in process development of biological product from a cell bank through purification. Students will develop two products; one produced in bacteria and the other in a mammalian cell culture system. Students will optimize growth conditions on a small scale and then produce the biologic in a bioreactor. Students then purify the product after optimizing purification condition. Topics to be covered include microbial fermentation, cell culture production, bioassays, product purification, and the regulatory engineering and business principles associated with scale-up of a biologic product. Prerequisites: 410.601 Biochemistry, 410.60 Molecular Biology, 410.603 Advanced Cell Biology I.

410.752  High Throughput Screening & Automation Lab  (4 credits)
This course will utilize hands-on instruction in automated bioassay systems for high-throughput screening as an entry point to covering pertinent aspects of HTS, such as data manipulation, storage, and analysis; liquid handling robotics; microtiter plate washing, manipulation, and bar coding; HTS assay detectors; and automated devices for assay setup, validation, and visualization. Cost considerations, HTS amenable assay systems, and miniaturization and scale-up will also be discussed. Prerequisites: All four core courses and 410.696 Bioassay Development.
The Master of Arts in Communication program helps professionals advance or switch their careers. Although many of our diverse group of students are already working in the field of communication and looking for additional training to advance, some are transitioning from another field. Regardless, the majority of our graduates claim that the master's degree helps with getting a new position. Our alumni are managers, directors, vice presidents, presidents, and other leaders in various organizations, such as government agencies, associations, nonprofits, and corporations. Students and alumni have access to our exclusive job opportunities network and career services center. This degree provides a great opportunity to hone or perfect your communication skills, learning from leaders in the field. It is not necessarily a path to a PhD program in that it is geared toward providing practical, leading edge skills that will prepare you yourself to be a leader in the field.

**DEGREES**

**Master of Arts in Communication**
The Master of Arts in Communication requires 10 courses, or 30 credits. It is possible for full-time students to complete their course work in one year. Students enrolled part time can earn their degrees in about two years or take up to five years if they wish. Students who work full time are encouraged to take a maximum of two courses per semester, and those working part time or not at all can take three to four courses per semester. Registering for four courses in a single semester requires permission of your adviser.

**Dual Master of Arts in Communication and Master of Business Administration**
The university allows students to simultaneously pursue a Master of Arts in Communication in the School of Arts and Sciences and a Master of Business Administration at the Carey Business School. To pursue these dual degrees, students must apply and be accepted to both programs. Students who successfully complete the requirements for both degrees will receive two separate documents. Students may complete one program first and be awarded the diploma or certificate before continuing with the second program, or work in both programs concurrently. Pending graduates must complete the graduation application for each program. Combined-degree students participate in a single commencement exercise. Read more about the Master of Arts in Communication program and start an application online at communication.jhu.edu.

**APPLICATION**
Individuals who wish to apply for the Master of Arts in Communication program must do so through Advanced Academic Programs. (The Admissions Committee reserves the right to request additional information from applicants, if needed, to assess their candidacy for admission, including an interview. All application materials submitted to Advanced Academic Programs become the property of the Johns Hopkins University and will not be returned to applicants under any circumstances.)
Prerequisites
Prospective students must hold a bachelor’s degree with a minimum grade-point average of 3.0 (or the equivalent from outside the U.S.). Competitive applicants have excellent writing skills, and a strong academic or professional background in communication prior to enrolling in the Master of Arts in Communication program.

Application Requirements

All Students

- AAP application
- Nonrefundable application fee
- Resume: Include any part- or full-time work, internships, and volunteer history. Detail any responsibilities related to communication.
- Statement of purpose: Explain why you are interested in earning the Master of Arts in Communication and how it will help your career or other goals. Double space your essay and limit it to 500 words or less (place the word count at the end of the document).
- Writing sample: Please go to the online application to download instructions and an article for your writing sample. This exercise asks you to write a single, brief paragraph. It should not take the form of a larger document, such as a letter, an email, a report, or a plan. Submit one paragraph with no more than 250 words.
- Two recommendations: Professors or supervisors should verify academic and professional accomplishments. The department prefers that they complete the AAP recommendation form rather than provide a letter.
- Official transcripts: For U.S. graduates, transcripts should show all undergraduate and graduate course work completed within the U.S. only.
- GRE scores, if necessary: The Master of Arts in Communication program waives this requirement for applicants who have (a) a cumulative undergraduate GPA of 3.0 or higher or (b) five or more years of full-time work experience after earning an undergraduate degree. Submit results directly to the Advanced Academic Programs Office of Admissions, using the code 8747. Photocopies will not be accepted.

International Students

- Foreign credential evaluation: Students who earned their postsecondary degree(s) in a country other than the U.S. are required to have a “course-by-course” credential evaluation with GPA performed by an outside evaluation service. Study abroad may be exempt.
- TOEFL or IELTS scores: International students who have not graduated from an accredited college or university in the U.S. and whose native language is not English must take the Test of English as a Foreign Language or International English Language Testing System. Submit results directly to the Advanced Academic Programs Office of Admissions, using the code 8747. Photocopies will not be accepted. For the TOEFL, AAP requires a minimum score of 600 on the paper test, 250 on the computer-based test, and 100 on the Internet-based test. AAP requires an IELTS bandscore of 7.0.

Student Status

At the time of admission, students will fall under one of the following statuses: degree, provisional, conditional, or special. Degree candidates fulfill all academic requirements at the time of application. All degree candidates must take the course 480.600 Research & Writing Methods in the first semester of matriculation. Students may take additional courses as well, but are cautioned against taking too many courses during the first semester of study.

Provisional students must take 480.603 Communication in Practice in their first semester of matriculation and pass with a grade of B or better in order to advance to degree candidacy. This course will count toward the MA in Communication degree as an elective. Once this course is passed satisfactorily, a change of status from provisional student to degree candidate must be submitted by the student to the Registrar. Students may take one additional elective course along with Communication in Practice. If a provisional student does not earn a grade of a B or better in Communication in Practice, the student will be dismissed from the program.

Conditional students are in their last semester of undergraduate study at the time of application and must submit an official transcript verifying degree conferral prior to registering for their second semester.

Special students qualify as degree candidates but wish to take fewer than the 10 courses required for conferral of the Master of Arts in Communication.

Student Visas

International students who have been admitted as degree, provisional, or conditional candidates, and who take at least three courses per semester, which is full-time classification, may request certification for an F-1 visa. Students for whom this may be a possibility should indicate “Yes” on their admissions application at the appropriate check box regarding initiating the visa process. In order to maintain status on an F-1 visa, students in AAP must be enrolled in a minimum of three courses per semester, one of which can be an online course. The students must complete their certification process with the Office of International Services. For more information, international applicants should refer to the International Applicants webpage: advanced.jhu.edu/students/international-students.

CURRICULUM

The curriculum of the Master of Arts in Communication program aims for the following learning outcomes for students:

1. Provide theoretical knowledge about the social science of communication that students can use on the job to produce more effective messages and strategic communication programs.
2. Provide cutting-edge, real-world job skills and training for students to move into the field of communication or move up to jobs that require more responsibility and greater knowledge.

3. Improve students’ critical thinking, problem-solving, and writing skills.

4. Help students develop into communication professionals who understand how to conduct, read, evaluate, and use research to further their professional objectives.

Electives meet the second learning outcome, while required and core courses address the remaining learning outcomes. All courses help students develop strong portfolios that they can present to their current or prospective employers.

Students must take a total of 10 courses, or 30 credits. Each semester, courses are offered on-site and online, but due to popular demand, more courses are offered online than on-site. For this reason, students who prefer being on-site may have to take some courses online. At the same time, we cannot guarantee that a particular course will be offered online in any given semester (i.e., it may be offered on-site only). Every attempt is made to offer a variety of courses both online and on-site.

PROGRAM TRACKS

Students will choose to follow either the strategic planning track, or the research track. The majority of students opt for the strategic planning track, which is geared toward preparation to become a communications practitioner. Students with an interest in conducting communication research may opt for the research track. Students must satisfy the appropriate core courses and electives to be eligible to receive the MA degree.

Students may choose to switch from one track to the other during the course of studies. Note that this may increase time to graduation if it requires additional courses to be taken in order to satisfy the track requirements.

Core Courses

Degree candidate students must complete Research and Writing Methods before taking any core courses. Strategic planning students can enroll in Practicum in their last semester.

Students who earn a C or below in a core course may not count that course toward core requirements and will not earn credits for that course.

Strategic Planning Track

Degree candidates following the Strategic Planning Track must satisfy the following ten courses:

- Research and Writing Methods
- At least three core courses from the following:
  - 480.601 Intro to the Digital Age (3 credits)
  - 480.602 Changing Behavior through Communication (3 credits)
  - 480.604 Theory of Mass Communication Practice (3 credits)
  - 480.606 Persuasion (3 credits)
- 480.608 Analytic Techniques in Communication Research (3 credits)
- 480.609 Applied Qualitative Research (3 credits)
- Six electives

Communication Research Track

Degree candidates following the Research Track must satisfy the following ten courses:

- Research and Writing Methods
- At least two core courses from among the following:
  - 480.601 Intro to the Digital Age (3 credits)
  - 480.602 Changing Behavior through Communication (3 credits)
  - 480.604 Theory of Mass Communication Practice (3 credits)
  - 480.606 Persuasion (3 credits)
- At least one core course from among the following:
  - 480.608 Analytic Techniques in Communication Research (3 credits)
  - 480.609 Applied Qualitative Research (3 credits)
  - 480.800 Thesis and if necessary, Thesis Continuation
- Five electives

Prerequisite Course

All provisional students must pass Communication in Practice during their first semester in the Master of Arts in Communication program before changing from provisional student to degree candidate and then enroll in Research and Writing Methods. Provisional students who earn a B- or below in Communication in Practice or any other course are dismissed.

Required Courses

Degree candidates must pass Research and Writing Methods during their first semester before enrolling in any core courses. Students may not take a leave of absence while completing their theses. Students who earn a C or below in a required course must repeat that course.

Electives

Students may take electives in any of the areas listed below regardless of concentration. Students may take additional core courses as electives.

CONCENTRATIONS

Students are not required to specify a concentration. Students who want a concentration may identify one, or occasionally two, of the fields listed below. A single course cannot count toward two concentrations. Students may take electives in any area regardless of concentration. To earn a concentration, students may have to take in-person and online courses. Although it is possible for online students to earn a concentration, we cannot guarantee enough courses will be available online for all concentrations. Concentrations appear on transcripts but not diplomas.
Public and Media Relations
The concentration in public relations and media covers everything from pitching and planning to budgeting and executing a comprehensive communication campaign. Private companies, nonprofit organizations, and federal agencies all employ communication strategies and need employees knowledgeable in theory and practice. Students must complete at least three of the following electives:

480.629 Public Relations in the Age of Digital Influence (3 credits)
480.634 Journalism and Publishing in the Digital Age (3 credits)
480.635 Communication.org: Not-for-Profits in the Digital Age (3 credits)
480.637 Using Social and Digital Media (3 credits)
480.638 Utilizing Images: Media Literacy in Practice (3 credits)
480.642 Corporate Social Responsibility Campaigns (3 credits)
480.643 Branding and Advertising (3 credits)
480.651 Sports Branding and Marketing (3 credits)
480.655 Communicating for Social Change (3 credits)
480.654 Strategic Communication Program Management (3 credits)
480.657 Introduction to Public Relations (3 credits)
480.658 Public Relations Writing (3 credits)
480.659 Crisis Communication (3 credits)
480.660 Ecosystem of New Media (Formerly Media Effects) (3 credits)
480.661 International Public Relations and Public Diplomacy (3 credits)
480.662 Opinion Writing (3 credits)
480.663 Integrated Marketing Communication (3 credits)
480.665 Speech Writing (3 credits)
480.668 Understanding Markets and Audiences (3 credits)
480.669 Emergency and Risk Communication (3 credits)
480.678 Spokesperson Development and Training (3 credits)
480.681 Communication Evaluation (3 credits)
480.685 Argument & Public Address (3 credits)

Health Communication
The concentration in health communication covers how to develop and evaluate effective public information campaigns, how to manage the demands placed on communication specialists during a crisis, and how to incorporate behavior change messages into a variety of channels and genres, such as entertainment. Health communication professionals must develop, deliver, and evaluate modern health communication programs. This concentration explores what has been done, what works, and why. Students must complete at least three of the following electives:

480.645 Health Literacy, Language and Culture (3 credits)
480.653 Communicating for Social Change (3 credits)
480.654 Strategic Communication Program Management (3 credits)
480.659 Crisis Communication (3 credits)
480.668 Understanding Markets and Audiences (3 credits)
480.669 Emergency and Risk Communication (3 credits)
480.670 Law for Communication Professionals (3 credits)
480.681 Communication Evaluation (3 credits)
480.682 Health Psychology and Behavior Change (3 credits)
480.686 Behavior Change and Education Through Entertainment (3 credits)
480.687 Intercultural Communication (3 credits)

Digital Communication
The concentration in digital communication examines the strategic use of digital technologies for communication professionals. This concentration addresses how to use the Web and social media to reach out to diverse public groups and how to incorporate digital with traditional communication campaigns. Digital communication tools are an important part of the modern communication workplace. Students must complete at least three of the following electives:

480.622 Branding by Motion Picture (3 credits)
480.629 Public Relations in the Age of Digital Influence (3 credits)
480.630 Multimedia Authoring (3 credits)
480.631 Effective Web Design and Strategy (3 credits)
480.632 Digital Political Strategy (3 credits)
480.633 Interactive Marketing and Advertising (3 credits)
480.634 Journalism and Publishing in the Digital Age (3 credits)
480.635 Communication.org: Not-for-Profits in the Digital Age (3 credits)
480.636 Web Writing and Content Strategy (3 credits)
480.637 Using Social and Digital Media (3 credits)
480.638 Utilizing Images: Media Literacy in Practice
Corporate and Nonprofit Communication
The concentration in corporate and nonprofit communication examines all of the important components of communication in an organizational context. Students study how managers communicate with staff members effectively across the organization, how businesses and nonprofits communicate with the media, and how advertisers and marketers persuade potential consumers and donors. Successful organizations have solid internal and external communication strategies. Students must complete at least three of the following electives:

- 480.605 Organizational Communication
- 480.635 Communication.org: Not-for-Profits in the Digital Age
- 480.637 Using Social and Digital Media
- 480.638 Utilizing Images: Media Literacy in Practice
- 480.642 Corporate Social Responsibility Campaigns
- 480.643 Branding and Advertising
- 480.645 Health Literacy, Language and Culture
- 480.646 Managerial Communication
- 480.653 Communicating for Social Change
- 480.654 Strategic Communication Program Management
- 480.659 Crisis Communication
- 480.660 Ecosystem of New Media
- 480.663 Integrated Marketing Communication
- 480.665 Speech Writing
- 480.668 Understanding Markets and Audiences
- 480.669 Emergency and Risk Communication
- 480.670 Law for Communication Professionals
- 480.671 Government Relations and Lobbying
- 480.675 Public Policy Management and Advocacy
- 480.677 Grassroots Communication
- 480.681 Communication Evaluation
- 480.687 Intercultural Communication

Applied Research in Communication
The concentration in applied research prepares students to assess the research needs of a communication effort; design theory-based formative, process, and summative evaluation studies; execute quantitative and qualitative methods; analyze data using thematic, descriptive, and inferential approaches; and use results to plan and refine communication efforts. Students must complete all of the following cores and electives:

- 480.608 Analytic Techniques in Communication Research
- 480.609 Applied Qualitative Research
- 480.618 Communication Evaluation
- 480.804 Practicum

COURSE DESCRIPTIONS

Required Courses

480.600 Research & Writing Methods
Communication professionals take on diverse and multiple roles within and across organizations, but they share one role in common as strategic problem-solvers. This course will teach you how to find, read, interpret, evaluate, and apply scientific research studies to solve practical problems encountered by communication practitioners. Topics covered include how to effectively use library resources to find research that can be of strategic value; how different research methods, including focus groups, case studies, surveys, and interviews, are used in communication research; how to evaluate the quality of research reports; how to interpret qualitative and quantitative findings, including statistics; and how to distill the information found in research reports down to what is most relevant and usable. In addition to learning how to become a competent and critical research consumer, you will also be exposed to current research across different areas of the communication discipline.

480.805 Research and Authorship in Communication
This course is designed to guide students through the thesis process. It is the last course applied research track students take in finishing their master’s degrees. Students select a topic for original research and conduct and write up their research in the course of the class. Students are encouraged to select a topic that will be useful in the workplace and that can be part of their professional portfolio. Graduation is subject to approval of the thesis by the thesis committee and completion of a successful defense. Students are encouraged to enter the class with a clear idea of what they would like to research. All core courses must be completed before starting the Thesis course.

480.888 Thesis Continuation
Students not finishing the thesis during the term in which they enroll in the Thesis course must enroll in Thesis Continuation in every ensuing semester (including summer) until they complete their degrees. It is not possible to take a semester off or a leave of absence while working on the thesis.

Core Courses

480.601 Introduction to the Digital Age
The digital age is changing how communication professionals communicate with public groups and how people access, understand, and process information. As a result, digital tools are an increasingly important part of the modern communicator’s toolkit. This course examines empirical research that will help communication professionals in the digital age. Topics include creating usable and credible websites and effective Internet advertising. The course also examines blogs, social networking, and digital journalism. The digital age is explored through primary research across a range of subjects, including public relations, political communication, and health communication. Prerequisite: 480.600 Research and Writing Methods.
480.602 Changing Behavior Through Communication (3 credits)
The goal of many communication initiatives is to encourage some type of behavior change. Communication professionals who understand how people change their behavior can create more successful campaigns. This course surveys major theories used to predict when and under what circumstances individuals are most likely to change their behavior. Behavior change includes a variety of actions, such as voting for a candidate, purchasing a product, joining a social networking group, or adopting a new health habit. Individual-level, interpersonal level, and community-level models of change are covered. By becoming familiar with specific theories and the empirical support for those theories, students learn how to use social science-based models to guide their communication strategies effectively. Prerequisite: 480.600 Research and Writing Methods.

480.604 Theory of Mass Communication Practices (3 credits)
This course surveys major theories and perspectives on how mass media can influence individuals, organizations, and society, with a focus on content areas that have the most strategic relevance for public relations practice. The course covers readings on the role media plays in shaping what issues people attend to; how they think about those issues and potential outcomes; how public relations practitioners attempt to use media strategically to meet their objectives; and the implications that current media systems, technologies, and practices have for their media relations efforts. Prerequisite: 480.600 Research and Writing Methods.

480.606 Persuasion (3 credits)
This course addresses two questions of vital importance to communication professionals: what aspects of a message make it persuasive (or not), and what attributes of individual people and audiences make them susceptible or resistant to influence. The course examines all varieties of messaging, from individuals communicating one on one to messages communicated via mass media. We study topics such as how the expertise, trustworthiness, and likeability of a spokesperson can enhance or weaken a message’s persuasiveness, and how people’s social groups can affect their willingness to believe. The course draws on both theory and empirical evidence to provide students with a well-rounded understanding of influence and persuasive strategies in today’s world. Prerequisite: 480.600 Research and Writing Methods.

480.608 Applied Quantitative Research (3 credits)
This course will explore quantitative research methods, but will take the next step into quantitative communication research by investigating quantitative tools used by communication practitioners, in particular to measure the effectiveness of campaigns. In addition to standard quantitative methods, you will gain an insight on digital analytics, how to understand them, and how to make important information out of the data to report on the effectiveness of campaigns and messages. This class will satisfy the requirement for Applied Quantitative Research. Students should take this course prior to the semester in which they begin their research for Thesis or 480.804 Practicum. Prerequisite: 480.600 Research and Writing Methods.

480.609 Applied Qualitative Research (3 credits)
Communication professionals use qualitative methods to craft messages that resonate with audiences. This hands-on class exposes students to qualitative research methods that can be used on the job to guide communication efforts more strategically. Students learn how to design and conduct studies to gain insight into audience perceptions on a variety of issues. Specific techniques covered include in-depth interviews, focus groups, qualitative content analyses, and case studies. Through applied activities, students learn how to collect, analyze, and present qualitative research data. Students should take this course prior to the semester in which they begin their research for Thesis or 480.804 Practicum. Prerequisite: 480.600 Research and Writing Methods.

480.804 Practicum (3 credits)
Strategic planning students complete the Practicum course during their last semester in the MA in Communication program. This optional core course offers a culminating experience that helps students integrate new or enhanced capabilities into a significant evidence-based project relevant to their profession. Each student can identify an organization or individual in need of support for a communication-related project and how to fulfill that need. In addition, the student must prepare (a) a proposal that outlines objectives, scope of work, any deliverables, timeline, and method for evaluating achievement of objectives, and (b) any final deliverables. The student must complete the Practicum course in one semester.

Elective Courses

480.603 Communication in Practice (3 credits)
Communication is a fast-changing field that requires practitioners to keep current with trends in technology, audience segmentation, needs of stakeholders, message techniques, evaluation methods, and much more. Equally important, practitioners must master new ways of branding themselves in a competitive job environment. This course covers up-to-date perspectives in communication practice so that students gain a concrete understanding of the practice environment. The content includes strategic management, presentation styles, ethics, branding, campaigns, evaluation, cultural diversity, client tactics, and professional networking. Experts in practice will lecture and lead class activities. Students will create deliverables throughout the semester that will showcase their personal brand, talents, and skills in communication. This course is designed for students who are provisional or have obtained adviser approval.

480.605 Organizational Communication (3 credits)
This course explores the complexities and strategies of internal and external communications in public, private, and non-profit organizations. As a leadership tool, communications serves a political, informational, symbolic and influential function. Topics covered include a competency-based approach of organizational communication, the interplay between internal and external communications, communicating effectiveness through problem-solving, decision-making, managing conflict and mitigating crises, organizational change management, addressing workforce diversity issues and others. Students gain exposure to various dimensions of organizational
communication from different industry leaders and field experts and gain first-hand experience in critiquing, crafting and developing communication strategies, tactics and tools, as communication professionals and leaders in the workplace.

480.622 Branding by Motion Picture (3 credits)
This is a course for those who want to use the motion picture medium to promote brands. It’s a writing course, not a production course, on the art of expressing a brand in linear form—as a 30-second commercial for television and the Web or a longer branding video for the Web. We study branding videos and commercials for what they can teach us about brands, brand dynamics, audience needs, and watchability. Most of all, we look at good storytelling. There are no textbooks; only videos we watch, read about in the advertising press, and dissect. Branding by Motion Picture is a practical course. We give students the experience of “doing the creative”—developing brands and writing scripts to promote them. Written assignments take the form of creative briefs and original scripts for brands selected by the students themselves.

480.623 Political Communication Campaigns (3 credits)
This course will cover the final few months of the 2016 campaign for president of the United States. As much as possible, the class will use actual events in the campaign as the basis for assignments and class discussions. Students will react to actual situations as if they were working for one of the candidates to prepare such campaign communication tools as news releases, talking points, op-eds, candidate or surrogate speeches, and radio or television commercials. Students will also learn about campaign strategic planning and message development. The final weeks of the class will focus on analysis, such as the role played by the news media in the result, if any, and any other external factors that might have affected the outcome. The class will expose students to the practical applications of the communication process as used in contemporary political campaigns, including the use of new technologies and social media. Students will also learn about the operation of a political press office and the duties of a political press secretary, media adviser or communication director, and the news media professionals who cover them.

480.624 Press Secretary: Theory & Practice (3 credits)
This class uses current events and interactive discussions to focus on the skills required to be an effective press secretary and communications adviser. It examines the roles, duties, and responsibilities of press secretaries in a variety of settings: on Capitol Hill, in federal agencies, the White House, industry associations, nonprofits, advocacy organizations, and political campaigns. The course includes engaging guest lectures that share insight from journalists, press secretaries, and communications professionals in the field about effective techniques and lessons learned. Students engage in real-time exercises that deal with typical situations that a press secretary faces in the course of a day and participate in discussions on the complex environments in which a press secretary works. By the end of the course, students will be able to draft and distribute materials, such as media strategy memos, press releases, and talking points, and to plan a press conference.

480.629 Public Relations in the Age of Digital Influence (3 credits)
Marketing and communication are changing. The levers that we have pulled for years to sell products and services, change behaviors, and advocate for causes no longer work the way they did. As trust in media and marketing plummets, trust in our peers, friends, family, and colleagues rises. Today we recognize new influencers in the people sitting next to us. Now, creating a conversation is just as important as driving media, forming partnerships, and crafting messages. Call it influencer marketing or brand stewardship in the network age. It’s all public relations. This class covers how to create comprehensive digital-influence strategies and ultimately how to be an effective public relations professional in this new digital age.

480.630 Multimedia Authoring (3 credits)
This course is an introduction to techniques for reading, writing, analyzing, producing, and publishing integrated forms of digital multimedia. Students will be assigned projects that explore the aesthetic, technological, and communications concerns inherent in new media production for the online medium. The course emphasizes the understanding of key paradigms of the multimedia experience, including integration, interactivity, hypermedia, and immersion essential to the construction of narrative forms specific to digital media. Production techniques and design strategies will be introduced for incorporating text, imagery, sound, and video into Web 2.0 applications, such as blogs, Twitter, Facebook, YouTube, etc. Readings will explore key issues in contemporary media and communications impacted by new and emerging digital technologies. The objective of the course is for students to learn the practical and critical skills necessary to achieve digital fluency for their professional work in the field of communication. This course was formerly called Essential Skills in Digital Media Literacy.

480.631 Effective Web Design and Strategy (3 credits)
Having a website in the 21st century is a no-brainer, but developing a website that really works is no small task. This class prepares students to analyze the critical communication considerations that drive the strategy of successful websites, and provides them with the knowledge and vocabulary to structure, define, and lead the development of sophisticated and effective Web-based communications platforms. From audience definition and content strategy through usability testing, information architecture, technologies, design, and search engine optimization, students will learn how to define, design, and deploy smart sites that succeed—communicate—across divergent audiences, brands, and businesses.

480.632 Digital Political Strategy (3 credits)
No president will ever be elected again without an Internet strategy. Mobile phones and Facebook are being used to organize mass protests. Thanks to YouTube, two senators lost elections, and bloggers took down former CBS anchor Dan Rather and former Senate Majority Leader Trent Lott. Clearly, the world of political and issue campaigns has changed in the digital age. In this course, students explore new strategies possible in a networked world and learn what it takes to be a digital political strategist.
480.633 Interactive Marketing and Advertising (3 credits)
This is a hands-on course that focuses on the creative process, design, and development of interactive marketing and advertising campaigns for online and mobile environments. Defining the audience, understanding the user experience, and empowering the consumer are key to creating effective campaigns in this constantly changing environment. Standards, guidelines, and best practices for creating display advertising and rich media will be taught, along with viral, word-of-mouth, and emerging technologies. Practical skills will be taught as well, and by the end of the course, students will produce an integrated interactive campaign.

480.634 Journalism & Publishing in the Digital Age (3 credits)
Publishing and journalism were once separate domains, but the Internet and new media have radically changed that. The rise of so-called civic journalism and the ease of “publishing to the ‘net” raise pressing questions, such as who is a journalist, and what does it mean nowadays to “publish” something? Is print dead? Is Google making us stupid? Will the iPad save publishing? Through lectures, readings, discussions, and individual projects, this research seminar will attempt to answer such questions. We’ll also examine recent or ongoing controversies, such as Wikileaks and the Google book project. We’ll explore the impact of new media (e.g., citizen journalism, social networking sites, online video, and mobile technologies) on both the publishing industry and the practice of journalism, and what the new media environment implies for communications professionals.

480.635 Communication.org: Not-for-Profits in the Digital Age (3 credits)
Students examine the primary reasons nonprofit organizations exist and the unique communication challenges they face in reaching their audiences and motivating their desired behaviors. They will examine leading trends in 21st-century communication and assess how nonprofit communicators can capitalize on these trends for the benefit of their organizations. Finally, they will devise practical solutions to one or more of a nonprofit “client”’s challenges, using one or more of a wide variety of communication tools offered in the current media landscape.

480.636 Web Writing and Content Strategy (3 credits)
You have 3.5 seconds to capture a Web visitor’s attention. How do you make sure your website entices them to stick around and learn more? This course examines how compelling Web content is essential to engaging visitors and driving their behavior. We’ll explore writing styles appropriate for B2B and B2C websites and blogs, and work with a variety of content formats, such as videos, infographics, contests, polls, and more. Using the website as the hub for content, we’ll cover techniques for driving Web visitors to your site with inbound and outbound content marketing strategies. We’ll discuss the intersection of search engine optimization, social media, and content marketing, and the importance of an integrated approach to content creation and distribution. Lectures and exercises draw on real-world examples from a variety of industries. By the end of the semester, students will be able to create and execute a comprehensive content marketing program.

480.637 Using Social and Digital Media (3 credits)
In this class, students learn about 12 useful social media tools, including blogging, Twitter, social networking, podcasting, online video, and Digg. More importantly, students apply what they learn by developing a social media plan for a company or organization that they choose. They will be the student’s “client.” Each week, students learn how to use a different social media tool to engage in conversations that help to tell their client’s story. Students also learn the theories behind why social and digital media are fundamentally changing the way that customers, advocates, and engaged consumers are interacting with brands. By the end of semester, students will be able to not just answer but inspire the inevitable questions being raised in every organization today: Why should we care about social media? How is it changing the way individuals and organizations communicate? Where should we begin?

Note: Prior to fall 2009, this course was taught under the title Introduction to the Digital Age. Students who took that course may not register for this class, as the content is the same.

480.638 Utilizing Images: Media Literacy in Practice (3 credits)
This course will teach you how to critically evaluate media, create effective visual communication by identifying key elements of a visual message, and apply relevant theory as it relates to visual message design. This course provides an overview of the approaches and strategies communication practitioners use to incorporate media literacy in their practices. This course will address the following questions: What is media literacy, and how does it relate to visual communication? How can visual media be used effectively to promote strategic messages or positive change? How can we critically evaluate the quality of visual messages and create effective and ethical visual communication?

480.642 Corporate Social Responsibility Campaigns (3 credits)
The corporate social responsibility movement is a worldwide phenomenon, and corporations, trade associations, and nonprofits are being asked to step up and be accountable. Public relations and communication professionals need to develop the skills to prepare strategic communication plans that reflect their organization’s commitment to CSR in order to protect and enhance their employer’s reputation in the marketplace. This course examines the global CSR movement, explores the communication challenges it presents, and offers practical suggestions and tactics to respond to this trend. The class features in-class activities, outside research, and guest speakers from NGOs, communication firms, and major corporations with practical advice on meeting this challenge in the global marketplace.

480.643 Branding and Advertising (3 credits)
Branding and advertising are major components of any business or nonprofit organization. Showcasing products and services in creative ways increases visibility and improves sales. This course teaches students how to develop brands, create concepts, and develop advertising campaigns. Students also learn practical tips, including how to organize a creative department,
write a creative brief, create budgets and timelines, research and purchase visual imagery, and determine appropriate media for particular branding and advertising campaigns.

480.645 Health Literacy, Language and Culture (3 credits)
This course offers a skills-oriented approach to addressing literacy, language, and culture within a health care context. Understanding the relationship between literacy, language, and culture will benefit those in health communication, as well as professionals in areas such as public and media relations, digital communication, political communication, and corporate and nonprofit communication. Students will explore how low literacy and poor health literacy affect quality and outcomes at the individual and system levels, and consider the integration of health literacy, cultural competency, and language assistance strategies to reduce disparities in health and well-being. Overall, this 13-week course aims to improve the cultural and health literacy competency of professionals and the systems in which they work.

480.646 Managerial Communication (3 credits)
Writer and historian James Humes said, “The art of communication is the language of leadership.” It is that simple comment that forms the foundation of this course. Here, students explore the role of communication with stakeholders, including subordinates, superiors, internal and external customers, suppliers, and the community. Students examine effective communication in hiring and promoting, in conflict, in community interaction, and in the internal communication of an organization. The class is built around three precepts or questions: With whom does one communicate, what does one communicate and how does one communicate effectively?

480.651 Sports Branding and Marketing (3 credits)
Sports, in all facets, are engrained in our society. The culture of sports has a profound impact on how we work, live, and play. It can create cultural symbols and define cultural aspirations. At the simplest level, it provides an escape from routine and allows for emotional, mental, and physical challenges not found in daily life. This course covers career opportunities in sports communication. It is intended to enlighten students on how communication professionals can leverage sports culture not only to build brand awareness for sports organizations, but also to gain positive brand association and momentum for companies and products whose identities are linked to sports. Students will look at different levels of sports, from international to local grass roots, and learn what communication strategies and tools can effectively market and advance the overall brand.

480.653 Communicating for Social Change (3 credits)
How do professionals in the nonprofit/government/issue-oriented world determine what messages will help their cause? Students in this skills-based course will work in teams to take on an issue and learn to make a difference. Students will learn a step-by-step process (audience-based communication) that many find so useful they immediately apply it to their professional settings or practicums and long after. This process shows how to determine the best role for communication and target the right audience segment. It also teaches how to determine what audience behavior change is needed to make a difference. Unlike for-profits campaigns typically focused on sales, it is often unclear what we actually need the audience to do to create social change. Students will learn how to motivate the audience, to create social brands that break through the clutter, and to reach the audience when they can act. Examples are based on real-world experiences and address some of the challenges involved in working in the nonprofit space.

480.654 Strategic Communication Program Management (3 credits)
This course covers strategic leadership and communication program development, management, and evaluation. It emphasizes basic communication research, strategic communication objectives and message design, selection of media, development of materials, management of teams, and impact evaluation. Crisis and issues management, as well as the use of new communication technologies, are also covered. The course focuses on a step-by-step design of a communication program using the highly acclaimed SCOPE (strategic communication planning and evaluation) Web learning and planning software. Students develop two strategic communication programs, one as individual work and another as part of a team. Lectures and discussions utilize case studies to illustrate key points and desired learning. This course combines reality-based and conceptual approaches to provide students with the intellectual tools needed to assume senior management or outside counsel roles in developing and implementing fully integrated communication programs.

480.657 Introduction to Public Relations (3 credits)
The Bureau of Labor Statistics lists public relations as one of the fastest growing professions in the United States. This introductory course, designed for career changers and those new to public relations, details the ideas, skills, and principles that underlie the public relations craft. Students in this class study the role and contributions of public relations practitioners in contemporary society, learn about potential legal and ethical aspects of the practice of public relations, study the communication process and how persuasion is used with various audiences, and learn how to develop a strategic communication plan to achieve specific goals and objectives. The class will also introduce students to specialized practice areas within the public relations field, such as business and industry, government, nonprofit and associations, and health care.

480.658 Public Relations Writing (3 credits)
The primary goal of this course is for students to develop the professional-level persuasive writing skills expected of the best PR practitioners. Students are given weekly writing assignments outside of class and write on deadline during many class periods. The course covers various forms of public relations writing, including press releases, op-ed essays, crisis communications, and internal communications. Written work is judged using 10 tenets of good writing: organization, persuasion, clarity, focus, flow, tone, proper usage, timeliness, accuracy, and relevance.
480.659 Crisis Communication (3 credits)
This course provides students with a fundamental understanding of crisis management, risk communication, media relations, and public opinion research techniques in multiple contexts. It introduces students to crisis management principles, strategies, tactics, and communication methods. Course participants work as a team to develop a crisis management plan for analysis and discussion. Successful students are able to transfer to the workplace the knowledge and skills developed in this course. Students learn to predict, manage, and control real-world controversies that they may confront as they pursue their careers. Moreover, students are able to manage effectively, participate in, and control volatile situations involving the news media.

480.660 Ecosystem of New Media (3 credits)
Media outreach is a critical piece of any strategic communication effort. This course prepares students to build, implement, and measure earned media programs that achieve policy, business, and philanthropic objectives. Class lectures, guest speakers, readings, and assignments give students an understanding of the priorities and expectations of various types of contemporary media, and how to successfully engage them through research-based strategies and tactics designed to reach key audiences. Prior to Fall 2017 this course was named Media Relations. If you took 480.660 Media Relations you may not take this course.

480.661 International Public Relations and Public Diplomacy (3 credits)
In today's global world, reaching international audiences is a key function of U.S. government-funded public diplomacy programs, corporate public relations, and nongovernmental organizations involved in relief and development. Through readings, lectures, discussions, and exercises, this course examines the differences between domestic and international media environments. Students develop communication skills needed to deliver messages and craft outreach strategies and programs for non-American audiences. Special attention is paid to communicating with audiences in Africa, Latin America, and Southeast Asia, including Afghanistan, Pakistan, and India. Topics include a historical overview of international public relations and public diplomacy, opportunities and challenges for today's public diplomacy practitioner, using research to understand international audiences, writing effectively for international audiences, health and development communication, and communication in international conflict resolution. Students emerge with skills to work overseas in the fast-growing areas of public diplomacy and international public relations.

480.662 Opinion Writing (3 credits)
The world of Washington revolves around opinion, and access to the nation's editorial and op-ed pages is key to making sure your opinions (or those of your employer) are successfully shared with the policymakers and opinion leaders who shape public policy. Opinion pieces carry far more impact than news; consequently, the editorial and op-ed pages are much more difficult markets to crack than the news pages. The editorial and op-ed pages have their own writing style and standards of news judgment; once a writer knows them, though, opinion writing is some of the most rewarding journalism, personally and professionally. Students in this class learn to understand the anatomy of good editorial writing; how to write for opinion sections of newspapers, magazines, and other news outlets; how to pitch op-ed and opinion pieces; and how to sell ideas to editorial boards.

480.663 Integrated Marketing Communication (3 credits)
Integrated marketing communication breaks down the traditional advertising, public relations, and marketing silos by challenging practitioners to apply the optimum mix of media and message to motivate the target audience to act. The rise of the internet and now Web 2.0 support the need to embrace integrated marketing communication as a comprehensive approach to reach target audiences. In this course, students learn to evaluate audience demographics and apply the appropriate communication channels and messages based upon the audiences' needs and the business realities of marketing campaigns. During the semester, students develop a toolkit of steps to follow to attain marketing success. Through simulation exercises, case study analysis, and self-directed reading, students develop a results-oriented and measurable marketing campaign proposal.

480.665 Speech Writing (3 credits)
Speech writing is one of the most important but least instructed skills for Washington professionals. Through hands-on practice, students learn to write speeches for diverse clients, occasions, and contexts, including corporate and political speeches, keynote addresses, Congressional testimony, and informal remarks, such as eulogies and toasts, and how to coach speakers for more effective delivery. The course integrates speech writing with public relations skills in areas such as campaign messaging, investor relations, and crisis management.

480.668 Understanding Markets and Audiences (3 credits)
This course demonstrates the important role market research—and the use of existing data to better understand audience and environment—plays in the overall campaign process. This course will focus on the integral steps that facilitate target audience definition and how to extract a keen understanding of this audience and its interactions within its environment to develop effective campaign strategy. The course's structure and various assignments will often mimic a client/consultant relationship to ensure a real-world experience. To that end, the instructors will play the role of “client” in many instances, asking students to articulate how an assignment or deliverable contributes to the overall goals of the campaign.

480.669 Emergency & Risk Communication (3 credits)
Emergency and risk communication are an emerging set of practices that convey credible, accurate, and real-time information about adverse events and the degree of risk they pose. In a post-Katrina, post-9/11 environment, communication professionals must be familiar with best practices in emergency and risk communication to effectively work with government, industry, the media, and the general public during crises and longer-term threats involving health, safety, security, and the
Communication

unusual knowledge of the art of lobbying. The course also gives students a practical understanding and the skills necessary for all advocacy professionals. This class explores various political and applied principals of communication, influence methods, cultural appreciation, and the specific study of the structure of our government, ethical standards, and the implications of governmental representation. This class conducts a detailed discussion, reading, guest lectures, and actual site visits, on successfully communicating with governmental officials, and teach the students a “how to” approach, with specific focus on the tactics of this influential business. The course is designed to help students gain valuable applied knowledge in the communication of political lobbying and governmental relations. Through discussion, reading, guest lectures, and actual site visits, students gain valuable applied knowledge in the communication tactics of this influential business. The course is designed to teach the students a “how to” approach, with specific focus on successfully communicating with governmental officials, designing lobbying campaigns, and reviewing the foundations of governmental representation. This class conducts a detailed study of the structure of our government, ethical standards, influence methods, cultural appreciation, and the specific communication skills necessary for all advocacy professionals. The class explores various political and applied principals that are needed in practicing governmental representation. The course also gives students a practical understanding and unusual knowledge of the art of lobbying.

480.670 Law for Communication Professionals (3 credits)
Communication professionals encounter the law in many ways. They need to know what they can put on paper, what they can say about private citizens and public figures, what they have to say in political commercials, and what claims they can make about products they advertise. This course explores the laws communication professionals need to know about to do their job effectively. Students will learn how to evaluate slander, libel, and defamation issues. Copyright, trademark, and privacy law will be addressed, including the “fair use” right to excerpt materials on and off the Internet. First Amendment issues to be covered include regulation of advertising and other government regulation of speech, as well as its impact on the rights of parents and children. Campaign finance issues will also be considered, including “equal time,” independent expenditures, and candidates’ speech rights. The course also covers issues raised by broadband deployment, including spectrum management and “open Internet” issues.

480.671 Government Relations and Lobbying (3 credits)
This course introduces students to the practical applications of federal lobbying and governmental relations. Through discussion, reading, guest lectures, and actual site visits, students gain valuable applied knowledge in the communication tactics of this influential business. The course is designed to teach the students a “how to” approach, with specific focus on successfully communicating with governmental officials, designing lobbying campaigns, and reviewing the foundations of governmental representation. This class conducts a detailed study of the structure of our government, ethical standards, influence methods, cultural appreciation, and the specific communication skills necessary for all advocacy professionals. The class explores various political and applied principals that are needed in practicing governmental representation. The course also gives students a practical understanding and unusual knowledge of the art of lobbying.

480.672 Polling for Strategic Communication (3 credits)
Polling is more than a snapshot of who is winning and who is losing. Effective analysis is important for any campaign, whether one’s object is to elect a candidate for office, position a company or product, or advance an issue. This class concentrates on teaching students the best practices for designing, writing, and conducting polls, and how to use the results to formulate a successful communication strategy. Students critique existing opinion surveys and learn how to read and interpret polls, including those used in political and health campaigns and by corporations and other issue organizations.

480.675 Public Policy Management & Advocacy (3 credits)
Washington, D.C., is home to thousands of organizations attempting to influence public policy. Associations, foundations, think tanks, and private lobbying firms are all competing for the attention of policymakers and the public. These groups invariably need competent communicators who can help them cut through jargon, crystallize their messages, and strategically communicate with the key audience’s imperative to advancing their policy goals. This course introduces students to the deliberate process organizations undertake to speak out on issues and exert influence over the policies that have the potential to impact them and the way they do business. The class will cover how organizations conduct advocacy efforts and how communication is used as a tool to advance policy change. Students will gain a practical understanding of how policy groups and communications professionals operate in the field.

480.677 Grass-roots Communications (3 credits)
Grass-roots communication is critical for candidates and for causes. This course explores how grass-roots political communication differs from other types of communication, when and where it’s effective, and how to build an effective strategy and plan. Students discuss how grass-roots communication links to the rest of the communication plan, which messages are best suited to it, and how it can be leveraged to benefit other activities. The data are rich, the anecdotes are informative, and the potential of grass-roots political organizing is immense.

480.678 Spokesperson Development & Training (3 credits)
This course provides students with the knowledge and skills necessary to perform effectively as spokespersons in news media interviews and other high-stakes situations requiring public testimony. Students learn what motivates news media and how journalists cover stories. They learn to recognize the numerous interview techniques used by reporters and the major differences between broadcast and print interviews. Course participants also learn successful spokesperson strategies, tactics, and techniques designed to enhance their performance and reduce the risks inherent in today’s volatile media environment. Students develop effective messages and the other tools needed to prepare for interviews and public communication differs from other types of communication, and testimony. Students use on-camera training throughout the course to sharpen interview skills and to critique student performance. Successful students are able to transfer the knowledge and skills acquired in this course to the workplace. They are prepared to serve as spokespersons in a wide array of situations ranging from routine news interviews to potentially volatile confrontations.
480.680 Nonfiction Filmmaking  (3 credits)
Today's communication environment calls for a good understanding of the process and methods of nonfiction filmmaking. This course introduces students to nonfiction storytelling in the motion picture medium, from conceptualization to writing to production. Using smartphones, simple production equipment and editing software, students will produce their own videos and be prepared for real-world production with professional crews.

480.681 Communication Evaluation  (3 credits)
This course will prepare communication researchers to gather evidence that guides the planning, implementation, and refinement of communication campaigns. Throughout the semester, students will practice using evaluation to inform the various stages of a communication effort based on real-world conditions. They will draw from behavior theory and formative (including pretesting), process, and summative evaluation. They also will learn how to ensure the protection of the rights of human research participants.

480.682 Health Psychology & Behavior Change  (3 credits)
This course provides an overview of health psychology: the scientific study of behaviors and cognitive processes related to health states. It addresses the mind/body connection, the influence of social and physical environments on our health, cognitive processing of health information, health belief models, and the link between personality traits and health. Understanding the interactions between these biological, psychological, and social influences on individuals' health states is a key element in developing effective health communication and intervention programs. Students approach all course topics from both theory-driven and applied perspectives.

480.685 Argument & Public Address  (3 credits)
Argument construction, engagement, and analysis are critical skill sets for communication professionals. Whether substantiating your own position or refuting claims made by others, it is important to understand how arguments function, interact, and effect action and policy. This course prepares students to understand and construct arguments by exploring how they are developed and communicated to diverse audiences. Students will learn to analyze, critique, and fashion arguments through written and speech-based exercises.

480.686 Behavior Change and Education through Entertainment  (3 credits)
This course explores the various ways communication professionals can use entertainment to educate people and encourage them to adopt and enjoy improved lifestyles. Throughout history, stories, drama, poetry, music, dance, and other entertainment formats have been used to enlighten and educate both adults and children. In today's society, the channels of communication are ever increasing. This course investigates ways in which education can be subtly but effectively worked into both new and time-honored genres of entertainment to foster positive behavior change.

480.687 Intercultural Communication  (3 credits)
This course examines the meaning and importance of intercultural communication as it applies to individuals, groups, organizations, and nations. Students examine the meaning of “culture” and how culture can affect personal, national and international understanding and communication, beliefs, and behaviors. The course examines the difficulties and dangers that can result from cultural misunderstanding. In a modern world with diverse communication methods, there is an ever-increasing need for intercultural understanding and communication. The course investigates the various ways in which cultures differ and the necessity of understanding and respecting other cultures. The course assists communication professionals to be more effective with external communication campaigns in other countries and internal communication within a diverse workplace. The course emphasizes clear and logical spoken and written expression to enhance individual ability to interact effectively with people of different cultures.
Post-Baccalaureate Certificate in Applied Research in Communication

advanced.jhu.edu/appliedresearch

The Post-Baccalaureate Certificate in Applied Research in Communication is for students who are working in or pursuing a wide variety of jobs. For example, a vice president of strategic planning and research at a public relations firm may manage studies that help communication clients identify target audiences, set campaign objectives, create messages, and identify channels. A market research director at a trade association may oversee research for brand, product, and business development as well as marketing, advertising, and social media evaluation. A senior behavioral scientist at a federal health agency may lead formative, process, and summative evaluation to plan and refine health communication and social marketing campaigns. A lead policy analyst at an advocacy firm may supervise studies that guide communication about lobbying policy and reform. A research manager at a corporation may collect data, draw insights, and make recommendations that work toward business objectives. Students and alumni have access to our exclusive job opportunities network and career services center.

Read more about the Post-Baccalaureate Certificate in Applied Research in Communication program and start an application online at advanced.jhu.edu/appliedresearch, or contact us at 202-663-5776.

CERTIFICATE

The Post-Baccalaureate Certificate in Applied Research in Communication requires five courses. Students can enroll part time and thus earn the certificate within one year, or take up to five years.

APPLICATION

Individuals who wish to apply for the Post-Baccalaureate Certificate in Applied Research in Communication program must do so through Advanced Academic Programs. (The Admissions Committee reserves the right to request additional information from applicants, if needed, to assess their candidacy for admission. All application materials submitted to Advanced Academic Programs become the property of the Johns Hopkins University and will not be returned to applicants under any circumstances.)

Prerequisites

Prospective students must hold a bachelor’s degree with a minimum grade-point average of 3.0 prior to enrolling in the Post-Baccalaureate Certificate in Applied Research in Communication program.

Application Requirements

> AAP application
> Nonrefundable application fee
> Resume: Include any part- or full-time work, internships, and volunteer history. Detail any responsibilities related to communication and research.
> Statement of purpose: Explain why you are interested in earning the Post-Baccalaureate Certificate in Applied Research in Communication and how it will help your career. Double space your essay and limit it to 500 words or less (place the word count at the end of the document).
> Writing sample: Please go to the online application to download instructions and an article for your writing sample. This exercise asks you to write a single, brief paragraph. It should not take the form of a larger document, such as a letter, an email, a report, or a plan. Submit one paragraph with no more than 250 words.
> Two recommendations: Professors or supervisors should verify academic and professional accomplishments. The department prefers that they complete the AAP recommendation form rather than provide a letter.
> Official transcripts: They should show all undergraduate and graduate course work completed within the U.S. only. (We accept official transcripts sent electronically through Scrip-Safe or Docufide, or in sealed institutional envelopes. If a transcript comes in a sealed envelope, it must be dated within the past three months.)
> GRE scores, if necessary: The program waives this requirement for applicants who have (a) a cumulative undergraduate GPA of 3.0 or higher or (b) five or more years of full-time work experience after earning an undergraduate degree. Submit results directly to the Advanced Academic Programs Office of Admissions, using the code 8747. Photocopies will not be accepted.

PROGRAM COMMITTEE

Brad Leithauser  Program Chair
Jennifer Todd  Program Director
Susan Allen  Assistant Director
Stella-Monica Mpande  Program Coordinator
International Students

Foreign credential evaluation: Students who earned their postsecondary degree(s) in a country other than the U.S. are required to have a “course-by-course” credential evaluation with GPA performed by an outside evaluation service. Study abroad may be exempt.

TOEFL or IELTS scores: International students who have not graduated from an accredited college or university in the U.S. and whose native language is not English must take the Test of English as a Foreign Language (TOEFL) or International English Language Testing System. Submit results directly to the Advanced Academic Programs Office of Admissions, using the code 8747. Photocopies will not be accepted. For the TOEFL, AAP requires a minimum score of 600 on the paper test, 250 on the computer-based test, and 100 on the Internet-based test. AAP requires an IELTS bandscore of 7.0.

Student Status

At the time of admission, students fall under one of the following statuses: degree or conditional. Degree candidates fulfill all academic requirements at the time of application. Conditional students are in their last semester of undergraduate study at the time of application and must submit an official transcript verifying degree conferral prior to registering for their second semester.

Student Visas

The Post-Baccalaureate Certificate in Applied Research in Communication is part time and online, thus international students cannot request certification for an F-1 visa.

CURRICULUM

The Post-Baccalaureate Certificate in Applied Research in Communication will help students acquire the knowledge and skills necessary to achieve the following learning outcomes:

1. Assess the research needs of a communication effort.
2. Design theory-based formative, process, and summative evaluation studies.
3. Execute quantitative and qualitative methods.
4. Analyze data using thematic, descriptive, and inferential approaches.
5. Use results to plan and refine communication efforts.

Students must take a total of five courses. All are online. The courses are a mix of required, core, and elective.

Required Courses

One of the five courses is required. Students who earn a C or below in a required course must repeat that course. The required is as follows:

480.600 Research and Writing Methods: Students must complete this course during their first semester and before enrolling in any core courses.

Core Courses

Three of the five courses are cores. Students who earn a C or below in a core course may not count that course toward core requirements. The cores are as follows:

480.608 Applied Quantitative Research: Students can complete this course during their second through last semesters.

480.609 Applied Qualitative Research: Students can complete this course during their second through last semesters.

480.804 Practicum: Students must take either 480.608 Applied Quantitative Research or 480.609 Applied Qualitative Research before enrolling in 480.804 Practicum, which they must complete during their last semester.

Electives

One of the five courses is an elective. It is as follows:

480.681 Communication Evaluation: Students can complete this course during their first through last semesters.

Students who start the Post-Baccalaureate Certificate in Applied Research in Communication program can switch to the Master of Arts in Communication program. Moreover, they can apply all of their certificate courses toward the master’s degree. To learn more about the MA in Communication, go to communication.jhu.edu.

COURSE DESCRIPTIONS

Required Courses

480.600 Research and Writing Methods (3 credits)
Communication professionals take on diverse and multiple roles within and across organizations, but they share one role in common as strategic problem-solvers. This course will teach you how to find, read, interpret, evaluate, and apply scientific research studies to solve practical problems encountered by communication practitioners. Topics covered include how to effectively use library resources to find research that can be of strategic value; how different research methods, including focus groups, case studies, surveys, and interviews, are used in communication research; how to evaluate the quality of research reports; how to interpret qualitative and quantitative findings, including statistics; and how to distill the information found in research reports down to what is most relevant and usable. In addition to learning how to become a competent and critical research consumer, you will also be exposed to current research across different areas of the communication discipline.
Core Courses

**480.608  Applied Quantitative Research** *(3 credits)*
This hands-on course guides students through the various types of quantitative research they may need to perform on the job, such as analyzing an audience, testing a message, doing a media audit, or demonstrating the effectiveness of a department. Students learn how to develop and design good surveys, experiments, and quantitative content analyses, and how to run basic statistics on their data including chi-square, t-test, and correlation. Students also learn how to write up and present the results of their research. Students should take this course prior to the semester in which they begin their research for Thesis or Practicum. Prerequisite: 480.600 Research and Writing Methods.

**480.609  Applied Qualitative Research** *(3 credits)*
Communication professionals use qualitative methods to craft messages that resonate with audiences. This hands-on class exposes students to qualitative research methods that can be used on the job to guide communication efforts more strategically. Students learn how to design and conduct studies to gain insight into audience perceptions on a variety of issues. Specific techniques covered include in-depth interviews, focus groups, qualitative content analyses, and case studies. Through applied activities, students learn how to collect, analyze, and present qualitative research data. Students should take this course prior to the semester in which they begin their research for Thesis or Practicum. Prerequisite: 480.600 Research and Writing Methods.

**480.804  Practicum** *(3 credits)*
Strategic planning students complete the Practicum course during their last semester. This optional core course offers a culminating experience that helps students integrate new or enhanced capabilities into a significant evidence-based project relevant to their profession. Each student can identify an organization or individual in need of support for a communication-related project and how to fulfill that need. In addition, the student must prepare (a) a proposal that outlines objectives, scope of work, any deliverables, timeline, and method for evaluating achievement of objectives, and (b) any final deliverables. The student must complete the Practicum course in one semester.

Elective Course

**480.681  Communication Evaluation** *(3 credits)*
This course will prepare communication researchers to gather evidence that guides the planning, implementation, and refinement of communication campaigns. Throughout the semester, students will practice using evaluation to inform the various stages of a communication effort based on real-world conditions. They will draw from behavior theory and formative (including pretesting), process, and summative evaluation. They also will learn how to ensure the protection of the rights of human research participants.
Leaders in business and industry recognize the importance of communication, but few MBA programs offer communication courses. At the same time, communication professionals recognize the importance of good business practices, but programs rarely offer courses in business. The Master of Arts in Communication/Master of Business Administration dual degree program was developed to fill that need. It helps advance the careers of managers in public and media relations, advertising, crisis communication, organizational development, and risk communication. Students and alumni have access to our exclusive job opportunities network and career services center.

DEGREE

Dual Master of Arts in Communication/
Master of Business Administration

The university allows students to simultaneously pursue a Master of Arts in Communication in the School of Arts and Sciences and a Master of Business Administration at the Carey Business School. To pursue these dual degrees, students must apply and be accepted to both programs. Students who successfully complete the requirements for both degrees will receive two separate degrees. Students may complete one degree first and be awarded the diploma before continuing with the second degree, or strive toward both degrees concurrently. Pending graduates must complete the graduation application for each school. Dual-degree students may participate in both commencement exercises.

APPLICATION

Individuals who wish to apply for the dual MA in Communication/MBA program must apply through Advanced Academic Programs. They can apply to both programs concurrently, or they can start with one program and then apply for the dual degree by submitting an application to the second program through the AAP Admissions Office. The MA in Communication program will consider applicants for the MA in Communication portion of the degree, while the MBA program will consider applicants for the MBA portion of the degree. An individual can be accepted by one rather than both programs; in this case, that person can decide whether to enroll in the single program. (The Admissions Committees reserve the right to request additional information from applicants, if needed, to assess their candidacy for admission. All application materials submitted to Advanced Academic Programs become the property of the Johns Hopkins University and will not be returned to applicants under any circumstances.)

Prerequisites

Prospective students must hold a bachelor’s degree with a minimum grade-point average of 3.0 prior to enrolling in the MA in Communication/MBA program.

Application Requirements

All Students

> AAP application
> Nonrefundable application fee
> Resume: Include any part- or full-time work, internship, and volunteer history. Detail any responsibilities related to communication or business.
> Statement of purpose: Explain why you are interested in earning the dual MA in Communication/MBA and how it will help your career. Double space your essay and limit it to 500 words or less (place the word count at the end of the document).
> Writing sample: Please go to the online application to download instructions and an article for your writing sample. This exercise asks you to write a single, brief paragraph. It should not take the form of a larger document, such as a letter, an email, a report, or a plan. Submit one paragraph with no more than 250 words.
> Two recommendations: Professors or supervisors should verify academic and professional accomplishments. The departments prefer that they complete the AAP recommendation form rather than provide a letter.
Official transcripts: They should show all undergraduate and graduate course work completed within the U.S. only. (We accept official transcripts sent electronically through Scrip-Safe or Docufide, or in sealed institutional envelopes. If a transcript comes in a sealed envelope, it must be dated within the past three months.)

The MA in Communication and MBA programs have different requirements for GRE or GMAT scores:

The MA in Communication program may require GRE scores. The program waives this requirement for applicants who have (a) a cumulative undergraduate GPA of 3.0 or higher or (b) five or more years of full-time work experience after earning an undergraduate degree. Submit results directly to the Advanced Academic Programs Office of Admissions, using the code 8747. Photocopies will not be accepted.

The MBA program may require the GMAT or GRE scores. A waiver from these exams may be approved if a candidate has:

- Completed a graduate degree and can demonstrate quantitative ability through coursework of B or better in statistics, corporate finance or microeconomics.
- Completed an undergraduate degree and has at least five years of professional experience. Applicant has also taken at least one course in statistics, corporate finance and microeconomics, and earned a B or better and earned an overall GPA of 3.0 or better.
- Holds a professional designation, such as CPA or CFA.

International Students

Foreign credential evaluation: Students who earned their postsecondary degree(s) in a country other than the U.S. are required to have a “course-by-course” credential evaluation with GPA performed by an outside evaluation service. Study abroad may be exempt.

TOEFL or IELTS scores: International students who have not graduated from an accredited college or university in the U.S. and whose native language is not English must take the Test of English as a Foreign Language or International English Language Testing System. Submit results directly to the Advanced Academic Programs Office of Admissions, using the code 8747. Photocopies will not be accepted. For the TOEFL, AAP requires a minimum score of 600 on the paper test, 250 on the computer-based test, and 100 on the Internet-based test. AAP requires an IELTS band score of 7.0.

Student Status

At the time of admission into the MA in Communication program, students fall under one of the following statuses: degree, provisional, or conditional. Degree candidates fulfill all academic requirements at the time of application. In contrast, provisional students do not meet the requirements but demonstrate promise toward completing the MA in Communication program; therefore, they must pass a prerequisite course before being able to request a change of status from provisional student to degree candidate. Conditional students are in their last semester of undergraduate study at the time of application and must submit an official transcript verifying degree conferral prior to registering for their second semester.

Student Visas

International students who have been admitted as degree, provisional, or conditional candidates and who take at least three courses per semester, which is full-time classification, may request certification for an F-1 visa. Students for whom this may be a possibility should indicate “Yes” on their admissions application at the appropriate check box regarding initiating the visa process. The Admissions Office of Advanced Academic Programs will assist in the certification process (aapinfo@jhu.edu), which the student must complete with the Office of International Student and Scholar Services.

MA IN COMMUNICATION CURRICULUM

The curriculum of the MA in Communication program portion of the dual degree is the same as that of the MA in Communication program. Refer to the latter’s section of the catalogue for detail.

MBA CURRICULUM

Students must take the following courses. All courses are two credits, with the exception of Strategic Management.

120.601 Business Communication*
121.610 Negotiation*
131.601 Leadership Ethics Seminar*
132.601 Business Law*
142.620 Leadership in Organizations*
142.730 Strategic Human Capital*
210.620 Accounting and Financial Reporting*
220.610 The Firm and the Macroeconomy*
220.620 Economics for Decision Making*
231.620 Corporate Finance*
232.701 Investments*
350.620 Information Systems*
410.620 Marketing Management*
510.601 Statistical Analysis*
520.601 Decision Models*
680.620 Operations Management*

Five Carey electives

*Not an AAP course. Please refer to partner JHU school/division for credit information.
Master of Arts in Communication/Certificate in Nonprofit Management
Combined Program

Professionals with sharpened skills in the social science of communication will be able to apply those skills to mission-driven nonprofit organizations. Upon graduating from the combined program, individuals will be well prepared to lead their nonprofit employers in designing and implementing communication campaigns that promote reforms in public policy, mobilize constituencies to lobby their elected officials, advance their goals through public and media relations, or change behaviors in ways that improve the health, well-being, and public safety of all. Even if students pursue careers in the corporate or public sectors, they are highly likely to interact with nonprofit or nongovernmental organizations, or serve on nonprofit boards of directors. All of these roles require an understanding of the impact of nonprofits in the U.S. and other countries, and the principles and challenges of managing them, including what it means to supervise a volunteer workforce and raise money through the generosity of others.

DEGREE

Combined Master of Arts in Communication/Certificate in Nonprofit Management

The university allows students to simultaneously pursue a Master of Arts in Communication and Certificate in Nonprofit Management in the School of Arts and Sciences. To enroll in both programs, students must apply and be accepted to both programs. Students who successfully complete the requirements in both programs will receive two separate documents—a communication diploma and nonprofit certificate. Students may complete one program first before continuing with the second program or be in both programs concurrently. Pending graduates must complete the graduation application for each school. Students who finish the combined program participate in a single commencement ceremony.

APPLICATION

Individuals who wish to apply for the combined MA in Communication/Certificate in Nonprofit Management program must apply through Advanced Academic Programs. They can apply to both programs concurrently, or they can start with one program and then apply for the combined program by submitting an application to the second program through the AAP Admissions Office. The MA in Communication program will consider applicants for the MA in Communication portion, while the Certificate in Nonprofit Management program will consider applicants for the Certificate in Nonprofit Management portion. An individual can be accepted by one rather than both programs; in this case, that person can decide whether to enroll in the single program. (The Admissions Committees reserve the right to request additional information from applicants, if needed, to assess their candidacy for admission. All application materials submitted to the Advanced Academic Programs become the property of the Johns Hopkins University and will not be returned to applicants under any circumstances.)

Prerequisites

Bachelor’s degree from a regionally accredited U.S. college or university with a minimum grade-point average of 3.0 (or the equivalent from outside the U.S.).

Application Requirements

All Students

> AAP application
> Nonrefundable application fee
> Resume: Include any part- or full-time work, internship, and volunteer history. Detail any responsibilities related to communication and nonprofit management.
> Statement of Purpose: Explain why you are interested in entering the MA in Communication and Certificate in Nonprofit Management combined program, and how it will help your career or other goals. Double space your essay and limit it to 500 words or fewer (place the word count at the end of the document).
> Writing Sample: Effective for summer 2015 and beyond, applicants to the MA in Communication program must submit a writing sample. Please click here to download the instructions and article for your writing sample. This exercise asks you to write a single, brief paragraph. It
Student Status
At the time of admission into the MA in Communication program, students fall under one of the following statuses: degree, provisional, or conditional. Degree candidates fulfill all academic requirements at the time of application. In contrast, provisional students do not meet the requirements but demonstrate promise toward completing the MA in Communication program; therefore, they must pass a prerequisite course before being able to request a change of status from provisional student to degree candidate. Conditional students are in their last semester of undergraduate study at the time of application and must submit an official transcript verifying degree conferral prior to registering for their second semester.

Student Visas
International students who have been admitted as degree, provisional, or conditional candidates and who take at least three courses per semester, which is full-time classification, may request certification for an F-1 visa. Students for whom this may be a possibility should indicate “Yes” on their admissions application at the appropriate check box regarding initiating the visa process. The Admissions Office of Advanced Academic Programs will assist in the certification process (aapinfo@jhu.edu), which the student must complete with the Office of International Student and Scholar Services.

International Students
> Foreign credential evaluation: Students who earned their postsecondary degree(s) in a country other than the U.S. are required to have a “course-by-course” credential evaluation with GPA performed by an outside evaluation service. Study abroad may be exempt.

> TOEFL or IELTS scores: International students who have not graduated from an accredited college or university in the U.S. and whose native language is not English must take the Test of English as a Foreign Language or International English Language Testing System. Submit results directly to the Advanced Academic Programs Office of Admissions, using the code 8747. Photocopies will not be accepted. For the TOEFL, AAP requires a minimum score of 600 on the paper test, 250 on the computer-based test, and 100 on the Internet-based test. AAP requires an IELTS band score of 7.0.
MA IN COMMUNICATION CURRICULUM

Students must complete 10 courses under the MA in Communication program. Courses are offered in Washington, D.C. and online. Refer to the MA in Communication section of the catalog to learn more about the program's requirements.

Students must pass 480.600 Research and Writing Methods under the MA in Communication program before they can start taking courses under the Certificate in Nonprofit Management program.

The combined MA in Communication/Certificate in Nonprofit Management program enables students to reduce their course load. If students were to complete the two programs separately, they would complete a total of 16 courses. Yet students in the combined program take a total of 14 courses, by ensuring that they take the following courses under the MA in Communication program:

480.602 Changing Behavior Through Communication, a core course from the Informing Practice Through Research Group.

At least one of the following electives:

- 480.635 Communication.org: Not-for-Profits in the Digital Age (3 credits)
- 480.653 Communicating for Social Change (3 credits)
- 480.654 Strategic Communication Program Management (3 credits)
- 480.671 Government Relations and Lobbying (3 credits)
- 480.675 Public Policy Management and Advocacy (3 credits)
- 480.677 Grassroots Communication (3 credits)

CERTIFICATE IN NONPROFIT MANAGEMENT CURRICULUM

Students must complete four courses under the Certificate in Nonprofit Management program. Courses are offered online.

- 470.728 Influence and Impact of Nonprofits (3 credits)
- 470.736 Principles of Nonprofit Management (3 credits)
- 470.774 Nonprofit Governance and Executive Leadership (3 credits)
- 470.798 Financial Management and Analysis in Nonprofits (3 credits)
- 470.623 Nonprofit Program Development and Evaluation (3 credits)
- 470.625 Resource Development and Marketing in Nonprofits (3 credits)

Refer to the Certificate in Nonprofit Management section of the catalog to learn more about the program's requirements.
Master of Arts in Cultural Heritage Management
An Online Master’s Degree Program

heritage.jhu.edu

The challenges of the 21st century and the expansion of heritage tourism worldwide have increased the need for forward thinking management and preservation strategies. With a focus on emergent technology and its impact on conservation, preservation, and engagement; together with integrated approaches to management, and community and stakeholder partnerships, Johns Hopkins University offers an innovative, online graduate degree in Cultural Heritage Management. This degree program immerses students in a broad context of cultural heritage issues, including social, environmental, and economic trends, and provides them with the qualifications needed to assume leadership and management roles in the cultural heritage sector.

We train leaders in the field that embrace our shared humanity and heritage in order to advance its interpretation, documentation, preservation, and management for the betterment of a global society.

Core Principles:
Our program is built around several guiding principles. We embrace an inclusive definition of heritage beyond sites, monuments, and artifacts, to include full landscapes, environments, and intangible heritage.

> We recognize grassroots efforts and community buy-in as critical to successful management strategies.

> We support an integrated approach to management and a wide understanding of its ties to sustainability, development, and community.

> We take full advantage of our online medium by focusing on emergent technologies related to the field and their impact on preservation, engagement, documentation, and asset management.

> In addition to a sustained focus on digital technologies, the program is framed through a global lens, situating the local, regional, and national within a global context.

We welcome students from around the world interested in Cultural Heritage Management. The interdisciplinary nature and international focus and concern of Cultural Heritage is supported well in the online format where domestic and international students have the opportunity to learn together.

PROGRAM COMMITTEE

Rebecca M. Brown
Associate Professor, History of Art; and Program Chair

Phyllis Hecht
Director, Museum and Heritage Studies

Sarah Chicone
Program Director

DEGREE REQUIREMENTS

All students earn a Master of Arts (MA) in Cultural Heritage Management. Nine online classes and one on-site seminar are required to complete the degree. These 10 courses are made up of three required courses, three core courses, and four electives, which must be completed within five years of beginning the graduate program.

Online Classes
All online classes are offered as asynchronous learning experiences, allowing maximum flexibility in a student’s schedule. Students can log on to an easy-to-use course management system at any time, from anywhere, 24 hours a day and 7 days a week. Courses are structured around weekly course content, and students log on multiple times a week at their convenience to access course materials, participate in discussion, submit assignments, or take exams. Course content is delivered mainly via text, multimedia presentations, and threaded discussions. As an online program, we use the Internet to its full potential, and learning is enhanced through the most up-to-date Web-based tools for design, collaboration, conferencing, and community building. Classes are kept small (15 to 17 students) to encourage active engagement and community among students and faculty. Students have direct access to faculty in their courses and can arrange one-on-one student/faculty member online meetings in real time.

To address student concerns or questions about an online learning environment, an orientation course, offered by the university, introduces the student to the online learning tools, and is required before taking the first online class.
Onsite Seminar
A two-week intensive period of on-ground heritage management study in a location organized by the MA in Cultural Heritage Management program is a required component of the degree. The seminar includes practicum opportunities related to site management, heritage tourism, and conservation, alongside classroom sessions that integrate the daily experiences. Using the rich diversity of the designated city, the seminar provides students with the chance to use what they have learned in their prior courses, develop networks with fellow students and heritage experts, and explore the latest in cultural heritage practice. Students work on directed activities during the two-week period, coupled with multiple site visits focused on the academic work being accomplished.

Note: In order to register for this course, students must have completed a minimum of two courses in the program, although four or more courses are encouraged. One of these courses must be 460.704, students are also strongly encouraged to take 460.707 and some seminars may have other specific requirements. Students are responsible for travel to and from the location, accommodations, and meals, as well as any specified field trip fees.

Waiver option: Students who are unable to travel to a seminar location due to accommodation needs, financial hardship, or family challenges may apply to the program director for an exemption to the two-week seminar. If a waiver is granted, the student must enroll in the internship option (460.780) to fulfill the on-site component of the degree requirement.

COMMUNITY

Students
Students in the MA in Cultural Heritage Management program include current and aspiring heritage professionals from around the world with baccalaureate degrees in study areas relevant to the curriculum (Anthropology, Archaeology, Architecture, Preservation, Art History, Conservation, Environmental Sciences, Geography, Preservation, Cultural Management or Tourism, Public History, or related field).

Faculty
The MA in Cultural Heritage Management faculty is made up of highly regarded experts in the heritage field and academia from diverse geographic locations. The faculty is primarily full-time heritage practitioners who are active members of the global heritage community. They are passionate about training the next generation of heritage leaders and professionals and enthusiastic about the online course format.

Advisers
All MA in Cultural Heritage Management students are assigned an academic adviser who will help determine which courses are best for their career goals.

Network
As an online program, we offer students valuable opportunities to meet heritage professionals from around the world. We build a community within the program through social media tools and a virtual café, where students meet others in the program, find internship and job announcements, and learn about relevant conferences and events.

ADMISSION REQUIREMENTS

> Applicants must hold a baccalaureate degree in study areas relevant to the curriculum (Anthropology, Archaeology, Architecture, Preservation, Art History, Conservation, Environmental Sciences, Geography, Preservation, Cultural Management or Tourism, Public History, or related field).

> Applicants are accepted to the program on the understanding that they have sufficient background in a relevant field, either through their previous degree, or through relevant professional experience, to be able to successfully complete the program.

> A grade point average of at least 3.0 on a 4.0 scale. A minimum GPA of 3.0 does not guarantee admission. For students who have been out of school for some time, work

Application Documents

> AAP application and fee

> A current résumé or CV

> Two letters of recommendation that verify professional and/or academic accomplishments

> A statement of purpose (approximately 750 words)
  This statement should address how your academic and professional experiences have led to your decision, to apply to this program. It should demonstrate an understanding of the cultural heritage sector and describe your academic and career goals, highlighting how this program will serve those goals. If you have worked in the heritage sector in any capacity, please incorporate your experience into your statement. Your statement will be reviewed for content, organization, and writing style.

> Official undergraduate and graduate transcripts from all institutions attended

> International students must submit TOEFL scores and a “course-by-course” credential evaluation of their undergraduate and graduate (if applicable) transcripts performed by an outside evaluation service.

> All students who earned their postsecondary degree(s) in a country other than the United States must submit a “course-by-course” credential evaluation performed by an outside evaluation service.

> International students, see http://advanced.jhu.edu/prospective-students/international-applicants/ for more information.
CURRICULUM

The MA in Cultural Heritage Management offers a structured curriculum of required and core courses augmented with electives. This curriculum provides opportunities for students to gain the knowledge and skills necessary for current professional heritage practice with an eye to the future and an integration of past philosophies. We emphasize the interdisciplinarity of the field, and as a result the curriculum allows each student to customize his or her studies to their unique career goals and trajectory. The program encompasses both theory and practice, focusing on providing real-world skills and training that enable students to move into the heritage field or advance into jobs with more responsibility.

Students must take a total of 10 courses
> Three required courses
> Three core courses
> Four elective courses

An internship, approved by the Program Director, may be substituted for one elective course. Students may take courses offered in the MA in Museum Studies program or up to two core courses in other JHU programs as electives, subject to the approval of the director of each program.

Note: Students may not earn a C in a core course or required course. If you earn a C in a core or required course, you must either repeat the course or take another core or required course to count toward your degree. Degree candidates who receive a second C or below in either a repeated core course or any course taken in the program will be dismissed from the program.

REQUIRED COURSES

Students complete three required courses.

460.702 Studies in World Heritage (3 credits)
This course offers an in-depth exploration of World Heritage by focusing on the concept of heritage, both tangible and intangible, its historical development, its international conventions, and the role of society and history in its past, present, and future. Students will be asked to engage critically with contemporary heritage concepts such as authenticity, ownership, assessment, value, and preservation that form much of our global understanding of the field of cultural heritage studies. Through case studies, lectures, discussions, and readings, students will explore international heritage policy as structured by the institutional complex (UNESCO, ICOMOS, ICOM, etc.) and consider both its local and global impact.

460.704 Cultural Heritage Management/Leadership (3 credits)
Cultural heritage management is a complex intersection of theory and practice. This course will explore issues related to cultural sector management and leadership. Through the lens of current practice, we will examine core theoretical concepts and tools, including traditional approaches as well as the incorporation of emergent technology. We will look closely at the roles of the cultural manager and the proficiencies and characteristics needed for effective management and leadership within the cultural sector. We will consider changing definitions of protection and stewardship as they relate to cultural heritage as well as a larger framing of public interest, what publics, which interests.

460.708 (Onsite Seminar) Reading the City: A Case Study in Urban Heritage (3 credits)
A two-week, intensive, period of on-ground study organized by the Cultural Heritage Management program to be held in one of 230 inhabited cities designated as UNESCO World Heritage Sites. The seminar includes practicum opportunities related to site management, heritage tourism, and conservation, alongside classroom sessions that integrate the daily experiences. Using the rich diversity of the city the seminar provides students with the chance to use what they have learned in their prior courses, develop networks with fellow students and heritage experts, and explore the latest in cultural heritage practice. Students work on directed activities during the two-week period, coupled with multiple site visits focused on the academic work being accomplished. Students are strongly encouraged to take 460.707 prior to registering for this course. Individual course description will be posted for each location.

Waiver option: Students who are unable to travel to a seminar location due to accommodation needs, financial hardship, or family challenges may apply to the program director for an exemption to the two-week seminar. If a waiver is granted, the student must enroll in the internship option (460.780) to fulfill the on-site component of the degree requirement.

CORE COURSES

Choose three out of five.

* Once core course requirements are satisfied, any additional core courses may count toward elective course requirements.

460.707 Reading the Landscape: Cultural Heritage at Scale (3 credits)
This course examines the unique challenges faced by academics and practitioners in defining, preserving and managing rural, natural, and urban heritage at a landscape scale. The multiplicity of interests involved add to the complexity and require robust engagement strategies. Students will use a regional, national and international perspective to derive best practices for understanding the breadth of the cultural landscape concept and the opportunities for its sustainable development. Students are strongly encouraged to take this course before enrolling in the onsite seminar Reading the City (460.704).

460.710 The Protection of Global Cultural Heritage: Laws, Policies, Politics, and Advocacy (3 credits)
This course will consider the laws, policies, and politics that provide for the public commemoration of tangible and intangible heritage. It will explore ideas related to cultural
property across a global and digital landscape including indigenous claims, institutional ownership, and legal rights. Beyond gaining an understanding of applicable laws and policies from a global perspective, students will also examine the politics of heritage and its social and economic impact, including the ways in which it is used in projects of nation building, cultural appropriation, economic development and sustainability, identity, and cultural hegemony. To this end we will take an in depth look at the current threats to world heritage and the laws and policies governing the response of the global community. We will consider what can and cannot, and for that matter what should and should not be done to protect both tangible and intangible world heritage at both the local and international levels and what this means for local and global communities.

460.730 Heritage and Representation: Approaches to Interpretation and Outreach (3 credits)
Outreach and interpretation are key components of cultural heritage management and the visible link between heritage and its diverse publics. This course considers current practice and emerging developments in the field with an eye toward digital strategies and multimedia: (i.e. virtual reality, augmented reality, social media campaigns, and TV and web productions) as well as a broad range of heritage both tangible and intangible: from museums and sites, to archeological excavations, to urban and rural landscapes, and both the natural and built environment. It asks students to evaluate the impacts of engagement strategies and interpretation on diverse publics; from global travelers participating in heritage tourism to the grassroots efforts of indigenous communities. It looks critically at interpretation across global landscapes considering both the intended and unintended consequences of chosen narratives. This course looks closely at audience and community, the control of narrative and interpretation, and the short and long-term impact in terms of identity and access.

460.732 Engaging Communities in Heritage: Ownership, Stewardship, Sustainability, and Creative Cultural Expression (3 credits)
Museums and other heritage institutions are increasingly recognizing the value of “bottom-up” heritage programming. This class will explore issues related to community engagement in the heritage sector as well as strategize ways to engage various constituencies in the formulation, collection, and presentation of their heritage. We will use global case studies (as related to memory and memorial, sites of conscience, marginalized histories, indigenous heritage, and eco-museums) to explore the challenges faced by such projects. Examining both the failures and successes will result in a broader understanding of best practices in the field and help us formulate effective strategies for future engagement.

460.740 Cultural Heritage in the Digital Age (3 credits)
A Greek colony from the 6th century BC is brought to life with augmented reality; a Buddhist cave with centuries-old artworks—at risk because of environmental threat—is preserved with a 3D digital reconstruction; cultural heritage information, images, and damage assessments are catalogued in open source databases. These are just a few examples of how a growing number of scholars, researchers, and practitioners are looking to technology as a means to understand, interpret, document, and preserve cultural heritage worldwide. This course will explore the ways in which cultural heritage professionals are implementing contemporary digital technologies to enhance research, conservation, management and preservation of tangible and intangible heritage, as well as methods of education and engagement of visitors to cultural heritage sites. Through lectures, readings, assignments, and social media, students will identify and analyze the incorporation of technology currently being used in cultural heritage studies and practice, as well as envision its use for the future.

**ELECTIVES**

Choose four of the following.

460.706 Research Methods in Cultural Heritage (3 credits)
The supervised research course enables students to investigate a significant problem or issue in cultural heritage and to develop and demonstrate leadership, critical thinking, and communication skills. The research project is expected to result in a deliverable, written or digital, that makes a contribution to the field of cultural heritage broadly defined. Coursework, assignments, and meetings with a faculty member will take place in an online course environment. This course is normally completed toward the end of the degree program.

460.712 Cultural Resource Management and Methods (3 credits)
Cultural Resource Management (CRM) in the United States is critical to the identification, preservation, and mitigation of our national heritage. This course will cover cultural resource law, its political histories, statutes, jurisprudence, and practice in the United States, scaffolding our understanding of federal, state, and local regulations. Beyond the auspices of governing legislation, we will explore current issues facing CRM including the needs and priorities of varied stakeholders: native sovereign nations, federal cultural resource managers, state and local citizens, business and development, and the academy.

460.714 Culture as Catalyst for Sustainable Economic Development (3 credits)
The role of cultural heritage in global developmental policy emphasizes a human centered and inclusive approach. The course will introduce students to the current global discourse on sustainable economic development and unpack the role of cultural heritage including the socio-economic impacts of investment. Students will consider the role of cultural heritage in long-term development strategies and policy in order to assess impacts and effects. Cultural heritage will be considered as both a means and an end.

460.716 Cultural Heritage Risk Management and Security (3 credits)
The 21st century has seen an unprecedented threat to our global heritage—from natural disasters, extreme weather events, and climate change, to military conflicts in some of our most sensitive areas of global heritage alongside the
intentional targeting of cultural sites for destruction. In this course students will gain an understanding of the risks facing our global heritage. They will be introduced to a variety of security strategies and technologies implemented to protect and preserve sites from 21st century threats. And they will analyze the pros and cons of various approaches to create their own security and disaster mitigation proposals.

460.734  **Heritage Tourism** (3 credits)
This course explores the practice and theory of heritage tourism and the history of its developments and impacts. Through the lens of sustainable economic development, it will examine the benefits and challenges of tourism and site management in both rural and urban contexts.

460.780  **Internship** (3 credits)
An internship at a cultural heritage organization, approved by the internship coordinator, may be substituted for one elective course. To fulfill the internship requirement, a student must complete a minimum of 80 hours of work on-site and a project, (either a research paper or a practical product) on an approved topic related to his/her experience, due at the end of the semester. Students also participate in online discussion and course work during the semester. Before registering for the internship option, the student should contact the internship coordinator for approval. At least four to six weeks before the beginning of the semester in which the internship will take place, the student must submit: 1) a description of the internship weekly duties including activities and/or responsibilities; 2) learning objectives and goals; 3) why this experience should be part of the Cultural Heritage Management degree; and 4) a signed letter of commitment from the internship supervisor. Students must have completed a minimum of two courses in the program before registering for this internship.

Elective courses from the Museum Studies Program

For full course descriptions and more information, see the Master of Arts in Museum Studies.

460.611  History and Philosophy of Museums
460.609  Museums in Global Perspective
460.621  Evaluation Theory & Techniques for Museums
460.628  Architecture of Museums
460.633  Core aspects of Conservation: A 21st Century Approach
460.638  Management of Analog and Digital Images
460.639  Material Culture and the Modern Museum
460.645  Museums and Mobile: Adapting to Change
460.665  Introduction to Archives
460.666  Collection Management
460.670  Digital Preservation
460.671  Foundations of Digital Curation
460.675  Leadership in Museums
460.683  Project Management in Museums
Master of Science in Energy Policy and Climate

energy.jhu.edu

The MS in Energy Policy and Climate program will prepare the next generation of interdisciplinary professionals to address the challenges of climate change and a global transition to energy systems.

Graduates will be able to demonstrate an understanding of the science related to a changing climate, the impacts of current and future climate change on natural and human systems, the vulnerabilities of these systems to predicted changes, and a variety of possible legal, policy, and technological strategies for mitigation and adaptation. Graduates will also develop a comprehension of energy production, delivery, and consumption for both traditional systems and sustainable/renewable energy alternatives, and the implications of our energy choices for averting dangerous levels of climate change.

The program was originally designed by members of JHU’s Department of Earth and Planetary Sciences in the Krieger School of Arts and Sciences and by industry and policy specialists. Courses are taught by distinguished instructors with valuable experience in the academic, public, corporate, and nonprofit sectors.

The program seeks to build in students the technical and management skills needed to become highly competent and ethical professionals capable of leading societal responses to the challenges of a changing climate and the quest for a revolution in energy production. The curriculum is designed to help students develop an understanding of policy strategies employed at all levels, from the local to the international level, in response to these challenges. Graduates of the program will have an understanding of the current state of the U.S. response to climate change, as well as a familiarity with multilateral agreements and non-U.S.-based approaches to both mitigations of and adaptation to climate change. Additionally, students will develop expertise in energy production and policymaking.

PROGRAM OBJECTIVES

Graduates will be able to demonstrate:

> Understanding of the scientific principles that explain current and projected changes in climate and the role of humans in this process
> Knowledge of the impacts of current and future climate change on natural and human systems, the vulnerabilities of these systems to predicted changes, and a variety of possible strategies for adaptation
> Comprehension of the principles and applications of energy technologies for the mitigation of and adaptation to climate change

PROGRAM COMMITTEE

Tom Haine
Morton K. Blaustein Professor and Chairman of Earth and Planetary Sciences

Daniel S. Zachary
Program Director, Energy Policy and Climate Program

Benjamin F. Hobbs
Theodore M. and Kay W. Schad Professor of Environmental Management

Michael Mehling
Executive Director of the Center for Energy and Environmental Policy Research, Massachusetts Institute of Technology

Darryn Waugh
Professor of Earth and Planetary Sciences

ADMISSION REQUIREMENTS

In addition to the materials and credentials required for all programs (see Admission Requirements), the Master of Science in Energy Policy and Climate program requires:

> A grade-point average of at least 3.0 on a 4.0 scale in the latter half of undergraduate studies. Work experience or other demonstration of expertise may also be considered in the admissions process.
> One semester of undergraduate calculus and one semester of undergraduate statistics
> One semester of undergraduate chemistry or equivalent thereof
> It is highly desirable, but not required, that applicants have taken one semester of undergraduate microeconomics or equivalent thereof.

Students who do not have the necessary undergraduate training in calculus, statistics or chemistry may be offered provisional admission if their other credentials are strong.

Students who are admitted provisionally due to lack of quantitative skills have the option to:
1. Take appropriate courses at an accredited college/university.
2. Take 420.301 Quantitative Methods for Environmental Sciences.
3. Pass a math placement test, administered by the EPC program.

Students who are admitted provisionally due to lack of training in chemistry have the option to:
1. Take one semester of general chemistry at an accredited college or university.
2. Take 420.302 Chemistry of Natural Processes.
3. Pass a chemistry placement test, administered by the EPC program.

Admissions Documents
> AAP application and fee
> A current résumé or CV
> A statement of purpose (500 words) addressing why at this time in your career you want to pursue this graduate degree and why at JHU
> Two letters of recommendation, preferably including one academic reference
> Official undergraduate and graduate transcripts

Provisional Student
Provisional students are admitted to this status because, in the view of the admissions committee, they do not fulfill all academic requirements for admission as a degree candidate at the time of the application. Provisional students may be required to take specific prerequisite courses, and/or take a specific number of graduate-level courses and complete them successfully in order to establish their eligibility to be admitted as a degree candidate. During the time of this provisional status, students are held to grading criteria stricter than those required of degree candidates (see Grading System, Requirements). Specifics of a provisional admission are outlined in a formal admissions letter mailed to the student. All listed criteria must be met for a student to continue to enroll in courses.

Math Test
Those provisional students who are required to take 420.301 Quantitative Methods for Environmental Sciences (see Prerequisite Courses below), may choose to take a mathematics assessment test. If successfully passed, provisional students place out of the prerequisite.

This test is administered online and can be done at the student’s convenience on any working day. After a student is admitted, he/she may make an appointment to take the test and/or to obtain relevant study materials by calling the EPC Program Director at 202-452-1280. Students can also obtain relevant practice materials at http://advanced.jhu.edu/academics/graduate-degree-programs/environmental-sciences-and-policy/program-resources/practice-math-questions/.

Special Students
Students admitted to the program as special students follow the guidelines provided elsewhere in this catalog and by the admissions office may count no more than two courses toward the degree should they apply and be admitted to the program a degree-seeking student.

PROGRAM REQUIREMENTS

Prerequisite courses
Provisional students who have not fulfilled the required courses for admission are required to complete one or more of the following prerequisites:

420.301 Quantitative Methods for Environmental Sciences (3 credits)
Provisional students may also take appropriate undergraduate-level courses at an accredited university or successfully pass the math assessment test to fulfill this prerequisite. Provisional students should discuss these options with their advisor.

420.302 Chemistry of Natural Processes (3 credits)
Provisional students may also fulfill this prerequisite by taking one semester of general chemistry at an accredited university. Provisional students should discuss these options with their adviser.

Program Course work
> Four core courses
> Five electives
> Capstone project

For more information about core and elective courses, please review the course descriptions on the following pages. Please note that not all courses are offered every semester, and the energy policy and climate course schedule should be consulted for current classes and times. Core courses are offered at least every other semester.

Electives should be chosen in consultation with the student’s adviser and should accommodate individual career goals. Students may also consider taking related courses in other
divisions of the graduate programs in AAP, including Environmental Sciences and Policy, Geographic Information Systems, Government Studies, or Applied Economics, as well as pertinent courses in other units of the Krieger School of Arts and Sciences; the schools of Engineering, Public Health, Business, or Education; or the School of Advanced International Studies (see Registering for Courses in Other Divisions/Programs). Students are permitted, with the written consent of the director of the program, to take up to two pertinent courses outside of the energy policy degree.

Please refer to the Advanced Academic Programs course schedule for exact dates, times, locations, fees, and instructors.

**CORE COURSES**

The core courses introduce the relevant body of knowledge in science and policy upon which students will base their studies. Some students may have covered most of the material of one or more of the core courses in previous academic work or through pertinent work experience. Such students should consider requesting that the appropriate core course(s) be waived (see Student Special Requests).

If approved, the waived core course must then be replaced with an additional elective. The core courses can be taken in any order, although it is recommended that students begin with 425.601 Principles and Applications of Energy Technologies. Students must complete fulfillment of the four core courses within the first seven courses in the program toward their degree.

**425.601 Principles and Applications of Energy Technology** (3 credits)
The course examines energy supply and consumption and how these activities impact the environment, with a focus on understanding the potential technology, market structure and policy implications for climate change. Students will gain a solid understanding of the science, economics, and environmental impact associated with various electricity generation technologies, including renewable energy, conventional generation (existing and future), carbon storage and sequestration, and electricity storage. Transportation topics will address a variety of technologies, including hybrids and fuel cells, as well as the potential role for alternative fuels, including biofuels. Climate change and the potential impact and mitigation of carbon dioxide will be considered throughout the course. Offered online or on-site twice per year.

**425.602 Science of Climate Change and Its Impact** (3 credits)
The course begins examining the basic processes of the climate system. The course then moves to the study of the changing climate. While natural changes will be studied, the emphasis will be on anthropogenic climate change. Various models for predicting future climate change will be presented, including the assumptions and uncertainties embedded in each model. The regional climate impacts and impacts on subsystems will be examined, including changes in rainfall patterns, loss of ice cover and changes in sea level. The possible ecological effects of these predicted changes will also be examined. Offered online or on-site twice per year.

**425.603 Climate Change Policy Analysis** (3 credits)
After a study of the historical development of climate change policy, this course analyzes current policy options for mitigating and adapting to long-term climate change. The course will examine various approaches available in the U.S. for national-level policy, including the regulatory approach and the market-based approaches, particularly cap and trade and carbon taxation. Various models for designing a cap and trade system will be studied, including the European experience and regional programs in the United States. Special attention will be paid to methods for setting initial prices and accounting for discounts. The course will focus primarily on national-level carbon management policies, but international agreements will also be included, as well as equity considerations on a global level. Offered online or on-site twice per year.

**425.604 Energy & Climate Finance** (3 credits)
This course introduces students to environmental markets and the policies that create them, focusing mainly on emissions trading systems to mitigate climate change. The course also provides an introduction to attributes of the financial sector through its analysis of markets for environmental commodities. Students learn the economic theory behind market-based environmental policy instruments, such as tradable renewable energy credits, carbon offsets, and water rights in a semester of lectures featuring presentations from practitioners, including state and federal government, private companies subject to market-based emissions regulation, commodity brokers, and representatives from international institutions. Offered online or on-site twice per year.

**425.605 Introduction to Energy Law & Policy** (3 credits)
This course will provide an overview of the major laws and policies that shape and regulate the complex energy system the United States and, to a lesser degree, the world. The goal is to provide students with a framework for understanding the energy laws and policies of today and those likely to be important in coming years. The course will review laws and policies for all major types of energy, including fossil fuels, nuclear, and renewables, as well as issues related to extraction, conversion, distribution, use, and conservation. Laws and policies ranging from local level to state, federal, and international levels will be included. Laws and policies will be presented against in the context of profound and rapid changes occurring in the energy system, climate change and other environmental issues, economics, national security, and population growth. The course will be largely empirical, but attention will be given to major theories. Most aspects of the course will be illustrated with reference to contemporary issues, such as the recently unveiled Clean Power Plan, court decisions, climate change negotiations, and changes in state policies and federal tax policies for renewables. Offered on-site at least once every two years. (425.605 can be used an alternative for either 425.603 or 425.604)
ELECTIVES

Choose five of the following.

425.605 Introduction to Energy Law & Policy (3 credits)
This course will provide an overview of the major laws and policies that shape and regulate the complex energy system in the United States and, to a lesser degree, the world. The goal is to provide students with a framework for understanding the energy laws and policies of today and those likely to be important in coming years. The course will review laws and policies for all major types of energy, including fossil fuels, nuclear, and renewables, as well as issues related to extraction, conversion, distribution, use, and conservation. Laws and policies ranging from local level to state, federal, and international levels will be included. Laws and policies will be presented against the context of profound and rapid changes occurring in the energy system, climate change and other environmental issues, economics, national security, and population growth. The course will be largely empirical, but attention will be given to major theories. Most aspects of the course will be illustrated by reference to contemporary issues, such as the recently unveiled Clean Power Plan, court decisions, climate change negotiations, and changes in state policies and federal tax policies for renewables. Offered on-site at least once every two years.

425.615 Understanding Public Attitudes and Behaviors for the Communication of Climate and Energy Policy. (3 credits)
The enormous gains in environmental protection achieved in the latter half of the 20th century in the United States can primarily be credited to legal policy instruments that targeted point-source pollution through legislation such as the Clean Air Act and Clean Water Act. However, that successful framework has been ill-equipped to handle the myriad sources of greenhouse gas emissions that contribute to climate change, and passing new national climate change legislation has remained frustratingly out of reach. To meet these challenges, citizens will need to make both political and consumer decisions about climate change and energy. Public attitudes influence what is believed to be politically possible in passing new legislation, and consumer decisions contribute to as much as 40 percent of national emissions. These conditions have generated renewed interests in low-cost, non-regulatory soft policy approaches based on social science to inform public decision-making and behavior change. Communication on whether in the form of information provision, participatory decision-making—social marketing—is among the foremost of these strategies. This course will introduce you to a growing literature on the use of social science research in informing and evaluating climate change and energy policies. Understanding some of the terms and concepts used in social science research will help you critically evaluate research commissioned by the organizations for which you work, or even just survey toplines reported by the media. Offered on-site at least once every two years.

425.621 Renewable Energy and Climate Change Projects in Australia (5 credits)
This course will explore the technologies and the supporting policy and is planned for a period of 10 days. The trip will include travel to Sydney and to one other city amongst a list: Melbourne, Canberra, Brisbane or Adelaide. The course will visit a number of renewable energy projects, including experimental and commercial sites. We will also visit the rich collection of projects in the Victoria and New South Wales area. Discussions will also be conducted with experts from some of the major climate labs including the Commonwealth Scientific and Industrial Research Organization and the Australian Bureau of Meteorology.

425.622 Renewable Energy and Proactive Climate Change in Benelux (3 credits)
Scientific evidence for warming of the climate system is unequivocal, according to the international Panel on Climate Change. Facing the combined issues of limited fossil fuel reserves and that ongoing CO2 emissions are contributing to global warming, the governments in Europe have decided to move toward more sustainable energy systems and to develop national projects to protect vulnerable coastal areas from expected sea level rise. European Union nations are world leaders in the development of renewable energy sources and have recently proposed a common renewable energy policy in the European Renewable Energy Directive, creating the binding obligations to all of its members with the aim of reaching the EU target of consuming 20 percent of its energy in form of renewables by 2020. On the climate side, the 2030 framework for climate and energy policies in Europe proposes a centerpiece policy of reduction of greenhouse gas emissions by at least 40 percent.

425.623 Transportation Policy in a Carbon-Constrained World (3 credits)
This course examines how transportation decisions and policies can affect climate change, and the transportation solutions available to help solve the problem of climate change. Three sets of policies are examined that can reduce GHGs from the transportation sector—cleaner vehicles, low GHG-emitting fuels, and better management of travel demand. Each policy covered in detail in this course. Prerequisites: 425.602 Science Climate Change and Its Impacts, 425.603 Climate Change Policy Analysis. Offered online or on-site twice per year.

425.624 Wind Energy: Science, Technology and Policy (3 credits)
Topics include the assessment of wind resources, basic principles of wind turbines and power transmission, electric markets and wind power, technological and economic aspects of storage of intermittent wind power, legal issues at state and federal levels, international water issues, and environmental impact assessment processes for wind developments. Offered on-site at least once every two years. Prerequisite: 425.601 Principles and Applications of Energy Technology.
425.625 Solar Energy: Science, Technology & Policy (3 credits)
This course focuses on the two primary solar technologies in the contemporary market: photovoltaic cells and concentrate solar power, with a focus on PV. The course will investigate techniques for increasing efficiency, expanding storage, and decreasing price. Solar energy for use as both distributed and grid-independent resources is considered. The course covers science and technologies, as well as the environmental impact on solar technologies. Additionally, the course examines the main structure considerations for solar technology development. Prerequisite: 425.601 Principles and Applications of Energy Technology.

425.626 Alternative Fuels: Science, Technology & Policy (3 credits)
This course will examine the significant proposed alternatives to conventional fuels and discuss the economic and environmental factors associated with the production, distribution, and use of these alternative fuels. Students will learn the technical and systemic barriers to the adoption of alternative fuels. Prerequisite: 425.601 Principles and Applications of Energy Technology.

425.628 Renewable Energy Project Development and Finance (3 credits)
This course examines the legal and regulatory issues associated with renewable energy projects (wind, solar, geothermal, etc.). Various ownership arrangements and contract agreements for successful development and financing will be examined. The federal-and-state level regulatory structure governing renewable energy project development and finance will be studied. Offered on-site at least once every two years.

425.629 Energy Efficiency: Demand Side Options (3 credits)
The focus of this course is a reduction of energy use on the demand side with a focus on buildings (their structure, design, and the contents, e.g., refrigerators, standards, and integration) and communities, and, to a lesser extent, industry technologies (e.g., timber and concrete). The course will also cover general concepts in demand side management and the benefits and implementation of a smart grid system. The course covers both technology and policy of energy efficiency. Prerequisite: 425.602 Science of Climate Change and Its Impacts, 425.603 Climate Change Policy Analysis.

425.630 Cities and Climate Change (3 credits)
This course looks at the energy demands of cities and potential for alternative energy production in the urban context. Local-level government climate policy options are also examined, including land use policies, building practices, green infrastructure, city-owned power facilities, local level offsets, and urban-based clean development mechanisms. Adaptation policies for cities are also studied. Offered online at least once every two years. Prerequisite: 425.603 Climate Change Policy Analysis.

425.635 Climate Modeling Techniques (3 credits)
The course is a survey of the history of climate modeling and also includes current modeling techniques. Students will understand the strengths and weaknesses of each climate model and how well climate models capture various processes. This class emphasizes the climate models’ prediction for the future with special attention to global level predictions. Offered on-site, at least once every two years. Prerequisite: 425.602 Science of Climate Change and Its Impacts.

425.637 International Climate Change Policy (3 credits)
This course focuses on the international frameworks for responding to climate change. It includes a review of the history of international responses to climate change, highlights the negotiations—what is agreed, what is outstanding, and where the fault lines exist—and then examines efforts at integrating climate change into various international institutions. The course includes an examination of how climate change is likely to affect the ability of countries to fulfill their international commitments under other agreements. The course also examines the role of a range of international organizations, such as the World Trade Organization, the World Intellectual Property Organization, regional bodies, international river and lake basin organizations, the UN Security Council, and the UN High Commissioner for Refugees. Offered on-site at least once every two years. Prerequisite: 425.602 Science of Climate Change and Its Impacts, 425.603 Climate Change Policy Analysis.

425.638 Adaptation to Climate Change (3 credits)
Global climate change risks are increasingly complex and may ultimately affect virtually every facet of our economic, energy, community, and environmental systems. At the same time, policy and investment responses to climate resiliency needs are similarly complex, controversial, and high stakes. Perhaps no issue facing leaders of today and tomorrow is more cross-cutting in nature or in greater need of improved understanding and capability than climate change risk. This course will provide a comprehensive framework for understanding, assessing, and applying climate change risk, vulnerability, a hazard assessment for the development of risk reduction an adaptation response. In the process, it will examine the status, limitations, and strengths of current assessment and action planning approaches across varying sectors, scales, and impact areas. The course will also include a review of methods prioritizing actions and addressing feasibility, flexibility, and logistical needs as applied to specific facilities, such as military installations, as well broader communities and multistate regions. Individual and group learning exercises will be involved. Offered on-site at least once every two years.

425.640 The Future of the U.S. Electric System in a Carbon-Constrained World (3 credits)
The course looks at the future of the U.S. electric system and the influence of climate change on it. The class will explore the increasing demands for low-carbon emissions, the need for increased quantity and quality of electric power, cybersecurity requirements, and other related issues. Class topics include constraints on the system, such as the need for reliability, affordability, and geographic differences in the system, and
consumer's requirements. The course will assess the strength and weaknesses of current and next-generation technologies expected to transform our nation's electric infrastructure, e.g., smart grid, renewable and distributed systems, and superconductivity. Students will learn the complexity of renovating this 120-year-old system and the promise it holds for the future. Offered on-site at least once every two years.

425.646  U.S. Offshore Energy: Policy, Science and Technology (3 credits)
Offshore energy is progressively becoming a significant part of the U.S. energy mix. Oil from offshore platforms now accounts for roughly one-third of the U.S. domestic production, and significant interest has emerged for developing renewable energy resources in the ocean and the Great Lakes. Large-scale offshore wind projects have been proposed along the East Coast, and there is also interest in developing wave energy off the West Coast and the Pacific islands. Ocean current and tidal energy are the other emerging sources. This course will take a multidisciplinary approach to offshore energy analysis. We will discuss both renewable resources, such as offshore wind, and conventional resources, such as offshore oil and gas. Topics covered will include resource assessment, state and federal regulations, economics of offshore energy, environmental impact and benefits, space use conflicts, cultural/tribal issues, public perception, offshore energy technology, and energy infrastructure. We will also review case studies on the proposed Cape Wind project and the Deepwater Horizon oil spill. In addition, we will discuss the recently launched National Ocean Policy initiative and how it is influencing offshore energy regulation. Subject matter experts from federal regulatory agencies will be invited as guest speakers. By the end of the course, students will understand policies and regulations governing offshore energy in the U.S. They will also be conversant with the economics of resource development, technological drivers for harnessing the resources, and the scientific advances in assessing and mitigating environmental impact from energy production in offshore areas. Offered on-site at least once every two years.

Capstone

425.800  Capstone Project in Energy Policy and Climate (3 credits)
The Capstone Project enables students to apply and synthesize the material learned in other courses, develop expertise on a specific topic related to climate change science or policy, work closely with experts in the field of study, and improve professional writing and presentation skills. In the semester prior to conducting the project, students must identify a proper topic and mentor who is both familiar with the chosen topic and willing to guide and oversee the project. The mentor must be a faculty member teaching in the program, a supervisor from the student's place of work, or any expert with appropriate credentials. Formal proposals must be submitted at least two weeks prior to the start of the semester in which the project will be completed. Prior to the enrollment in the course, the project must be reviewed and accepted by the course instructor.

Suggested Electives From Environmental Sciences and Policy

420.608  Oceanic and Atmospheric Processes (3 credits)
420.645  Environmental Challenges for Energy Policy (3 credits)
420.649  Strategic Mgmt for Sustainability (3 credits)
420.651  Risk Assessment and Risk Management (3 credits)
420.654  Environmental and Resource Economics (3 credits)

*Not an AAP course. Please refer to partner JHU school/division for credit information.*
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>420.656</td>
<td>Environmental Impact Assessment and Decision Methods</td>
<td>3</td>
</tr>
<tr>
<td>420.657</td>
<td>Environmental Issues and Congressional Policymaking</td>
<td>3</td>
</tr>
<tr>
<td>420.659</td>
<td>Management for Environmental Results with Performance-Based Measurement</td>
<td>3</td>
</tr>
<tr>
<td>420.665</td>
<td>Climate Change at the Front Lines: The Study of Adaptation in Developing Countries</td>
<td>3</td>
</tr>
</tbody>
</table>

**Suggested Electives from Geographic Information Systems**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>430.601</td>
<td>Geographic Information Systems (GIS)</td>
<td>4</td>
</tr>
<tr>
<td>430.602</td>
<td>Remote Sensing: Earth Observing Systems and Applications.</td>
<td>4</td>
</tr>
</tbody>
</table>

**Suggested Electives from Global Security Studies**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>470.734</td>
<td>Energy, Vulnerability, and War</td>
<td>3</td>
</tr>
<tr>
<td>470.773</td>
<td>Energy and Environmental Security</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives from Other Johns Hopkins University Divisions**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>575.710</td>
<td>Financing Environmental Projects*</td>
<td></td>
</tr>
<tr>
<td>575.723</td>
<td>Sustainable Development and Next Generation Buildings*</td>
<td></td>
</tr>
</tbody>
</table>
Climate change, population growth, energy consumption, habitat loss, availability of drinking water, air pollution, and species extinction have increasingly come to the fore in minds of citizens around the world. To manage the Earth’s environment effectively, there is a need to understand the processes that shape the planet’s surface, control the chemistry of its air and water, and the production of the resources that humans depend on. Our program is unique and distinct in its focus on the interplay between science and policy. This program is founded on the premise that in order to design rational solutions to the complex environmental challenges confronting our planet in the twenty first century, humans require both an in-depth understanding of the underlying scientific and technical issues and an appreciation for the relevant political, ethical, economic, legal, and historical dimensions. Graduates of the program emerge with a combination of expertise in science and policy that enables them to assume key positions in public and private entities responsible for safeguarding our environmental future. Many of the program’s students are already employed in the environmental field but wish to enhance their training or move in new directions. Others are seeking to move into the arena of environmental science and policy.

The program offers a flexible curriculum that allows students to tailor their academic experience to suit their personal needs and interests. Courses are focused towards wide ranging issues such as imperiled global ecosystems, natural resources economics and multinational environmental trusts and laws. The program is open to students with limited scientific background as well as those that already have a background in environmental sciences. Core course work includes geology, hydrology, oceanography, meteorology, ecology, geographic information systems (GIS), and policymaking. Electives range across a spectrum from courses strongly oriented toward policy to ones focused more heavily on science. Electives are selected by students under the guidance of advisers.

The program was originally designed by members of the Department of Earth and Planetary Sciences at Johns Hopkins, in conjunction with experts in applied science at regional and federal institutes and agencies. Courses are taught by distinguished instructors with valuable experience in the academic, public, and corporate sectors. Many of the program’s alumni are highly successful professionals. Curricula in the ESP program takes a holistic approach for putting students in position to join the global science community.

**PROGRAM COMMITTEE**

- **Tom Haine**  
  Program Chair, Environmental Sciences and Morton K. Blaustein Professor and Chairman of Earth and Planetary Sciences

- **Jerry Burgess**  
  Director, Environmental Sciences and Policy and GIS Programs

- **David Elbert**  
  Associate Research Scientist, Earth and Planetary Sciences

- **Alexios Monopolis**  
  Sr. Lecturer, Global Environmental Change and Sustainability Major, Department of Earth and Planetary Sciences

- **Katalin Szlavecz**  
  Associate Research Professor, Earth and Planetary Sciences

- **David Curson**  
  Director, Audubon Society, DC-MD

- **Michael Shelby**  
  Chief Economist, Transportation and Climate Division, Office of Transportation and Air Quality, U.S. EPA.

**ADMISSION REQUIREMENTS**

In addition to the materials and credentials required for all programs (see AAP Admission Requirements), the Master of Science in Environmental Sciences and Policy program normally requires:

- A grade-point average of at least 3.0 on a 4.0 scale in the latter half of undergraduate studies. Particular interests and work experience may also be considered.
Academic Catalog 2017-18

Environmental Sciences and Policy

One semester of undergraduate calculus and one semester of undergraduate statistics

One semester of undergraduate general chemistry

Students who do not have the necessary undergraduate training in calculus, statistics, or chemistry may be offered provisional admission if their other credentials are strong.

Students who are admitted provisionally due to lack of quantitative skills have the option to:

1. Take appropriate courses at an accredited college/university (courses must be approved by the academic adviser)
2. Take 420.301 Quantitative Methods for Environmental Sciences.

Students who are admitted provisionally due to lack of training in chemistry have the option to:

1. Take one semester of general chemistry at an accredited college or university
2. Take 420.302 Chemistry of Natural Processes.

Admissions Documents

AAP application and fee
A current résumé or CV
A statement of purpose (500 words) addressing why at this time in your career you want to pursue this graduate degree and at JHU.
Two letters of recommendation, preferably one academic reference
Official undergraduate and graduate transcripts

Provisional Student

Provisional students are admitted to this status because, in the view of the admissions committee, they do not fulfill all academic requirements for admission as a degree candidate at the time of the application. Provisional students may be required to take specific prerequisite courses, and/or take a specific number of graduate-level courses and complete them successfully in order to establish their eligibility to be admitted as a degree candidate.

During the time of this provisional status, students are held to grading criteria stricter than those required of degree candidates (see Grading System, Requirements). Specifics of a provisional admission are outlined in the formal admissions letter mailed to the student. All listed criteria must be met for a student to continue to enroll in courses.

Math and Chemistry Test

Those provisional students who are required to take 420.301 Quantitative Methods for Environmental Sciences or 420.302 Chemistry of Natural Processes (see Prerequisite Courses in the Course Descriptions section) may choose to take an assessment test. If successfully passed, provisional students will place out of the prerequisite. To take the test, please contact the Program Director at 202-452-1280.

Special Students

Provisional students who are not strongly qualified may be offered provisional admission to the master's program. These students will be required to take certain prerequisite courses and may be required to pass a test. If a student requests to be admitted provisionally, he or she should contact the Program Director to make this request. The decision will be made by the Admissions Committee.

Provisional students are admitted to this status because, in the view of the admissions committee, they do not fulfill all academic requirements for admission as a degree candidate at the time of the application. Provisional students may be required to take specific prerequisite courses, and/or take a specific number of graduate-level courses and complete them successfully in order to establish their eligibility to be admitted as a degree candidate.

During the time of this provisional status, students are held to grading criteria stricter than those required of degree candidates (see Grading System, Requirements). Specifics of a provisional admission are outlined in the formal admissions letter mailed to the student. All listed criteria must be met for a student to continue to enroll in courses.

Math and Chemistry Test

Those provisional students who are required to take 420.301 Quantitative Methods for Environmental Sciences or 420.302 Chemistry of Natural Processes (see Prerequisite Courses in the Course Descriptions section) may choose to take an assessment test. If successfully passed, provisional students will place out of the prerequisite. To take the test, please contact the Program Director at 202-452-1280.

MS in Environmental Sciences and Policy

The MS in ESP can be pursued with no concentration or by choosing one of the four concentrations listed on the next page.

NO CONCENTRATION

Five of the six core courses
Five elective courses

For more information about core and elective courses, please see the course descriptions on the following pages. Note: All electives are not offered every semester, and the mode of delivery (on-site or online) varies. It is very important that students consult the environmental sciences and policy course schedule for specific class offerings and times by semester.

The six core courses to choose five from are:

420.601 Geological Foundations of Environmental Science (3 credits)
420.604 Hydrology & Water Resources (3 credits)
420.608 Oceanic & Atmospheric Processes (3 credits)
420.603 Environmental Applications of GIS (3 credits)
420.611 Principles & Methods of Ecology (3 credits)
420.614 Environmental Policymaking and Policy Analysis (3 credits)

Electives should be chosen in consultation with the student’s adviser and should accommodate individual career goals. When a student elects the MS degree without a concentration, electives may be chosen from any combination of the environmental sciences and policy offerings. Students may also consider related courses elsewhere in Advanced Academic Programs or in the schools of Engineering, Public Health, Advanced International Studies, Business, or Education (see Registering for Courses in Other Divisions/Programs). Please refer to the Advanced Academic Programs course schedule for exact dates, times, locations, fees, and instructors.

Residency Requirement

Many courses are offered online, but at least one course must be taken in an on-site classroom or as an in-person field course to fulfill the requirements of the degree. Students may choose to come to D.C. for a whole semester or opt for an intensive field course. These are offered throughout the year, but the majority are scheduled during the summer or in January.
field courses require an additional fee and often include lodging, course transportation, and some food (this is variable). Students are responsible for travel to the location of their residency course. Note: The University does not have lodging facilities in D.C.

**Capstone Project**
The Capstone Project is optional for students pursuing the MS degree without a concentration. However, students in the MS in Environmental Sciences and Policy program with particular academic or professional interests, including those who are considering a PhD in the future, may wish to pursue independent research by completing an independent research project. This course is co-taught with the Energy, Policy and Climate program, 425.800, and is offered every fall and spring.

The Capstone Project is required for the MS with a concentration. Research must be original and bring a new perspective to a field or topic; it may include analysis of previously obtained data and overview and synthesis of published interpretations of such data or original primary research in the field or lab. The general guidelines and timeline for the course can be found on the ESP website (see Experience > Independent Research Project).

Note: If the project involves human subjects, clearance from the Johns Hopkins Institutional Review Board may be necessary and should be planned for as this process can take additional time.

**FOUR OPTIONAL CONCENTRATIONS**

### Environmental Monitoring and Analysis
This concentration focuses on identifying, assessing, monitoring, and quantifying environmental problems, as well as progress toward the redress of these problems. The concentration enables students to work on various topics, with a focus on measurement and analytical techniques.

**Required Courses**
- 420.603 Environmental Applications of GIS (3 credits)
- 420.614 Environmental Policymaking and Policy Analysis (3 credits)
- 425.800 Research Design for Capstone Projects in Energy and Environmental Sciences (3 credits)

Choose three of the following:
- 420.601 Geological Foundations of Environmental Science (3 credits)
- 420.604 Hydrology and Water Resources (3 credits)
- 420.608 Oceanic and Atmospheric Processes (3 credits)
- 420.611 Principles and Methods of Ecology (3 credits)

### Electives
Choose five of the following:

**Environmental Sciences and Policy Electives**
- 420.622 Ecotoxicology (3 credits)
- 420.626 Field Methods in Ecology (3 credits)
- 420.631 Field Methods in Stream and Water Quality Assessment (3 credits)
- 420.651 Risk Assessment and Risk Management (3 credits)
- 420.654 Environmental and Natural Resource Economics (3 credits)
- 420.656 Environmental Impact Assessment and Decision Methods (3 credits)
- 420.659 Management for Environmental Results with Performance-Based Measurements (3 credits)
- 420.660 Strategies in Watershed Management (3 credits)

**Energy Policy and Climate Courses**
- 425.602 Science of Climate Change and Its Impacts (3 credits)

**Biotechnology Electives**
- 410.662 Epidemiology: Diseases in Populations (4 credits)

**Geographic Information Systems Courses**
- 430.601 Geographic Information Systems (GIS) (4 credits)
- 430.602 Remote Sensing: Earth Observing Systems and Applications (4 credits)
- 430.603 Geospatial Data Modeling (4 credits)

**Public Health Electives**
- 187.610 Public Health Toxicology
- 188.680 Fundamentals of Occupational Health
- 340.601 Principles of Epidemiology

**Engineering Electives**
- 575.727 Environmental Monitoring and Sampling*

### Ecological Management
This concentration focuses on the management of natural resources within an ecological context. It enables students to understand particular ecosystems as well as broader issues within the ecological sciences applicable to various systems.

**Required Courses**
- 420.611 Principles and Methods of Ecology (3 credits)
- 420.614 Environmental Policymaking and Policy Analysis (3 credits)
- 425.800 Research Design for Capstone (3 credits)

Choose two of the following:
- 420.601 Geological Foundations of Environmental Science (3 credits)
- 420.604 Hydrology & Water Resources (3 credits)
- 420.608 Oceanic & Atmospheric Processes (3 credits)
- 420.603 Environmental Applications of GIS (3 credits)

*Not an AAP course. Please refer to partner JHU school division for credit information.
Choose three of the following:

**Environmental Sciences and Policy Electives**
- 420.613 Forest Ecosystems: A Global Perspective (3 credits)
- 420.607 Plant Biogeography (3 credits)
- 420.618.91 Terrestrial and Marine Conservation Biology (3 credits)
- 420.620 Soils in Natural and Anthropogenic Ecosystems (3 credits)
- 420.622 Ecotoxicology (3 credits)
- 420.623 Freshwater Ecology and Restoration of Aquatic Ecosystems (3 credits)
- 420.625 Ecology and Ecosystem Management in Coastal and Estuarine Systems (3 credits)
- 420.626 Field Methods in Ecology (3 credits)
- 420.628 Ecology and Management of Wetlands (3 credits)
- 420.631 Field Methods in Stream and Water Quality Assessment (3 credits)
- 420.637 Conservation Biology and Wildlife Management (3 credits)
- 420.638 Coastal Zone Processes and Policy (3 credits)
- 420.639 Landscape Ecology (3 credits)
- 420.641 Natural Resources Law and Policy (3 credits)
- 420.660 Strategies in Watershed Management (3 credits)
- 420.662 Coral Reefs and Caves: The Geology of the Bahamas (3 credits)
- 420.670 Sustainability Leadership (3 credits)
- 420.681 Climate Change Adaptation and Development in Nepal (3 credits)

**Geographic Information Systems Courses**
- 430.601 Geographic Information Systems (GIS) (4 credits)
- 430.603 Geospatial Data Modeling (4 credits)

**Environmental Management**
This concentration focuses on finding balances among economic, environmental, and social interests. The field of study serves business leaders, who must consider environmental impacts of their decisions and develop competitive advantage within an ecologically constrained world. The concentration is also important to environmental leaders who need business skills to keep agencies and nonprofits afloat and who need to include economic issues in their proposed solutions to environmental problems.

**Required Courses**
- 420.614 Environmental Policymaking and Policy Analysis (3 credits)
- 420.800 Research Design for Capstone Projects in Energy and Environmental Sciences (3 credits)

Choose three of the following:
- 420.601 Geological Foundations of Environmental Science (3 credits)
- 420.604 Hydrology & Water Resources (3 credits)
- 420.608 Oceanic & Atmospheric Processes (3 credits)
- 420.611 Principles and Methods of Ecology (3 credits)
- 420.603 Environmental Applications of GIS (3 credits)

**Electives**
Choose five of the following:

**Environmental Sciences and Policy Electives**
- 420.610 Sustainable Business (3 credits)
- 420.620 Soils in Natural & Anthropogenic Ecosystems (3 credits)
- 420.629 Drinking Water, Sanitation & Health (3 credits)
- 420.632 Air Quality Management and Policy (3 credits)
- 420.634 Bioremediation and Emerging Environmental Technologies (3 credits)
- 420.641 Natural Resource Law and Policy (3 credits)
- 420.642 Public Lands-Private Interests: The Struggle for Common Ground (3 credits)
- 420.644 Sustainable Cities (3 credits)
- 420.646 Transportation Policy and Smart Growth (3 credits)
- 420.650 International Environmental Policy (3 credits)
- 420.651 Risk Assessment and Risk Management (3 credits)
- 420.652 Environmental Justice (3 credits)
- 420.654 Environmental & Natural Resource Economics (3 credits)
- 420.656 Environmental Impact Assessment and Decision Methods (3 credits)
- 420.659 Management for Environmental Results with Performance-Based Measurement (3 credits)
- 420.662 Coral Reefs and Caves: The Geology of the Bahamas (3 credits)
- 420.665 Climate Change on the Front Lines: The Study of Adaptation in Developing Countries (3 credits)
- 420.668 Sustainable Food Systems (3 credits)
- 420.669 Applied Sustainability (3 credits)
- 420.670 Sustainability Leadership (3 credits)
- 420.671 Global Land Use Change (3 credits)

**Energy Policy and Climate Electives**
- 425.601 Principles and Applications of Energy Technology (3 credits)
- 425.602 Science of Climate Change and Its Impacts (3 credits)

**Applied Economics Elective**
- 440.622 Cost-Benefit Analysis (3 credits)

**Government Program Elective**
- 470.667 The Administrative State: How Washington Regulates (3 credits)

**Nonprofit Management Electives**
- 470.625 Resource Development and Marketing in Nonprofits (3 credits)
- 470.728 Fundamentals of Nonprofits and Nonprofit Management (formerly Influence and Impact of Nonprofits) (3 credits)
- 470.736 Principles of Nonprofit Management (3 credits)
- 470.774 Nonprofit Governance and Executive Leadership (3 credits)
- 470.779 Financial Management and Analysis in Nonprofits (3 credits)
Whiting School of Engineering
575.407 Radioactive Waste Management*
575.423 Industrial Processes and Pollution Prevention*
575.707 Environmental Compliance Management *
575.747 Environmental Project Management*

Environmental Planning
The focus of this concentration is to implement solutions to environmental problems in concrete situations. Environmental planning examines the interaction of the built environment and the natural environment in order to reduce impacts and restore the quality of both the natural environment and human settlements.

Required Courses
420.614 Environmental Policymaking and Policy Analysis (3 credits)
420.603 Environmental Applications of GIS (3 credits)
425.800 Research Design for Capstone Projects in Energy and Environmental Sciences (3 credits)

Choose three of the following:
420.601 Geological Foundations of Environmental Science (3 credits)
420.604 Hydrology & Water Resources (3 credits)
420.608 Oceanic & Atmospheric Processes (3 credits)
420.611 Principles and Methods in Ecology (3 credits)
420.613 Forest Ecosystems: A Global Perspective (3 credits)

Electives
Choose five of the following:

Environmental Sciences and Policy Electives
420.605 Maritime Law and the Environment (3 credits)
420.610 Sustainable Business (3 credits)
420.616 Environmental Consequences of Conventional Energy Generation (3 credits)
420.629 Drinking Water, Sanitation and Health (3 credits)
420.634 Bioremediation and Emerging Environmental Technologies (3 credits)
420.639 Landscape Ecology (3 credits)
420.641 Natural Resources Law and Policy (3 credits)
420.644 Sustainable Cities (3 credits)
420.646 Transportation Policy and Smart Growth (3 credits)
420.651 Risk Assessment and Risk Management (3 credits)
420.652 Environmental Justice (3 credits)
420.654 Environmental and Natural Resource Economics (3 credits)
420.656 Environmental Impact Assessment and Decision Methods (3 credits)
420.659 Management for Environmental Results with Performance-Based Measurements (3 credits)
420.662 Coral Reefs and Caves: The Geology of the Bahamas (3 credits)
420.665 Climate Change on the Front Lines: The Study of Adaptation in Developing Countries (3 credits)
420.668 Sustainable Food Systems (3 credits)
420.669 Applied Sustainability (3 credits)

Energy Policy and Climate Courses
425.601 Principles and Applications of Energy Technology (3 credits)
425.602 Science of Climate Change and Its Impacts (3 credits)

Geographic Information Systems Courses
430.601 Geographic Information Systems (GIS) (4 credits)
430.602 Remote Sensing: Earth Observing Systems and Applications (4 credits)
430.603 Geospatial Data Modeling (4 credits)

Whiting School of Engineering
575.731 Water Resources Planning*

Carey Business School
241.710 Sustainable Development*

ILLUSTRATIVE CURRICULA FOR TRACKS

ESP students can easily tailor programs and courses can also be plugged into the curricula that students build for themselves. Some curricula are also available fully on-line. The following is merely intended to illustrate the great substantive flexibility of the program, and is not binding in any way. The following are two informal environmental tracks that are being listed for illustrative purposes. All of the normal ESP degree requirements hold.

Sustainability Science Track
This track in the ESP program has a global focus and is designed to train students to analyze and explain local, national, and global efforts at sustainability using a multidisciplinary approach. It enables students to explain how natural, economic, and social systems interact to foster or constrain sustainability. The track will enable students to evaluate sustainability in terms of policy and legal frameworks, environmental institutions, ecological systems, property rights, food and energy security, and culture.

Electives
Choose five of the following from AAP programs (up to two from a program other than ESP):

Environmental Sciences and Policy
420.610 Sustainable Business (3 credits)
420.671 Global Land Use Change (3 credits)
420.613 Forest Ecosystems: A Global Perspective (3 credits)
420.615 Environmental Restoration (3 credits)
420.616 Environmental Consequences of Conventional Energy Generation (3 credits)
420.620 Soils in Natural & Anthropogenic Ecosystems (3 credits)
420.625 Ecology and Ecosystem Management in Coastal and Estuarine Systems (3 credits)
420.629 Drinking Water, Sanitation & Health (3 credits)
420.632 Air Quality Management and Policy (3 credits)

*Not an AAP course. Please refer to partner JHU school division for credit information.
### Environmental Sciences and Policy Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>420.616</td>
<td>Environmental Consequences of Conventional Energy Generation (3 credits)</td>
</tr>
<tr>
<td>420.641</td>
<td>Natural Resources Law and Policy (3 credits)</td>
</tr>
<tr>
<td>420.644</td>
<td>Sustainable Cities (3 credits)</td>
</tr>
<tr>
<td>420.646</td>
<td>Transportation Policy and Smart Growth (3 credits)</td>
</tr>
<tr>
<td>420.651</td>
<td>Risk Assessment and Risk Management (3 credits)</td>
</tr>
<tr>
<td>420.654</td>
<td>Environmental &amp; Natural Resource Economics (3 credits)</td>
</tr>
<tr>
<td>420.656</td>
<td>Environmental Impact Assessment and Decision Methods (3 credits)</td>
</tr>
<tr>
<td>420.665</td>
<td>Climate Change on the Front Lines: The Study of Adaptation in Developing Countries (3 credits)</td>
</tr>
<tr>
<td>420.681</td>
<td>Climate Change Adaptation and Development in Nepal (field course) (3 credits)</td>
</tr>
<tr>
<td>420.614</td>
<td>Environmental Policymaking and Policy Analysis (3 credits)</td>
</tr>
<tr>
<td>420.608</td>
<td>Oceanic &amp; Atmospheric Processes (3 credits)</td>
</tr>
<tr>
<td>425.800</td>
<td>Research Design for Capstone Projects in Energy and Environmental Sciences (3 credits)</td>
</tr>
</tbody>
</table>

### Energy Policy and Climate Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>440.601</td>
<td>Principles and Applications of Energy Technology (3 credits)</td>
</tr>
<tr>
<td>425.602</td>
<td>Science of Climate Change and its Impacts (3 credits)</td>
</tr>
<tr>
<td>425.603</td>
<td>Climate Change Policy Analysis (3 credits)</td>
</tr>
<tr>
<td>425.637</td>
<td>International Climate Change Policy (3 credits)</td>
</tr>
<tr>
<td>425.638</td>
<td>Adaptation to Climate Change (3 credits)</td>
</tr>
<tr>
<td>425.645</td>
<td>Global Energy Policy (3 credits)</td>
</tr>
</tbody>
</table>

Note: Other EPC course may be applicable, consult your advisor.

### Geographic Information Systems Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>430.601</td>
<td>Geographic Information Systems (GIS) (4 credits)</td>
</tr>
<tr>
<td>430.602</td>
<td>Remote Sensing: Earth Observing Systems and Applications (4 credits)</td>
</tr>
</tbody>
</table>

---

**Energy and Climate Track**

This track will provide students an opportunity to develop a breadth of knowledge in energy and environmental issues to augment their deep disciplinary skills to tackle the science, socioeconomic and cultural aspect of climate change. It can act as a platform for students that desire an environmentally based background that understands how the energy sector—whether oil and gas, renewables or utilities contend with the issues surrounding climate change.

**Electives**

*Choose five of the following from AAP programs (up to two from a program other than ESP):*

- **Energy Policy and Climate**
  - 425.637 | International Climate Change Policy (3 credits) |
  - 425.645 | Global Energy Policy (3 credits) |
  - 425.622 | Renewable Energy and Proactive Climate Change in Benelux (3 credits) |
- **GIS**
  - 430.601 | Geographic Information Systems (GIS) (4 credits) |
  - 430.602 | Remote Sensing: Earth Observing Systems and Applications (4 credits) |
- **Applied Economics**
  - 440.650 | Environmental & Resource Economics (3 credits) |
- **Government**
  - 470.734 | Energy, Vulnerability, and War (3 credits) |
  - 470.754 | Global Climate Change and U.S. Energy Security (3 credits) |
  - 470.755 | Sustainable Cities in France and Germany: Lessons for the United States (3 credits) |
- **Museum Studies**
  - 460.636 - Living Collections (3 credits) |
- **Whiting School of Engineering**
  - 575.423 | Industrial Processes and Pollution Prevention* |
  - 575.711 | Climate Change and Global Environmental Sustainability* |
  - 575.734 | Smart Growth Strategies for Sustainable Urban Development and Revitalization* |
  - 575.733 | Sustainable Development and Next-Generation Buildings* |
- **Carey Business School**
  - 790.047 - Innovation for Humanity Project* |
  - 151.620 - Global Strategy* |
- **School of Public Health**
  - 180.611 - The Global Environment and Public Health* |
  - 700.622 - Bioethics, Human Rights, and Global Health* |
  - 700.630 - Global Food Ethics* |
BA/MS OPTION FOR JOHNS HOPKINS UNIVERSITY
GECS MAJORS

Undergraduates majoring in global environmental change and sustainability may apply for accelerated status towards an MS in Environmental Science and Policy. These students should declare their intention to pursue the MS during their junior year or early in their senior year of undergraduate study by contacting either the undergraduate GECS Program Director Rebecca Kelly (rkelly36@jhu.edu), or the program director of the ESP program, Jerry Burgess (jerry.burgess@jhu.edu). GECS students may apply up to three courses taken as undergraduates toward the MS in Environmental Science and Policy, thereby leaving only seven more courses to complete the MS following receipt of their BA.

Application

GECS students may apply for the BA/MS anytime during the senior year or up to one year following conferral of their BA. The application procedure is the same as that of other AAP applicants, and details are found online at advanced.jhu.edu/admissions. Students admitted to the BA/MS program will be assigned a graduate adviser but will continue to be advised by their GECS adviser for all matters concerning the BA degree.

Course Requirements for BA/MS

GECS students will receive two separate degrees, so the requirements of both degrees must be fulfilled. Students may not earn the MS degree without completion of the BA, but students who do not complete the MS retain their BA. GECS BA/MS students must complete all the requirements of the MS in ESP and may opt for either the general ESP degree or a concentration.

Up to three courses completed while an undergraduate can count toward the 10 courses required for the MS. Specifically, up to two of the following courses can be used to satisfy the corresponding core course requirements for the MS in Environmental Science and Policy:

- 270.224 Oceans and Atmospheres may substitute for 420.608 Oceanic & Atmospheric Processes.
- 271.403 Environmental Policymaking and Policy Analysis may substitute for 420.614 Environmental Policymaking and Policy Analysis.
- 270.317 Conservation Biology may substitute for 420.637 Conservation Biology and Wildlife Management

(Note that the Environmental Policymaking and Policy Analysis course will be a combined GECS undergraduate and ESP graduate course.)

If a student wishes to apply a third course to both their GECS BA and their ESP MS, the course must be approved by the graduate adviser and the ESP Program Director and must be at the 300 or 600 level with content germane to environmental science and policy.

PREREQUISITE COURSES

The prerequisite courses below prepare provisional students for graduate work and do not count toward degree requirements. Students must be admitted as provisional in order to enroll in these courses.

420.301 Quantitative Methods (3 credits)

This prerequisite course provides the necessary background in mathematics for students who do not have sufficient undergraduate course work in calculus and statistics. Students who receive a provisional admission because of math deficiency can opt to take the mathematics assessment test. If the student earns a score of 80 percent or better, then s/he is not required to take the course. In this course, students acquire quantitative skills and an understanding of mathematical principles fundamental to environmental sciences that are necessary for evaluating the implications of policy measures. Topics include probability and statistics, systems of equations, analytical geometry, and basic concepts of calculus. Problem sets, interpretation of data, and applications to everyday problems help students appreciate the usefulness of quantitative methods. Offered online twice a year.

420.302 Chemistry of Natural Processes (3 credits)

This course provides students with a basic understanding of the fundamentals of chemistry, of Earth’s interrelated chemical and energy systems, and of how to manipulate and interpret chemical information. Topics include molecules and chemical bonding, states of matter, thermodynamics, and kinetics. Through a series of exercises, students apply chemistry principles to solve real-world environmental problems. Prerequisite: Students are urged to take 420.301 Quantitative Methods for Environmental Sciences before enrolling in this course. Offered online only, one to two times annually.

CORE COURSES

The core courses introduce the relevant, foundational body of knowledge in science and policy required of all students. Some students may have covered most of the material of one or more of the core courses in previous academic work; such students should consider requesting that the appropriate core course(s) be waived (see Student Special Requests). If approved, the waived core course must then be replaced with an additional elective. The core courses can be taken in any order and every student must take the core course 420.614 Environmental Policymaking and Policy Analysis. Students should complete the five core courses within the first seven courses in the program toward their degree.
420.601 Geological Foundations of Environmental Science (3 credits)
(formerly Earth Resources and Their Waste Products) This course provides an overview of Earth’s materials, processes, and resources for environmental scientists and policymakers. Topics include minerals, rocks, sediments, stratigraphy, structure, geomorphology, and geologic environments. Emphasis is placed on understanding geologic principles and methods as applied to environmental science, Earth resources, and public policy. Two field trips are part of the course for in-person sections. Offered on-site or online two to three times each year.

420.603 Environmental Applications of GIS (3 credits)
Geographic information systems technology (GIS) is a powerful data visualization and analysis tool. This course is designed to introduce students to advanced concepts of geographic information science related to the fields of reserve planning, environmental science, natural resources, and ecology for the purpose of spatial analysis and geo-visualization of environmental issues. Topics may include conservation needs using remote sensing, digital image processing, data structures, database design, landscape ecology and metrics, wildlife home range and habitat analysis, suitability modelling, terrain and watershed analysis, and spatial data analysis. This course will only be offered online yearly.

420.604 Hydrology & Water Resources (3 credits)
This course provides an introduction to the hydrological cycle and examines the influence of climate, geology, and human activity on this cycle. The components comprising this cycle will be examined and include: precipitation; evapotranspiration; surface and groundwater flow; storage in natural reservoirs; water quality; and water resource management and regulation. Discussion of these topics in threaded discussions using the primary literature as well as problem sets will highlight applications and areas of current hydrological research. Offered online and onsite three times per year. Onsite version includes a required field trip.

420.608 Oceanic & Atmospheric Processes (3 credits)
In this course, students study the oceans and the atmosphere as interrelated systems. The basic concepts of air masses, water masses, winds, currents, fronts, eddies, and storms are linked to permit a fundamental understanding of the similar nature of oceanic and atmospheric processes. Among the course’s topics are weather forecasting, global climate change, marine pollution, and an introduction to applied oceanography. A field trip is included for in-person sections. Offered on-site or online two to three times each year.

420.611 Principles & Methods of Ecology (3 credits)
This course examines the relationship between organisms and their biotic and abiotic environment at three levels of biological hierarchy: individual organism, population, and community. Population characteristics, models of population dynamics, and the effect of ecological interactions on population regulation are discussed in detail. The structure and function of natural and man-made communities and the impact disturbances have on community structure are also examined. Students are led to appreciate the importance of ecology in solving environmental problems. Two required field trips are included. It is offered every year during a fall or spring 14-week semester. To meet the needs of distance students, it is also offered in an Intensive, approximately three-week-long version in May and sometimes in July.

420.614 Environmental Policymaking and Policy Analysis (3 credits)
This course provides students with a broad introduction to U.S. environmental policymaking and policy analysis. Included are a historical perspective and an analysis of future policymaking strategies. Students examine the political and legal framework; become familiar with precedent-setting statutes, such as NEPA, RCRA, and the Clean Air and Clean Water Acts; and study models for environmental policy analysis. Cost-benefit studies, the limits of science in policymaking, and the impact of environmental policies on society are important aspects of the course. A comparison of national and international policymaking is designed to provide students with the global perspective on environmental policy. Offered on-site or online two to three times each year. Offered at Homewood campus each spring term.

420.605 Maritime Law And The Environment (3 credits)
The course is designed to introduce students to the process by which environmental policy can be implemented as binding law in the international sphere. “Law of the Sea” formed the foundation of modern public international law. It also represents the world’s first efforts to define and regulate a “global commons” and to grapple with the management of resources as the “common heritage of mankind”. Topics explored include freedom of navigation on the high seas, the limits on port-state jurisdiction over foreign vessels, and the scope of coastal nations’ power to regulate activities in their respective territorial waters, “contiguous zones”, and “exclusive economic zones”. The course also examines through case-studies how the UNCLOS regime functions in tandem with other treaties, customary international law, and domestic law in addressing specific current issues - including management of living and nonliving resources on the Continental Shelf, deep seabed mining, reduction of pollution, protection of highly migratory fish stocks, aquaculture, “marine dead zones”, and the future of ocean policy.

420.607 Plant Biogeography (3 credits)
Biogeography is the study of the present and past distribution of biodiversity. It is inherently multidisciplinary, integrating data and approaches across many fields (such as geology and soils) and perspectives of both ecology (biomes, climate, vegetation) and history (floristics, phylogenetics, paleobotany) within the physical and natural sciences. It includes world bioclimatic zonation, plant-geographic processes, other physical environmental factors, plant functional roles and types, vegetation dynamics, response to disturbance, and potential natural vegetation. Understanding these biogeographic principles is central for studies of biodiversity, global change, and conservation in today’s rapidly changing world. The course
format will consist of lecture, discussion, and computer-based activities. This course will be offered in Washington DC and online every other year.

420.612 Sustainability Science: Concepts and Challenges (3 credits)
Sustainability Science is an interdisciplinary field engaged with understanding the dynamics between natural and social systems and how those interactions challenge the notion of sustainability. This course will start by reviewing the history of the concept of sustainability and will then consider how it has been applied in the environmental sciences. Specifically the goal of the course is to provide a comprehensive, multidisciplinary perspective on this emerging field, understanding its theory, research horizons, and practical applications. Concepts to be reviewed include socio-environmental systems, complex adaptive systems, cross-scalar impacts, tipping points and regime shifts, vulnerability, resilience and adaptive capacity, equity, sustainable development, political ecology, governance, capital assets and livelihoods. In a seminar context this course will consider these and other concepts from a theoretical perspective but will focus on their application in solving real-world problems. Offered on-site, infrequently.

420.613 Forest Ecosystems: A Global Perspective (3 credits)
Forests are critical global ecosystems that provide not only timber and wood products, but an array of services including habitat for wildlife, water filtration, carbon storage, and recreational opportunities. Yet in many parts of the world they being impacted by deforestation, climate change, biotic homogenization, the spread of invasive species and a range of other natural and anthropogenic stressors. This class will explore the distribution, ecology and sustainability of forest ecosystems. It will examine factors and interactions that influence forest productivity and nutrient cycling as well the structure and composition of plant and animal communities, over time and across the landscape. Examples will be drawn from temperate, tropical and boreal ecosystems. The course will address the influence of disturbance (e.g. wind, insects, disease, fire) and forest fragmentation in shaping forest ecosystems and will provide a foundation in conventional and sustainable forest management practices. Emphasis will be placed on understanding why forests have particular characteristics and how they might change in an era of extensive management and forest management practices. Offered on-site or online every two years. Prerequisites: Principles and Methods of Ecology

420.615 Environmental Restoration (3 credits)
This is field-centered course focused on the prehistoric and land use histories of river, freshwater tidal wetland, serpentine and deforested environments that have been restored/designed in the Maryland and DC region. Knowledge of prehistoric ecological conditions and post-settlement impact along with modern ecological studies provide important long-term guidelines for restoration, mitigation and conservation measures. Saturday or Sunday field trips (6 sites) include identification of plant indicator species, bird identification, background on geology, paleoecology, historical impact, conservation and restoration approaches at the field sites. Site locations include Gettysburg Battlefield, Soldiers Delight Environmental Area, Big Spring Run Restoration (Lancaster), Severn River and Kenilworth Marsh, DC. Weeknight classroom sessions include plant identification of grasses, sedges and trees, birds as habitat indicators, and slide/lectures on vegetation, land use history and paleoecological data derived from pollen, macrofossil, geochemical and geomorphic analyses of the field sites. The pros and cons of different restoration and conservation approaches are reviewed. Offered every other year.

420.616 Environmental Consequences of Conventional Energy Generation (3 credits)
Environmental consequences of conventional energy generation will explore the energy resources that have driven and are projected to be the primary energy sources worldwide for the next several decades. Specifically, this course will focus on the historical and future role of conventional energy sources such as those derived from fossil fuels, focusing on their geologic genesis and the consequences of resource extraction which will invite comparisons to more recent trends in energy generation. Students will be exposed to the nexus of social, technical, engineering and environmental challenges of providing energy supplies to an increasingly urban and technologically connected global population. Topics include petroleum, traditional natural gas, coal, nuclear, hydroelectric, and geothermal supplies as well as recent trends in shale hydrologic fracturing methods of obtaining petroleum resources. Environmental impacts will focus on mining, resource extraction, soil and groundwater contamination as well as particulates, smog, acid rain, and global warming. Global production, distribution, usage and impacts of these resources will be considered. Offered online, annually. Prerequisites: none.

420.618 Terrestrial and Marine Conservation Biology (3 credits)
Both the Maine coast and mountainous, interior Maine provide a stunning and ideal venue for learning about the myriad conservation biology issues, challenges and solutions in dealing with both marine and terrestrial conservation. These habitats provide an ideal “living laboratory” for studying, understanding and implementing conservation biology. Acadia National Park, established in 1919, will provide us opportunities to investigate the only fjord in the Atlantic Northeast, Somes Sound; carefully assess the ocean-land interface, e.g., Otter Cliffs, Thunder Hole, Sand Beach, and the Ocean Path Trail; hike Cadillac Mountain – the first place to see the sunrise from October to early March in the continental U.S.; time permitting visit Long Pond and hike the Ship Harbor Nature Trail; and spend a day “at sea” investigating cutting edge marine conservation issues up close. Additionally, day trips will be scheduled for the Schoodic Peninsula (via ferry from CA’s dock to Winter Harbor) and to the new Katahdin Woods and Waters National Monument, just east of Mt. Katahdin, Maine’s highest mountain — designated by President Obama as our newest National Monument in August 2016. Since this is a brand new Monument, we’ll investigate how to help implement its mission including through a day hike assessing Katahdin Lake off the Loop Road. Prerequisite: 420.611 Principles and Methods of Ecology, equivalent course, or experience. Offered every other year in the summer.
420.619  Ecological Assessment (3 credits)
This course introduces students to concepts and tools used in quantitative ecological assessment and demonstrates how they can be applied in managerial or regulatory contexts. The course covers assessment strategies, methodologies for ecological assessment, design of sampling programs, indicators of ecological integrity, bioassessment, and coping with uncertainty, ecological risk assessment, and adaptive environmental assessment and management. Students are introduced to approaches for population, ecosystem, community, watershed, and landscape-level assessment. Computer exercises reinforce concepts and familiarize students with a variety of assessment techniques. Offered every two years. Prerequisite: 420.611 Principles and Methods of Ecology, equivalent course, or experience.

420.620  Soils in Natural & Anthropogenic Ecosystems (3 credits)
This course introduces students to basic concepts of soil science and the soil's contribution to the functions of natural and anthropogenic ecosystems. It provides an overview of soil morphological, physical, chemical, and biological properties, and how these interact to form a soil with unique characteristics and ecosystem function. Students discuss soils of the world from the perspective of soil taxonomy, the processes that form these soils, and land use properties specific to each soil order. Students learn to read soil maps, interpret and predict the quality and land use potential of soils, and to use available soil data. A strong focus will be given to environmental and ecological issues relating to soil science in the context of the ecological relationships between soil organisms and their biotic and abiotic environments, with emphasis on the role of soil organisms in biogeochemical cycling, ecosystem structure and function, long-term ecosystem sustainability, and global environmental change. Current issues regarding the proper use and management of soils are investigated. All sections (online and in person) will involve some field related work. Online sections will be offered every annually. Prerequisites: 420.601 Geological Foundations for Environmental Sciences; (recommended) 420.611 Principles & Methods of Ecology, or permission from the instructor.

420.622  Ecotoxicology (3 credits)
This course covers fundamentals of ecotoxicology, including chemical action on organisms, organ systems, and cellular functions. Modeling is used to investigate fate and transport mechanisms, concentration effects, and selective toxicity. Toxicity testing, risk assessment, toxics reduction, and examples of bioremediation are also covered. Topics are covered in a framework of basic ecology, including trophic structure, food-web dynamics, bioaccumulation, and effects of toxic materials on ecosystems and individuals. Offered infrequently. Prerequisite: 420.611 Principles and Methods of Ecology, equivalent course, or experience.

420.623  Freshwater Ecology & Restoration of Aquatic Ecosystems (3 credits)
This course focuses on the ecology, protection, and restoration of non-tidal waters. Students study the biological, chemical, and physical characteristics of the waters and riparian zones. There is also a focus on ecological responses to anthropogenic activity and approaches to protection and damage mitigation in freshwater ecosystems. Ongoing and planned protection and restoration activities in Maryland and elsewhere are presented. Students develop holistic restoration plans based on existing ecological data. Two weekend field trips are required parts of the course. Offered onsite every two years. Prerequisite: 420.611 Principles and Methods of Ecology, equivalent course, or experience.

420.624  Contaminant Fate and Transport (3 credits)
This course presents the basic principles underlying the movement of contaminants in the predominant environmental media: surface water, groundwater, and the atmosphere. These principles are combined with modeling of contaminant transport in the different media to design remediation programs, provide the technical foundation of policy decisions, and support the evaluation of risk to the environment and human health caused by pollutants. Students in the course develop the skills to ask the right questions of modelers, understand the implications and limitations of model results, and communicate effectively to the public and decision-makers. Students should have strong mathematical reasoning skills. Offered on-site or online every other year. Prerequisite: 420.604 Hydrology and Water Resources, equivalent course, or experience.

420.625  Ecology and Ecosystem Management in Coastal and Estuarine Systems (3 credits)
This course examines the physical, chemical, and biological processes affecting coastal and estuarine ecosystems, with special emphasis on the Chesapeake Bay as a model system. Human influences on such large and critical ecosystems and the policy decisions made to manage and minimize human impact are explored in lecture and seminar formats. Topics include the hydrodynamics of shallow tidal waters; energy and material flows and transformations; diversity and adaptation of plant, animal, and microbial communities; population and pollution ecology; and ecosystem management. Case histories illustrate problems in fisheries management and the eutrophication of the coastal and estuarine systems. In-person sections include required weekend field trips to Chesapeake Bay sites. Offered infrequently. Prerequisite: 420.611 Principles and Methods of Ecology, equivalent course, or experience.

420.626  Field Methods in Ecology (3 credits)
This course centers on practical field exercises to develop both technical proficiency and broader understanding of varied ecological systems. Field methods include quadrat, transect, and SAV sampling, as well as multiple techniques for surveying animal communities and monitoring water quality. While analyzing their own data, students develop deeper understanding of fundamental concepts, such as species-area curves, importance values, species diversity, and community similarity indices. Students are also introduced to paleoecological tools, such as sediment coring. Several ecological processes including succession and the effect of disturbances on community structure are demonstrated. The significance, advantages, and disadvantages of various surveying methods are explored in classroom meetings, but for much of the
420.628 Ecology and Management of Wetlands (3 credits)
This course explores the biological, physical, chemical, and ecological aspects of tidal and nontidal wetland ecosystems. Topics include wetland classification, valuation, function, and dynamics. Wetland modification and manipulation are analyzed through case studies of restoration, construction, and mitigation. The effects of federal and state laws, various regulations, and human perturbations are explored. In-person sections include field trips that provide hands-on experience and demonstrate the significance of wetland mitigation, restoration, and construction projects. Offered on-site every two years. Prerequisite: 420.611 Principles and Methods of Ecology, equivalent course, or experience.

420.629 Drinking Water, Sanitation & Health (3 credits)
In this course, students examine scientific and public policy dilemmas related to the provision of safe drinking water and related protection of global human health. Course work emphasizes basic understanding of the fundamentals of water supply, treatment, regulation, and sanitation, as well as provides a focus on unresolved issues confronting scientists, resource managers, and policymakers. Students work to develop recommendations for solutions to such critical issues as controlling pathogens from urban and agricultural runoff, managing harmful byproducts of the disinfection process, regulating arsenic in groundwater, evaluating the risk posed by exposure to mixtures of contaminants, and confronting the threat of terrorist attacks on water supplies. Offered on-site or online annually. Prerequisite: 420.604 Hydrology and Water Resources, equivalent course, or experience.

420.631 Field Methods in Stream & Water Quality Assessment (3 credits)
This course provides an overview of field methods used to sample and assess various biological, physical, and chemical components in streams, rivers, and lakes. It allows students to determine the impact human activity has on aquatic environments. Students gain hands-on experience with standard sampling techniques and with the detection, identification, and quantification of biological specimens and chemical pollutants in the aquatic environment. Students discuss water quality standards and federal regulations, such as the Clean Water Act and Safe Drinking Water Act. Also included are study design, gear selection, sample preservation, and safety. Basic approaches to analyze and report findings are covered, with emphasis on methods currently practiced by government resource agencies. Offered on-site every two years. Prerequisite: 420.611 Principles and Methods of Ecology, equivalent course, or experience.

420.632 Outdoor Air Quality Management and Policy (3 credits)
Understanding and mitigating air pollution, both indoor and outdoor, are of extreme importance to global health. Underscoring this, the World Health Organization released a statement in 2014 that in 2012, approximately 7 million people died—one in eight of total deaths around the world—as a result of air pollution exposure. Air pollution also has a strong impact on climate change in terms of its abilities to both exacerbate and reduce global warming. This course provides an overview of the principles, effects, and policies regarding outdoor air quality, with an emphasis on emerging international air quality issues, public health, and environmental impacts of outdoor air pollution, and evolving ways to monitor air quality. Course topics include: the history of air pollution events and management; major air pollutants and sources; atmospheric chemistry, transport, and dispersion; measurement and monitoring; control technology; effects on human health and climate; and regulatory requirements. The effectiveness of the Clean Air Act, approaches toward air quality management in other countries, international treaties, future air quality projections, and regulatory case studies will also be discussed. Prerequisite: 420.608 Oceanic and Atmospheric Processes, an equivalent course or experience, or approval of the instructor.

420.634 Bioremediation & Emerging Environmental Technologies (3 credits)
(Formerly Environmental Remediation Technologies) This course presents details of environmental technologies for assessment and remediation of contaminated sites. The course includes a brief review of environmental policy related to impacts of hazardous chemicals and endocrine blockers but focuses on remediation technologies available for reclaiming contaminated resources and reducing health risks. It covers the application of multiple physical and chemical technologies but emphasizes the use of biological systems for the cleanup of hazardous chemicals. In the course, students are introduced to the nature of hazardous waste, behavior of chemicals in the subsurface, biochemistry of microbial degradation, and technology applications. Bioremediation technologies covered include bioventing, air sparging, monitored natural attenuation or intrinsic Remediation, and chemical oxidation. Students learn to select appropriate technologies, develop a monitoring program for assessing the applicability of bioremediation techniques, develop biological conceptual models for natural attenuation, and understand the key principles for design. Case studies and problem sets acquaint students with field applications and introduce modeling techniques for predicting performance. Prerequisites: 420.601 Geologic Foundations of Environmental Science and 420.604 Hydrology and Water Resources, equivalent courses, or experience.

420.635 Integrated Water Resources Management (3 credits)
Integrated water resources management provides coordinated, goal-oriented control for development of river, lake, ocean, wetland, and other water assets. This course provides students with a broad introduction to U.S., EU and international perspectives. The evolution of basic concepts behind IWRM will be explored as well as the limits of current practices and
strategies. Students will examine several different conceptual frameworks and become familiar with how various U.S. water management agencies and international institutions such as the World Bank, USAID, UNDP, and the EU, apply the principles of IWRM in various settings. Associated concepts of river basin management, climate adaptation, and sustainable development will be addressed within the context of IWRM. Case studies will be presented and evaluated by the students.

420.637 Conservation Biology and Wildlife Management (3 credits)
In this course, students will delve into principles and theories relating to the conservation of biological diversity. The course will focus on the following topics: patterns and processes creating biological diversity; estimates of extinction rates; consequences of diversity losses; approaches to conserving diversity, including large-scale conservation planning; conservation biology tools, such as population viability analyses and conservation triage; and causes of diversity loss including habitat loss/fragmentation, invasive species, and climate change. The course format is taught with lecture, socratic discourse and case studies with one required field trip to facilities where conservation biology will be interpreted. Offered on-site every two years. Prerequisite: 420.611 Principles and Methods of Ecology, equivalent course, or experience.

420.638 Coastal Zone Processes and Policy (3 credits)
The course is designed to provide the student with knowledge to address modern coastal, environmental, geologic, and policy issues. The course will focus on the coasts, barrier islands, major estuaries, and inner continental shelf areas of the United States. Fundamental coastal engineering principles will be described in order to address methods used for public works projects, including hurricane protection, beach nourishment, and tidal inlet maintenance. The policies pertinent to management and use of coastal environments will be studied. One weekend field trip will be required. Prerequisite: 420.601 Geological Foundations of Environmental Science, equivalent course, or experience.

420.639 Landscape Ecology (3 credits)
Landscape ecology is a rapidly developing area of study that explicitly examines the effects of spatial pattern and scale on ecological processes that unfold over areas of several square kilometers or larger. Thus, landscape ecology provides many concepts, tools, and approaches that will enhance the effectiveness of endeavors such as watershed management, ecosystem management, design of conservation reserves and green infrastructure, and smart growth. The goal of this course is to give students a firm grasp of the concepts of landscape ecology and of how they can be applied to enhance the effectiveness of environmental policy, management, regulation, and assessment. Uses of discussions, case studies, computer models, and a virtual field trip help to examine and apply concepts. Offered online at least every other year. Prerequisite: 420.611 Principles and Methods of Ecology, equivalent course, or experience.

420.641 Natural Resources Law and Policy (3 credits)
This course introduces students to federal and state legislation and policies of critical importance in natural resource management. Students explore such issues as regulation of ocean fishing, coastal zone management, mineral exploitation and associated environmental impact, water allocation and quality, hazardous waste cleanup programs under the Superfund law, urban industrial infrastructure such as water and sewage system, land use management, and water and air pollution control. Offered online or on-site every year. Prerequisite: 420.614 Environmental Policymaking and Policy Analysis, equivalent course, or experience.

420.642 Public Lands-Private Interests: The Struggle for Common Ground (3 credits)
This course prepares students to participate in the great debate over the use and protection of America’s federally owned forests, rangeland, parks, and sanctuaries. Students consider such questions as how much should be paid for grazing on federal lands, how to balance the demand for timber harvest with the need for watershed and wildlife management, who controls mineral and oil extraction on federal lands, and who has the rights to waters flowing through federal lands and stored behind federally funded dams. These and similar issues of today and tomorrow are studied in the context of history, statute and case law, and administrative regulations. Offered infrequently. Prerequisite: 420.614 Environmental Policymaking and Policy Analysis, equivalent course, or experience.

420.644 Sustainable Cities (3 credits)
(Formerly Cities, Urbanization, and the Environment)
This course examines urbanization and its impacts on the environment. The goal of the course is to better understand how urbanization contributes to ecological damage as well as how cities can be constructed in ecologically healthy ways. Topics include land use planning, transportation, waste, management, water quality, open space/greening, green building technology, urban design, and urban ecology. The course takes an international perspective by using case studies of cities in North America, Europe, Asia, Latin America, and Africa. The case studies also include a wide range of cities with different populations, geographic scale, and growth rates. Final projects are an in-depth study of one particular city of the student’s choice and its attempt to implement programs for sustainability. Prerequisite: 420.614 Environmental Policymaking and Policy Analysis, equivalent course, or experience.

420.645 Environmental Challenges for Energy Policy (3 credits)
The course examines energy supply and consumption and how these activities impact the environment, with a focus on understanding the potential technology, market, structure and policy implications for climate change and air quality. Particular emphasis is devoted to the electricity and transportation sectors, which combined represent over two-thirds of U.S. energy production and use. Students will gain a solid understanding of the science, economics, environmental impact, and potential policies associated with various electricity generation technologies, including renewable energy, such as
wind and solar, conventional generation (existing and future), carbon storage and sequestration, and electricity storage. Transportation topics will address a variety of technologies, including hybrids and fuels cells, as well as the potential role for alternative fuels, including biofuels. A range of policy alternatives will be discussed, including traditional command and control-style regulations, emissions trading (for both SO2 and carbon dioxide), and other market-based tools, portfolio standards, technology incentives, and the potential role of publicly funded R&D.

420.646 Transportation Policy and Smart Growth (3 credits)
This course examines how transportation policy and decisions can alleviate or prevent problems resulting from urban sprawl. How can transportation decisions and planning contribute to more "livable" urban designs and land use patterns that promote "smart growth”—growth that is environmentally and ecologically sustainable? Students discuss how different environmental media—land, water, and air—are affected by our transportation systems and resulting development patterns, and how the design of transportation systems—the highways, roads, transit systems, and bike and walk paths—can more closely harmonize with nature and provide communities with a better quality of life. A wide range of policy options is examined, from altering the structure of road pricing to redesigning neighborhoods and altering urban form. A number of case studies are examined to illuminate the issues and principles raised in the course. Offered online or on-site every year. Prerequisite: 420.614 Environmental Policymaking and Policy Analysis, equivalent course, or experience.

420.649 Strategic Mgmt for Sustainability (3 credits)
This course examines the "greening of industry" trend, its causes, and its implications for public policy. The course first examines environmental behavior from the strategic perspective of firms and industry associations. From the old emphasis on legal compliance, leading firms now have turned to a much more strategic view, and many have adopted an explicit goal of promoting sustainability. We consider the causes of this behavior among leading firms and the many forms that it has taken, as well as the meanings of sustainability within the industrial sector. The course then turns to a consideration of how public policy has influenced this trend and to government's response to these changes within industry. The course concludes with an evaluation of these policy responses and likely trends in industry and government. Prerequisite: 420.614 Environmental Policymaking and Policy Analysis, equivalent course, or experience.

420.650 International Environmental Policy (3 credits)
This course explores the methods and strategies for promoting solutions to global environmental problems. Through consideration of issues, such as stratospheric ozone depletion, global climate change, tropical deforestation, loss of biodiversity, transnational pollution, and other threats to the international commons, students examine policymaking from the perspective of developed and developing countries, the United Nations system, international financial entities, and nongovernmental interest groups. By investigating important international agreements, students determine how far the international community has come in solving specific problems, what obstacles prevent effective international solutions, and what needs to be done to overcome barriers. Prerequisite: 420.614 Environmental Policymaking and Policy Analysis, equivalent course, or experience.

420.651 Risk Assessment and Risk Management (3 credits)
Analysis of risk is becoming an increasingly important component of regulatory decision-making. Based on the premise that risk assessment has no "right" answers, this course explores what risk perception, risk management, and risk communication mean. Students are introduced to terminology and concepts necessary in risk communication. Case studies help to explain the complexities of risk assessment and management. Students learn how to balance the costs and benefits of risk reduction and how to account for the uncertainties in risk estimates. Prerequisite: 420.614 Environmental Policymaking and Policy Analysis, equivalent course, or experience.

420.652 Environmental Justice (3 credits)
The field of environmental justice is riven with conflicts over the scope, measurement, evaluation, nature, and seriousness of environmental problems. This course takes a seminar approach to develop options for resolving environmental justice problems using both practical and theoretical approaches for communication, understanding, and analysis to bridge interests, reconcile differences, reduce confusions, and improve environmental decision-making. The course will investigate and evaluate the effectiveness and possibilities of policies that can highlight, educate, and develop understanding among communities concerned with environmental issues. The course will focus on how communication can encourage discussion about potential causes and responses to environmental justice concerns. A primary area of the course will be to examine how disenfranchised groups understand environmental justice within a hierarchy of community concerns, accumulated experience, and particular histories within communities. The course has an applied aspect and will look at a local manifestation of how environmental justice is inseparable from broader components of justice, such as living and working conditions, violence, powerlessness, marginalization, and processes producing and reproducing inequities. Prerequisite: 420.614 Environmental Policymaking and Policy Analysis, equivalent course, or experience.

420.654 Environmental & Natural Resource Economics (3 credits)
This course presents the fundamental concepts and applications of economic theory related to renewable and nonrenewable resources and environmental protection. Topics covered include the economics of resource use and depletion, the relationship between the environment and the economy as a whole, the role of government in addressing market failure, concepts and methods for valuing of environmental benefits, cost-benefit analysis of regulatory policies, and how economic incentives can be used to protect the environment. Offered online or on-site every year. Prerequisite: 420.614 Environmental Policymaking and Policy Analysis.
420.655 Federal Environmental Compliance in Public Transit (3 credits)
This course provides a comprehensive investigation of public transit systems in the United States. We'll focus specifically on environmental compliance requirements that apply to various types of public transit infrastructure, with an emphasis on those that receive federal funds. Using extensive case studies of real projects, students will gain an applied understanding of environmental policy and the wide variety of environmental statutes and requirements that govern the planning and construction of public systems. This case study approach will include an exploration of the history and context of how public transit has developed over the centuries, along with the important changes in environmental statutes and regulations that have been applied to federally funded transit projects. In addition, the course will provide a look at recent policies enacted to expedite the environmental review of surface transportation projects, giving students the opportunity to assess those reforms and consider other policy options for reaching the same goals. Offered infrequently.

420.656 Environmental Impact Assessment & Decision Methods (3 credits)
This course introduces the process of environmental impact assessment and policy decision-making as required under the National Environmental Policy Act and the regulations of the Council of Environmental Quality. Topics include identification of purpose and need for any actions affecting the environment, development of objectives and decision criteria, and various techniques for assessing impact and comparing alternatives for a given environmental intervention. The strengths and weaknesses of various approaches are evaluated with techniques that allow analysis of multiple objectives and conflicting uses of environmental resources. The importance of scientific credibility and public acceptance are demonstrated with actual cases. Offered on-site or online annually. Prerequisite: 420.614 Environmental Policymaking and Policy Analysis, equivalent course, or experience.

420.657 Environmental Issues & Congressional Policymaking (3 credits)
This course explores how Congress debates and passes environmental legislation, including the way in which scientific facts are introduced to nonscientists and scientific inquiry is used and misused by Congress. Students learn to appreciate the powerful influences of the media and of lobbyists in swaying congressional decision-making. Case studies provide perspective into which environmental legislation has been effective and which has not, and the reasons for success or failure. A field trip to Capitol Hill and classroom simulation of a congressional committee debate give students insight into the give and take of the process. Offered on-site infrequently. Prerequisite: 420.614 Environmental Policymaking and Policy Analysis, equivalent course, or experience.

420.659 Management for Environmental Results with Performance-Based Measurement (3 credits)
At all levels of government and throughout private industry, performance-based initiatives now place unprecedented demands on environmental managers to achieve measurable environmental results. The goal of the various performance-based initiatives is to give environmental managers a systematic understanding of the causes of environmental problems, both natural and anthropogenic, and their human, ecological, and economic effects. It is also at the heart of sound environmental impact analysis, risk assessment, and benefit-cost analysis. In this course, students learn the foundations and applications of modern performance-based initiatives. Using case studies taken from a variety of environmental programs, students learn to use available scientific knowledge to uncover the likely keys to program success. Students learn why success has so often eluded environmental managers in the past. The goal of this class is for students to critically assess the design, performance measurement, and management of environmental programs on all scales and to recommend effective improvements. Students will develop skills for implementing results-oriented environmental management.

420.660 Strategies in Watershed Management (3 credits)
This course provides an overview of natural resource management using the watershed as an example. It proposes that water resources are a primary indicator of environmental quality and that the watershed—of various dimensions—is an appropriate context for addressing resource management concerns. In addition to examining the theoretical framework for watershed management, the class will spend several weekends conducting extensive field research to produce a watershed quality management report. Fieldwork will include documenting land use practices, tributary flow rates and characteristics, and water quality measurements for unit loading estimations, sediment sampling, and fishtrawls. Some of this work will involve time on an EPA research vessel. Prerequisites: 420.611 Principles and Methods of Ecology, equivalent course, or experience.

420.662 Coral Reefs and Caves: The Geology of the Bahamas (3 credits)
This course presents an opportunity to study the physical, chemical, and biological processes that operate to produce carbonate platforms (e.g., tides, waves, and the growth of corals), geomorphic processes that operate to further shape carbonate platforms (e.g., groundwater flow, cave development, and soil development), and the environmental impacts of human activities on carbonate platforms. The course consists of two weeks of intensive, online study followed by a week of field study at the Forfar Field Station on Andros Island in the Bahamas. Note: This course counts toward residency requirement. Offered as intensive field course every January. Prerequisite: 420.601 Geological Foundations of Environmental Science.

420.665 Climate Change on the Front Lines: The Study of Adaptation in Developing Countries (3 credits)
Poor and developing countries are predicted to bear the brunt of climate change. This course will focus on key sectors, such as agriculture, forestry, biodiversity, water resources, human health, and tourism, and the ways in which poorer and developing countries are impacted by and adapting to climate change. This course may focus on a region or a specific country depending on the instructor. Assessment and evaluation of demographic
trends, environmental challenges such as retreating ice, potential flood hazards, ecosystem impacts, as well as health issues will be incorporated. International instruments, such as adaptation funds, carbon funds, clean development mechanisms, and reduced deforestation/degradation strategies and policies, will be investigated in a comparative analysis of impacts and adaptation responses of countries around the world. Offered on-site every two years.

420.668 Sustainable Food Systems (3 credits)
This course will consider the environmental and social challenges of providing a sustainable global food system. We will investigate the geographic patterns of agricultural and food production systems, emphasizing contemporary patterns and how these came to be. Attention will be given to agricultural systems from the local to the global scale, and we will consider the global distribution of production and consumption of agricultural products. The impacts of global change issues, such as climate change, energy crops, population growth, and urbanization on food production, will also be part of the course. This course has no prerequisites. This course will be offered on an annual basis either in an online or on-site format.

420.669 Applied Sustainability (3 credits)
This course examines the history and current trends in the expanding field of sustainability. Students will be exposed to a wide range of case studies, visit many field sites and have discussions with sustainability practitioners in Maryland to determine the current state of the science as well as impediments to progress. Additional work includes practical application through development and implementation of a sustainability-related vision project. Offered only as a compressed field course every other summer. Offered as intensive field course every other summer.

420.670 Sustainability Leadership (3 credits)
Using a highly interactive format, this course examines practical, state-of-the-art concepts in leadership, with a focus on the unique challenges of sustainability facing our world. Students will examine the essential components of leadership, including vision, communication, strategy, organization, synergy and strategy. Recognition of barriers and risks and how to work around them will be stressed, and the restricted area. This course will have both hands-on field work and in-class lecture components. As a field course, natural communities will be a major emphasis. On land (the Islands and the Amazon), focus will be placed on the tectonic development of the Islands and of the origin, evolution, and ecology of flora and fauna, and the reasons for the concentration of threatened and endangered species in the forests and on the Galapagos. In the marine environment, emphasis will be placed on the ecological processes that maintain biodiversity, community organization, and the impacts of climate change on coral reefs which are threatening their extinction.

420.675 Geology and Tropical Ecology of Hawaii (3 credits)
The breathtaking beauty and unfettered access to the soaring Mauna Kea, the highest mountain when measured from the ocean floor, and home to the Big Island's eight major climate zones, from desert to alpine, inspire countless superlatives. The volcanoes of the Big Island of Hawai’i are one of the premier examples of active hotspot volcanism in the world, and are by far the most accessible. This location offers an unparalleled opportunity to observe the planetary processes of destruction and creation through Hawai'i's geology and tropical ecology. This field course explores the unique marine, freshwater and terrestrial habitats of the island interconnections between the geology and the ecology and the integrated management of natural resources from volcanic mountain tops to the biodiversity of the coral reef. The primary goal of this interdisciplinary course will be to provide a solid foundation in field science for both geologic and ecologic methods. Specifically, we will examine the geological development of Hot Spot generated Hawaiian ocean islands we will describe the biological development of the ecosystems on the islands, and examine the interaction between humans (landscape use and introduction of exotic species) and the island environments (major biomes and anthropomorphic systems). As a field course natural communities will be a major emphasis. On land, focus will be placed on the tectonic development of the Islands and of the origin, evolution, and ecology of flora and fauna, and the reasons for the concentration of threatened and endangered species in Hawaii. In the marine environment, emphasis will be placed on the ecological processes that maintain biodiversity, community organization, and the impacts on coral reefs.
420.680 Special Topics in Environmental Sciences & Policy (3 credits)
Important and timely topics related to environmental sciences and policy that are not part of the regular course offerings examined with particular emphasis on the applied and problem-solving aspects of the topics. Specific topics vary by semester and are listed in registration materials.

420.686 Special Topics in Environmental Sciences and Policy (3 credits)
Important and timely topics related to environmental sciences and policy that are not part of the regular course offerings examined with particular emphasis on the applied and problem-solving aspects of the topics. Specific topics vary by semester and are listed in registration materials.

420.700 Environmental Communication (1 credit)
Communication drives both environmental science and policy with increasing importance. Modern media has substantially changed the level and focus of messaging and education about environmental issues. This course is centered on actual production of modern tools, including a student-run blog and podcast series. Students form the editorial board of the JHENS blog (http://jhens.jhu.edu) and plan, write, and manage content. Reviews of academic literature on environmental communication will be included in weekly discussions. Offered infrequently.

420.800 Independent Research Project in Environmental Sciences and Policy (3 credits)
An independent research project is required for students electing the ESP Master's degree with one of the concentrations. It is optional for students not electing a concentration. Students must have completed at least eight courses in the program before completing an IRP. The independent research project enables students to apply and synthesize the material learned in their courses, develop expertise on a specific environmental topic, work closely with an expert in the field, and improve their professional writing skills. Students who elect this option must identify a project topic and mentor who is both familiar with the chosen topic and willing to guide and oversee the project. The mentor may be a faculty member teaching in the program or elsewhere at JHU, a qualified and appropriate person from the student's place of work, or any expert with appropriate credentials. A preliminary proposal must be approved by the mentor and the course instructor prior to enrollment in the course. In order to enroll for the class, permission of instructor is required. The mentor agreement form must be completed and returned at the beginning of the semester in which the student takes the IRP course. That form is available on the ESP-IRP website, as is a document that spells out all the requirements and a timeline for completion. Final proposals for the IRP must be approved by the mentor and the course instructor at least two weeks prior to the start of the semester in which the IRP is to be completed. A mentor agreement form must be completed and returned at the beginning of the semester in which the student is to take the IRP course. This form is sent to the mentor by the course instructor once the final proposal is approved. For more information, please go to the ESP-IRP website (advanced.jhu.edu/academics/graduate-degree-programs/environmental-sciences-and-policy/the-experience/independent-research-project). Offered every term and scheduled as needed.

MS in Environmental Sciences and Policy/Graduate Certificate in Geographic Information Systems

The use of geographic information systems has become standard for many environmental professionals. At the same time, environmental work remains one of the most popular and powerful applications of GIS investigations. To enable students to better exploit the complementary nature of the fields, we have eliminated the overlap between the MS in Environmental Science and Policy and the graduate certificate in GIS. This enables students to earn both the MS degree and the Graduate Certificate by completion of a total of 13 courses rather than the 15 courses that would be required to complete the programs separately.

Interested students, including those already enrolled in either program, should apply to the combined MS in ESP/Graduate Certificate in GIS program. New students may select this option at the time of application. Current students should consult their academic adviser and apply by filing a change of program form with the Registration Office.

Course requirements can be pursued simultaneously and are as follows:

MS in Environmental Sciences and Policy:

- Five core courses (no ESP concentration) or four core courses plus an independent research project (ESP with concentration)
- Five elective courses to include both:
  - 430.601 Geographic Information Systems (GIS) (4 credits)
  - 430.602 Remote Sensing: Earth Observing Systems and Applications (4 credits)

Certificate in Geographic Information Systems:

Any three of the following:

- 430.600 Web Mapping (3 credits)
- 430.603 Geospatial Data Modeling (4 credits)
- 430.604 Spatial Analysis with GIS (4 credits)
- 430.605 Development and Management of GIS Projects (4 credits)
- Substitution of other GIS courses allowed
Master of Arts in Film and Media
advanced.jhu.edu/filmandmedia

The Master of Arts in Film and Media provides an in-depth curriculum designed to develop skill sets required to succeed in the film, television, and media industries. Students are exposed to the latest technology, taught the most current financial and distribution strategies, and trained in advanced narrative techniques. The program emphasizes experiential learning and focuses on the latest trends and advances in the entertainment industry. All our courses balance practice with theory and are taught by successful artists and executives in the film, television, and media world. Our program has been specifically designed to keep up with constant advances in technology, ideas and trends, both practical and aesthetic.

Courses and workshops feature current case studies that help expose students to the latest tools, equipment and resources in specific fields. The Johns Hopkins MA in Film and Media brings the industry to Baltimore, as our students grow their professional network while creating a two-way bridge between the local burgeoning film scene and the industry hubs in Los Angeles, New York and abroad. Courses are held at the JHU/MICA Film Center, Baltimore's new film studio and recording center in the Station North Arts and Entertainment District.

Students choose two concentrations from the fields of business, sound, and writing. While they specialize in two of these tracks, they acquire hands-on experience in developing, shooting, editing, and marketing original film and television content in the Graduate Filmmaking Studio.

PROGRAM REQUIREMENTS

> Two core courses
> Eight electives in two concentrations
> Capstone

CURRICULUM

Students take 11 courses, including the two-course Graduate Filmmaking Studio and a capstone within the required course sequence. Students take at least eight elective courses from two concentrations within the areas of Writing for Film and Television, Sound Production and Design, and Business of Film and Media.

The Business track revolves around a two-semester seminar taught by veteran development and acquisitions executives. This Fundamentals of Business seminar is structured around presentations by internationally renowned industry leaders, who—together with students—analyze case studies in the film and television industries. Students are required to develop their own business plans, investor decks, and marketing plans, and present them to invited executives, investors, and entrepreneurs.

Students in the Sound concentration acquire hands-on experience in creating and recording sound effects, dialogue, and music as they pertain to film, television, and media projects. Leveraging the experience and resources of The Peabody Institute and featuring a new sound studio co-designed by Thomas Dolby and Scott Metcalfe, the Sound concentration provides students the opportunity to create, edit and mix soundtracks and soundscapes at the highest level.

Award-winning screenwriters and television writers lead the intensive workshops in the Writing concentration, centered on analyzing and polishing original narratives. Students create and strengthen their writing portfolios as they design, draft, and polish their feature-length screenplays, television spec scripts, and television pilots. Master classes are offered by guest executives, agents, and executive producers, providing excellent opportunities to network within the industry.

CAPSTONE

Students are required to complete a capstone project at the culmination of the program. During the capstone project, students will demonstrate professional expertise in one of their concentrations, completing a project that will be part of a work portfolio to be used to gain a professional position in the industry.
COURSE DESCRIPTIONS

Core Courses

AS.455.641 Graduate Filmmaking Studio I & II (4 credits)
This two-semester course is the centerpiece of the graduate experience. The studio meets for four to six hours weekly, allowing students plenty of time to explore all the aspects of the filmmaking process. Co-taught with the MICA MFA Program, this hands-on studio is where good, smart and impactful movies are born. Students will work in groups, particularly during their first semester. While writing and editing are often solitary activities, production is not. Great films are collaborations and students will be expected to work in teams. Group discussions and critiques are balanced with individual meetings with faculty and visits with guest filmmakers. Special emphasis will be placed on ways that filmmakers can build and reach an audience. Students will explore the diverse ways filmmakers are sustaining careers while creating high impact films.

Writing for Film and Television Courses

AS.455.611 Screenwriting Workshop I – The Outline (3 credits)
This will be the first half of a class that will go from basic idea through a full outline for a feature in the first semester and a completed first draft based on that outline in the second. Each student is required to come to the first class with one or two ideas for a completely new screenplay. Please do not bring anything for which there is an outline, treatment, or draft of a script. The focus of the class will be the structure of the feature screenplay as a function of thematic coherence. We will analyze films by act, sequence, and scene to understand dramatic action as a tension between different possible outcomes. There will be five weekend intensive workshop sessions, divided between Friday evening and Saturday that will include some lecture components, some viewing and discussion of films, and, more and more as the semesters develop, reading and discussion of student work. Between the weekend workshops there will be weekly writing assignments and individual Internet or telephone conferences. By the end of the first semester, each student will be required to have completed an outline for a feature film, organized by act, sequence, and scene, and including character, setting, and aesthetic details.

AS.455.612 Screenwriting Workshop II – The Draft (3 credits)
The focus of the class will be the structure of the feature screenplay as a function of thematic coherence. There will be five weekend intensive workshop sessions, divided between Friday evening and Saturday that will include some lecture components and some viewing and discussion of films. During this second semester, the emphasis will be on reading and discussion of student work. Between the weekend workshops there will be weekly writing assignments and individual Internet or telephone conferences. By the end of this semester, each student will be required to have completed a feature-length screenplay based on the outlines from the first semester.

AS.455.614 Acting for Screenwriters (3 credits)
This course taught by a professional actor and director introduces students to the craft of screen acting, using the student's own scenes and screenplays as text. The first part of the course focuses on the basics of screen acting, using scenes from produced films and episodic series. Students will learn how to analyze a scene, find the truth of the moment and prepare for a scene as actors, as they act the scenes themselves. Essential actions, super objectives, dramatic beats and physical actions are some of the subjects covered. The second part of the course finds the students analyzing, preparing for and acting in scenes from their own screenplays. As the group acts, films and discusses each scene, students will revise the scenes and screenplays, informed by the insights gleaned from the dynamic.

AS.455.615 Episodic Writing Workshop I – Drama (3 credits)
This course exposes students to the mechanics and realities of writing an original pilot for an episodic series, from concept through outline to draft. Each student will finish the semester with a detailed outline of the pilot and an outline of the series format. Dramatic goals, character arcs, operational themes will be a few of the many subjects covered. Emphasis is placed on exploring ways to further push the form through students' original ideas. Classes will be designed so they center on the specific challenges of the students' works-in-progress, with an emphasis on exploring and discussing different narrative approaches and solutions that may enhance their writing and revision processes. In this course, students will be working on a one-hour drama series.

AS.455.616 Episodic Writing Workshop II – Comedy (3 credits)
This course will expose students to the mechanics and realities of writing a spec script or pilot script for episodic comedy, from concept through beat sheet to draft. We will study, analyze and break down a specific television show then proceed to sketch out a spec episode based on that show. Each student will finish the semester with a detailed outline and the first pages of the draft. Genre, act structure, dramatic dialogue and cold-opens will be a few of the many subjects covered. Emphasis is placed on exploring and discussing different narrative approaches and solutions that may enhance their writing and revision processes. In this course, students will be working on a half-hour comedy series.

AS.455.617 Episodic Writing III - The Limited Series (3 credits)
This workshop is an innovative learning experience for select graduate and undergraduate students in film, as they participate in the research and outlining process of a limited series in active development. Students will have an opportunity to engage with a television and screenwriter and a development executive as they develop a “limited series” concept and outline for an eight-hour drama. The students will operate as an apprenticeship with the faculty members (similar to law students working on a case or art students working on a large installation with a senior professor). Through their direct involvement with the writer and producer, participants will gain invaluable firsthand experience of the creative and practical process of developing a historically based limited (or “mini”) series for television.
Business of Film and Media Courses

**AS.455.619 Business of Nonfiction: Producing the Documentary (3 credits)**

Smaller cameras combined with an expanded distribution network have opened a window for nonfiction content like never before – flooding our television, cinemas and streaming platforms with reality television, documentaries and branded content. For filmmakers, programmers and distributors this means an insatiable appetite for content, but with more than 400 hours of video uploaded to YouTube every minute how do you prevent your work from getting lost in the sea of sneezing pandas and piano playing cats? This course will explore the nuts and bolts of nonfiction production – giving students an inside look at how each part of the process, from story selection to distribution, can influence the commercial and creative viability of the project. Students will have the opportunity to meet acclaimed documentarians and ask questions on all aspects of production of short and long form documentaries and digital content.

**AS.455.620 Fundamentals of Business I (3 credits)**

This comprehensive business seminar is centered on presentations and interactive sessions with experts in the field, the study of relevant case studies and the creation of sample plans and strategies by the students. During the first semester we cover such subjects as entertainment law, film finance, production, marketing, public relations and distribution. Emphasis is placed on analyzing and recreating actual and relevant case studies and business situations. Other subjects include sales estimates, comps, tax credits, festivals, release strategies and the art of the pitch. Each student must prepare a business plan, which they will present during the final course day.

**AS.455.621 Entertainment Law for Independent Filmmakers (3 credits)**

The objective of this class is to ensure that you are an informed filmmaker who can anticipate certain legal and business issues that may arise with your project. Using real-life case studies as basis for discussion, students in this course will explore the legal and business affairs aspect of filmmaking. We will discuss option agreements, distribution agreements, production-related agreements, delivering legal materials to distributors, music and clip clearances, and fair use and guild considerations.

**AS.455.623 Fundamentals of Business II (3 credits)**

This comprehensive business seminar will be centered on presentations and interactive sessions with experts in the field, the study of relevant case studies and the creation of sample plans and strategies by the students. During the second semester we will cover such subjects as alternative financing, crowdfunding, branded content, digital content distribution and international co-productions. Emphasis will be placed on analyzing and recreating actual and relevant case studies and business situations. Other subjects will include micro budgets, over the top content, equity and presales.

**AS.455.625 Line Producing, Creative Producing, Executive Producing (3 credits)**

Through in-class projects, interactions with production courses and on-going independent productions, students will be exposed to the myriad responsibilities of producers, from the creative, executive and on-the-field perspectives. We will explore the many elements that make up the creation of films and television shows, from development and financing through production, marketing and distribution. An intensive weekend workshop will focus on scheduling, budgeting and running a set.

Sound Production and Design Courses

**AS.455.630 Recording Sound for Film (3 credits)**

This course serves as an orientation to the recording studio and the craft of capturing sound with microphones. Topics will include sound behavior (i.e., basic acoustics), human perception of sound (i.e., basic psychoacoustics), microphone theory and techniques, signal flow and processing, basic digital audio theory, and the digital audio workstation (Pro Tools and Logic Pro). Projects will include in-studio and location recordings. By the end of the semester students will be able to effectively navigate the studio at the Ten East North facility and capture sound on location for use in subsequent classes. Should be taken prior to or concurrently with AS.445.631 Designing Sound for Film.

**AS.455.631 Designing Sound for Film (3 credits)**

This course explores the use of software and hardware in the music studio as a means by which composers and sound designers create sound for use in soundtracks. Topics will include exploration of software instruments using synthesis and sampling, as well as instrumentation and orchestration of acoustic instruments. The art of Foley will be explored through which students will create sound effects and background ambience using a variety of objects. Projects will incorporate the creation of soundscapes and compositions with both software and ‘real’ acoustic instruments. Best if taken concurrently or following AS.455.630 Recording Sound for Film.

**AS.455.632 Sound on Film I (3 credits)**

This course builds on the training from Recording Sound for Film and Designing Sound for Film by utilizing the knowledge and skills acquired in the operation of the recording studio and use of software and hardware instruments. Students will study finished works and analyze the use of sound by filmmakers in different genres, and apply those techniques to short film projects created by filmmakers also in the MA program. The ProTools digital audio workstation will be the primary tool used during the course but students are welcome and encouraged to integrate their knowledge of other audio systems into their work. Grading will be based on the quality of work, use of the tools and techniques discussed in class and classroom participation. Prerequisites: AS.455.630 Recording Sound for Film, AS.455.631 Designing Sound for Film.

**AS.455.633 Sound on Film II (3 credits)**

The final course in the sound concentration sequence, this course is focused on composing and sound designing a longer-form capstone work in collaboration with a filmmaker also in the MA program. Final grade is based on the quality of the finished product and an evaluation by the instructor of how the student incorporated knowledge and techniques introduced in the previous three classes. Prerequisite: AS.455.632 Sound on Film I.
PY.550.524 Sound Design for Video Games (3 credits)
This course is designed to bring together students with backgrounds in composition and/or recording engineering to learn the fundamentals of designing sound and music for video games. Topics will include an overview of the game production process and team members involved, elements of sound design, surround sound principles, MIDI, interactive music structures, middleware and an exploration of common console and PC hardware. Final project: All sound and music for a 3-5 minute of actual gameplay, in surround. Open to Composition, Computer Music and Recording Arts and Sciences majors, or by permission of instructor.
Geographic Information Systems (GIS) is a dynamic and versatile technology that enables visualization, analytics and data management capabilities for an increasingly wide spectrum of industries. It has come to play a key role in empowering decision makers understand various processes and make well-informed decisions. It is used in various fields, such as natural resource management, environmental planning, homeland security, defense and intelligence, marketing, telecommunications, economic development, transportation, law enforcement, public health and other health care industries. It is this dynamism that the Johns Hopkins University GIS programs encompass in their offerings, the Master of Science in GIS and the Post-Baccalaureate Certificate in GIS.

These two programs are fully online and provide a strong foundational education that delves into the principles and real-world applications of GIS, allowing students to build their credentials and capitalize on a marketplace that continues to grow in its demand for skilled employees. The Master of Science in GIS is designed to prepare the next generation of geospatial professionals skilled in all facets of GIS, including project management, web-based application development, spatial analytics, visualization and database administration.

Both programs are designed for students who have little or no knowledge of the GIS field, as well as students with prior experience. Students entering either program will be introduced to the most widely used commercial software, as well as open-source software, utilizing cloud computing infrastructure. The program is designed to introduce students to the basic discipline of geographic information as a system and a science. Hands-on experience is emphasized and students in the program can expect to work on real-world geospatial scenarios with real data along with the accompanying issues those data may introduce.

**ADMISSION REQUIREMENTS**

In addition to the materials and credentials required for all programs (see Admission Requirements), the Master of Science and Post-Baccalaureate Certificate in Geographic Information Systems programs require:

1. A grade-point average of at least 3.0 on a 4.0 scale in the latter half of undergraduate studies. Particular interests and work experience may also be considered.
2. One semester of undergraduate calculus and one semester of undergraduate statistics

Students who do not have the necessary undergraduate training in calculus or statistics may be offered provisional admission if their other credentials are strong. Students who are admitted provisionally due to lack of quantitative skills have the option to:

1. Take appropriate courses at an accredited college/university.
2. Take 420.301 Quantitative Methods for Environmental Sciences.
3. Pass a math placement test, administered by the Environmental Sciences program.
Admissions Documents
- AAP application and fee
- A current résumé or CV
- A statement of purpose explaining how GIS is an appropriate avenue of instruction for your career needs
- Two letters of recommendation, preferably one academic reference
- Official undergraduate and graduate transcripts

Provisional Student
Provisional students are admitted to this status because, in the view of the Admissions Committee, they do not fulfill all academic requirements for admission as a degree candidate at the time of the application. Provisional students may be required to take specific prerequisite courses, and/or take a specific number of graduate-level courses and complete them successfully in order to establish their eligibility to be admitted as a degree candidate.

During the time of this provisional status, students are held to grading criteria stricter than those required of degree candidates (see Grading System, Requirements). Specifics of a provisional admission are outlined in a formal admissions letter mailed to the student. All listed criteria must be met for a student to continue to enroll in courses.

Math Test
This test is administered online and can be done at the student’s convenience on any working day. After a student is admitted, he/she may make an appointment to take the test by contacting the Environmental Sciences Program Director at 202-452-1280. Students can also obtain relevant practice materials at http://advanced.jhu.edu/academics/graduate-degree-programs/environmental-sciences-and-policy/program-resources/practice-math-questions/.

PROGRAM STRUCTURE

Post-Baccalaureate Certificate
Five courses are required to complete the certificate. All courses are taught online, giving students access to the best geospatial experts, regardless of their location.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>430.600</td>
<td>Web GIS</td>
<td>4</td>
</tr>
<tr>
<td>430.601</td>
<td>Remote Sensing: Earth Observing Systems and Applications</td>
<td>4</td>
</tr>
<tr>
<td>430.602</td>
<td>Geospatial Data Modeling</td>
<td>4</td>
</tr>
<tr>
<td>430.603</td>
<td>Spatial Analysis With GIS</td>
<td>4</td>
</tr>
</tbody>
</table>

Master of Science
A) Four out of five certificate courses (see above)
B) Five electives from the list below.
C) Capstone Project

Elective Courses (Five Courses)
The following elective courses are offered as part of the Master of Science in GIS. We recommend that one of the four electives be a GIS programming course and one be a spatial data management course.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>430.605</td>
<td>Development and Management of GIS Projects</td>
<td>4</td>
</tr>
<tr>
<td>430.606</td>
<td>Programming in GIS</td>
<td>4</td>
</tr>
<tr>
<td>430.607</td>
<td>Spatial Databases and Data Interoperability</td>
<td>4</td>
</tr>
<tr>
<td>430.608</td>
<td>GIS and Spatial Decision Support Systems</td>
<td>4</td>
</tr>
<tr>
<td>430.609</td>
<td>Spatial Data Management: Quality and Control</td>
<td>4</td>
</tr>
<tr>
<td>430.610</td>
<td>Development and Management of GIS Projects</td>
<td>4</td>
</tr>
<tr>
<td>430.611</td>
<td>Geospatial Ontology and Semantics</td>
<td>4</td>
</tr>
<tr>
<td>430.612</td>
<td>Cartographic Design and Visualization</td>
<td>4</td>
</tr>
<tr>
<td>430.613</td>
<td>Advanced Topics in Remote Sensing</td>
<td>4</td>
</tr>
<tr>
<td>430.614</td>
<td>Big Data Analytics: Tools and Technique</td>
<td>4</td>
</tr>
<tr>
<td>430.615</td>
<td>Demographics Modeling</td>
<td>4</td>
</tr>
<tr>
<td>430.616</td>
<td>Advanced Python Scripting for GIS</td>
<td>4</td>
</tr>
<tr>
<td>430.617</td>
<td>Advanced Web Application Development</td>
<td>4</td>
</tr>
<tr>
<td>430.618</td>
<td>GIS for Emergency Management</td>
<td>4</td>
</tr>
<tr>
<td>430.619</td>
<td>Geo Apps</td>
<td>4</td>
</tr>
<tr>
<td>430.620</td>
<td>System Architecture for Enterprise GIS</td>
<td>4</td>
</tr>
<tr>
<td>430.621</td>
<td>Capstone for Geographic Information Systems</td>
<td>4</td>
</tr>
</tbody>
</table>

For more information about core and elective courses, please see course descriptions. Please note that not all courses are offered every semester, and the GIS course schedule should be consulted for current classes and times.

Students may also consider taking related courses in other divisions of AAP, especially the Environmental Sciences and Policy and Energy Policy and Climate programs. Students are permitted, with permission of the GIS program coordinator, to take up to two pertinent courses outside of the GIS curriculum to fulfill their requirements toward the degree. Not all these elective choices are offered in an online format. Please refer to the Advanced Academic Programs course schedule for exact dates, times, locations, fees, and instructors. Courses are open only to students who meet enrollment requirements.
COURSE DESCRIPTIONS

Core Courses

430.600 Web GIS (4 credits)

Web GIS is an important foundation course in which students will become familiar with the current platforms available for delivering Web GIS and sharing geographic content over the web. Professionals in various industries often have to make information readily available and with current developments this has become easier than ever. The class offers a fundamental understanding of creating and designing web maps and web apps using various approaches and platforms. Capabilities such as editing, geoprocessing, geocoding, image analysis, 3D, mobile and real-time GIS in a web environment will be examined. Cloud-based and on premises infrastructure to deliver Web GIS will be utilized. Offered twice a year.

430.601 Geographic Information Systems (4 credits)

In this introductory course, students become familiar with the concepts and gain the experience necessary to appreciate the utility of Geographic Information Systems in decision-making. Topics covered include the fundamentals of data structures, georeferencing, data classification, querying, cartography, and basic spatial data analysis. The course provides an overview of the capabilities of GIS software and applications of GIS. Class time is divided between lectures and GIS exercises that reinforce critical concepts. Students must complete a term project as part of the course. Offered every semester. Elective option for Govt. Analytics students.

430.602 Remote Sensing: Earth Observing Systems and Applications (4 credits)

This course introduces remote sensing as an important technology to further our understanding of Earth's land, atmospheric, and oceanic processes. Students study remote sensing science, techniques, and satellite technologies to become familiar with the types of information that can be obtained and how this information can be applied in the natural and social sciences. Applications include assessment of land cover and land use, mapping and analysis of natural resources, weather and climate studies, pollution detection and monitoring, disaster monitoring, and identification of oceanographic features. Offered once a year in spring.

430.603 Geospatial Data Modeling (4 credits)

This course moves beyond the fundamentals of GIS to explore the constraints surrounding data modeling as well as the methods to model spatial data. The course focuses on various kinds of spatial data, how it is collected, handled, processed, and analyzed through GIS technologies. Data conversion, migration and relevant modeling methods are examined. Spatial and attribute accuracy as a requirement for any data model is emphasized. As the term progresses, students deal extensively with different types of data presentations and the manipulation of those data in GIS models. Students develop a significant GIS project over the course of the semester and present their findings at the end. Offered twice a year.

430.604 Spatial Analysis With GIS (4 credits)

This course introduces students to using various techniques for solving spatial problems. The course teaches a proven process one can utilize to address common geographic inquiries including site suitability analysis, line of sight (visibility) analysis, network analysis, geostatistical analysis, spatial interpolation, etc. Students will also learn to apply the principles of spatial statistics to address the distributional and locational aspects of spatial data within a variety of situations. Examples and assignments are drawn from many GIS applications, such as business, urban planning, public safety, public health, transportation and natural sciences. Offered twice a year. Elective option for Govt. Analytics students.

Elective Courses

430.605 Development and Management of GIS Projects (4 credits)

This course introduces students to project, program, and portfolio management standards, which will guide them on how to successfully manage GIS projects. Students will learn how to apply core project management principles and guidelines to real project scenarios. The course will impart knowledge and skills for managing GIS projects throughout their entire lifecycle, while addressing technical, ethical, and institutional problems. Students will explore key issues in organizational management, including earned-value management, resource planning, and communications. During the course, students will learn how to determine the return on investment of a GIS project, create a comprehensive schedule and budget, and determine risk management, quality control, and contract management skills in support of your GIS project. Offered once a year.

430.606 Programming in GIS (4 credits)

In this course students will learn how to automate workflows and develop tools using Python scripts as well as develop web mapping applications using Application Programming Interfaces (APIs). The course is split in two sections. The first section covers Python as a scripting language which provides an easy way for automating complex GIS tasks and functionality, thus simplifying workflows and increasing efficiency. Management of Web GIS functions thought Python APIs will be emphasized. The second section teaching basic principles of developing web mapping applications utilizing JavaScript APIs. The students will learn how to develop rich, interactive web mapping applications which contain common GIS functionality such as selection, querying, geocoding, routing, editing and geoprocessing. Offered once a year. Prerequisites: 430.600 Web GIS, 430.601 Geographic Information Systems.

430.607 Spatial Databases and Data Interoperability (4 credits)

A well-designed database is necessary to construct relevant spatial data queries. In this course, students learn the different database designs for stand-alone databases and enterprise database systems. This course examines the requirements for a GIS Decision Support System by focusing on the design of the data schema, identifying the necessary data elements and their formats, and exploring data interoperability as a designed constituent of a database. Data management routines for
maintaining the spatial integrity will also be introduced. Offered once a year. Prerequisites: 430.601 Geographic Information Systems, 430.603 Geospatial Data Modeling.

430.608 GIS and Spatial Decision Support Systems (4 credits)
GIS can be a very effective tool to assist in making decisions for a wide range of applications at the local, regional, and global scale. This course will examine the use of GIS as a spatial decision support system for systematic policy analysis and scenario modeling. Case studies will be used from the areas of agriculture, conservation planning, homeland security, land use planning, natural disasters, transportation, urban planning, and water resources. Offered once a year. Prerequisites: 430.601 Geographic Information Systems, 430.604 Spatial Analysis with GIS.

430.609 Spatial Data Management: Quality and Control (4 credits)
Spatial data quality is a major concern for any GIS. This course examines the nature of errors in spatial data and various aspects of spatial data quality, including positional and thematic accuracy, resolution, precision, completeness, and logical consistency. The impacts of errors on the reliability of GIS-based analysis are explored. Various strategies to improve the quality of spatial data are addressed, including the use of standards for spatial data (FGDC, OGC, and ISO) and data management tools. Offered once a year. Prerequisites: 430.601 Geographic Information Systems, 430.603 Geospatial Data Modeling.

430.611 Geospatial Ontologies and Semantics (4 credits)
The Geospatial Semantics and Ontologies course examines the foundations, design, and use of linked data (LD) modeling technologies and approaches for geospatial data. LD is based on the node-edge-node triple data model to form graphs that can represent information networks and so, addresses challenges associated with information management problems such as the use of variable terms used in GIS applications and their associations within related enterprises and information exchange over the Internet. The introduction to the course presents a general approach to semantics and ontology, and basics of information interchange on the Internet, such as Extensible Markup Language (XML) and its extension Geography Markup Language (GML). Standards for formal information semantics are covered, including serialization for Resource Description Framework (RDF) data, Well Known Text (WKT) for specifying coordinate geometries, SPARQL and GeoSPARQL query language, and Web Ontology Language (OWL) for logical reasoning and data inference. The triple model is compared to natural language, tree, and relational data models. Exercises are intended to explore LD resources and services over the Internet. Subsequent lessons examine LD architectures and publication, ontology pattern design for the reuse of concepts, and visualization and mapping. The relation of LD to CyberGIS is presented in the final week. Some required technical literacies, such as JavaScript Object Notation (JSON), data indexing, and Scalable Vector Graphics (SVG) will be reviewed. These introductory skills provide the foundation of advanced geospatial LD applications. Offered once a year. Prerequisite: 430.601 Geographic Information Systems

430.612 Cartographic Design and Visualization (4 credits)
The Cartographic Design and Visualization course focuses on the fundamentals of cartography, spatial statistics, thematic mapping techniques, 3D mapping, and web-based mapping. Students will gain an inter-disciplinary understanding of cartographic representation and visualization with hands on applications using cutting edge GIS and graphic design software to create purpose tailored maps. Upon successful completion of this course, students will be able to interpret and appropriately communicate spatial data; will have developed a personalized cartographic style; will have created a professional GIS portfolio for current/potential employers; and most importantly will have developed a keen appreciation for maps and spatial awareness! Offered once a year. Prerequisite: 430.601 Geographic Information Systems.

430.613 Advanced Topics in Remote Sensing (4 credits)
This course explores the various remote sensing platforms, collection systems, processing methods, and classification approaches to remotely sensed data. Discussion of image adjustment techniques, relative orientation, and georeferencing methods are compared. Topics include hyperspectral imaging, spectral analysis, and image filtering. Offered once in two years. Prerequisites: 430.601 Geographic Information Systems, 430.602 Remote Sensing: Earth Observing Systems and Applications.

430.615 Big Data Analytics: Tools and Techniques (4 credits)
The explosion of data collection methods from a vast array of data sources in volumes previously unimaginable has tested the limits of traditional technology, which are not able to scale to the requirements of massive data. Big Data is the field of data studies where the data is identified by very large volumes, high velocity in data generation, and data format variety. This course explores Big Data technologies while utilizing cloud infrastructures. We will discuss the characteristics and architectural challenges surrounding Big Data, and explore geo-visualization techniques of data processed using Big Data Analytics. Students will work in a cloud computing environment to build Hadoop clusters, NoSQL databases, and work with other open source technologies to process data stores like Census data, and twitter feeds. Offered once a year. Prerequisites: 430.600 Web GIS, 430.601 Geographic Information Systems. Programming experience is highly recommended.

430.617 Demographics Modeling (4 credits)
Census data is the most often used data in geospatial studies. Census data provide information on the demographic composition of households all the way through state and national population trends. Census data also serve the data layers that form the basis of most mapping applications. In this course, students will learn how to work with Census data in GIS by understanding the vast amounts of data collected in support of the decadal Census, how to discover and read the various tables that associate with the raw Census data, and how to create custom data layers for demographic models in economics, housing, and population studies. Offered once in two years. Prerequisite: 460.601 Geographic Information Systems, or permission of the instructor.
430.618 Advanced Python Scripting for GIS (4 credits)
This course focuses on advanced uses of Python as a scripting tool to automate workflows in GIS and create customized applications. This includes the development of script tools, utilizing advanced ArcPy modules, implementing Python geoprocessing services, customizing GIS applications, and more advanced Python functionality. Offered once a year. Prerequisites: 430.606 Programming in GIS.

430.619 Advanced Web Application Development (4 credits)
This course is designed to provide students with advanced experience in web application development. It focuses on uses of Web APIs, including the new ArcGIS API 4.2, for developing rich and interactive web mapping applications. HTML, CSS and several popular JavaScript frameworks, such as Dojo, JQuery and AngularJS, will be covered. Interchange languages (JSON, XML) and responsive design will also be explored. Widgets will be examined to quickly develop solutions, but the emphasis will be placed on tasks which provide more control over server-side functionality. Conceptual and technical documentation and samples will be greatly utilized. The course will facilitate heavy engagement in the large and growing community of Web API developers. Offered once a year. Prerequisite: 430.606 Programming in GIS.

430.621 GIS for Emergency Management (4 credits)
Geographic Information Systems (GIS) have become an integral part of understanding the natural hazards in our world and how emergency management agencies respond to events and mitigate the impact of disasters. Furthermore, the advent of Web GIS has helped agencies overcome many challenges previously associated with GIS in Emergency Management. This course is an opportunity to learn about the use of GIS in studying natural hazards and apply cutting edge GIS technology to help emergency management agencies in the field. In today’s device-driven world, maps need to work on mobile devices so there will be an emphasis on enabling GIS in the field. You will use Web GIS to deploy maps that assist agencies with their incident command functions: Planning, Operations, Logistics, Command, and Public Information. While the industry focus will be on Emergency Management, the knowledge, skills and abilities you develop will be widely applicable in both public and private sector industries. Offered once a year. Prerequisite: 430.601 Geographic Information Systems or permission of the instructor.

430.623 Geo Apps (4 credits)
The Geo Apps course is designed to reflect current developments in the GIS industry. The course will teach you to extend your reach beyond common desktop GIS workflows, allowing you to present information and tools to a broader audience. You will learn how to create information models for field and crowdsource data collection apps, best practices for publishing geospatial information and configuring a range of web and native applications, and how to create meaningful information products that match specific user needs. You will work with different types of 2D and 3D data in desktop, web, and mobile geo apps to simulate how GIS is being used in modern organizations. Offered once a year. Prerequisite: 430.601 Geographic Information Systems.

430.625 System Architecture for Enterprise GIS (4 credits)
This is a project-based course, which allows students to build an Enterprise GIS implementation. Various enterprise architecture components, such as portals, servers, data stores, web adaptors, load balancers, enterprise databases and big data stores, real time servers, geonalytics servers, etc. will be examined and implemented in a deployment scenario. Students will first design the enterprise architecture, then implement it. Students will have multiple Amazon EC2 instances configuration available to them at least for part of the semester, in order to practice setting up this enterprise implementation. Topics such as high availability and disaster recovery, enterprise authentication, and administration through scripting, will be applied. Offered once a year. Prerequisites: 430.600 Web GIS, 430.601 Geographic Information Systems.

Capstone
430.800 Capstone for Geographic Information Systems (4 credits)
The capstone is the culmination of the instruction and training a student receives in the MS in GIS program. In this course, the student selects a mentor, identifies a topic of interest, acquires the relevant data required for the study, develops a data model and/or analysis method, devises the visualization of the data as part of the data interpretation, and summarizes the study in a final report. Students are encouraged to make their presentations at a GIS conference or publish the results of their study in a peer-reviewed GIS publication. Students are responsible for selecting a mentor who may be a JHU faculty member, a qualified and appropriate person from the student’s place of work, or any expert with appropriate credentials. Offered twice a year in fall and spring. Prerequisite: core course requirements for MS in GIS, at least eight courses taken in the program.
Center for Advanced Governmental Studies


advanced.jhu.edu/govstudies

The Johns Hopkins University Center for Advanced Governmental Studies encompasses a broad set of programs and initiatives designed to enhance students’ understanding of the role, function, and impact of government and the nonprofit sector. At the heart of the center are eight graduate programs: MA in Government, MA in Global Security Studies, MA in Public Management, dual MA in Government/MBA, MS in Government Analytics, Certificate in Government Analytics, Certificate in Intelligence, and Certificate in Nonprofit Management. In addition, the Center is involved in a number of government and private-sector partnerships.

Based at the Johns Hopkins University Washington, DC center in Dupont Circle, the Center is a forum for policy discussions and provides a venue for unbiased efforts to expand knowledge of the various governmental components, how they interact, and how they comply with their mandated accountability in administering the affairs of state. The mission of all the Center’s programs and initiatives is to provide a strong foundation of knowledge upon which innovative policy programs and promising leaders can develop.

GRADUATE DEGREES AND CERTIFICATES

The graduate degree programs of the Center bring together theory and practice in the study of government and its impacts domestically and abroad, while preparing individuals for leadership positions in the public and private sectors. At the center, students use their graduate studies to better inform their professional work and find that their practical work experience often augments their graduate studies. While our degree programs are designed as part-time studies, students have the option of accelerating their course of study by attending at a full-time pace.

In addition, students have various options for combining our master’s degrees with our certificates in intelligence or government analytics, allowing them to graduate with two credentials after pursuing a concentrated and efficient course of study.

PROGRAM COMMITTEE

Benjamin Ginsberg
David Bernstein Professor of Political Science and Program Chair

Kathy Wagner Hill
Director of the Center for Advanced Governmental Studies

Dorothea Israel Wolfson
Director of the MA in Government

Paul Weinstein Jr.
Director of the MA in Public Management

Mark Stout
Director of the MA in Global Security Studies and Certificate in Intelligence

Jennifer Bachner
Director of the MS in Government Analytics and Certificate in Government Analytics

Karin Orr
Program Coordinator, Certificate in Nonprofit Management

Sarah O’Byrne
Program Coordinator for the Center for Advanced Governmental Studies

Steven David
Professor of Political Science

PARTNERSHIPS, EVENTS, AND PUBLICATIONS

The Center for Advanced Governmental Studies is involved in a number of government and private-sector partnerships. We welcome opportunities for collaborations and initiatives that fit within the center’s goals of educational exchange and workshop/training efforts that further the understanding of the roles and functions of government.
The center has developed and instituted ongoing leadership exchange programs between U.S. federal executives and their counterparts in China, Germany, and other countries. In addition, the center hosts special events, policy workshops, and summits with embassies, government agencies, Washington think tanks, and other organizations. A series of papers is published by the Center on topics that can help inform current policy debates. The most recent is “Nonviolent Civilian Defense to Counter Russian Hybrid Warfare” (advanced.jhu.edu/nonviolent).

INTERNATIONAL STUDY

The Center for Advanced Governmental Studies at JHU offers degree-seeking students frequent opportunities for intensive international study. The basic format is several intensive course meetings and readings with JHU professors before the students leave; spending one week abroad with classes about 4.5 hours a day and field trips or other exercises, and a research project or major paper due after students return. Past courses have included The Birth of Modern Democracy” (Scotland and France), “China’s Place in the 21st Century,” “Command and Leadership in Modern War: Operation Overlord,” (United Kingdom and France); Politics, Security and Culture in Israel; Politics, Security and Culture in India; Environmental Governance, Climate Change and Energy Security in Europe and America (Belgium and Germany); Policymaking in the U.S. and Latin America: Perceptions and Misconceptions (Mexico); and Sustainable Cities in France and Germany: Lessons for the United States (Germany and France).

ADMISSION REQUIREMENTS

In addition to the materials and credentials required for all programs, the Master of Arts in Government, the Master of Arts in Global Security Studies, the Master of Arts in Public Management, the Master of Science in Government Analytics, the Certificate in Government Analytics, the Certificate in Intelligence, and the Certificate in Nonprofit Management require a grade-point average of at least 3.0 on a 4.0 scale. However, a 3.0 GPA does not guarantee admission. Particular interests and work experience will also be considered.

In addition to the materials and credentials required for all programs, the Master of Arts in Government, the Master of Arts in Global Security Studies, the Master of Arts in Public Management, the Master of Science in Government Analytics, the Certificate in Government Analytics, the Certificate in Intelligence, and the Certificate in Nonprofit Management require a grade-point average of at least 3.0 on a 4.0 scale. However, a 3.0 GPA does not guarantee admission. Particular interests and work experience will also be considered.

Application Documents

- A current résumé
- Two letters of recommendation. Applicants must use the AAP form.
- A statement of purpose (one to two pages double-spaced) that explains the applicant’s reasons for seeking admission and how the degree will be used for career advancement or academic enrichment.
- A writing sample of five to 10 pages that is research focused. The purpose of the writing sample is to demonstrate the applicant’s ability to make and support an argument.

If the applicant does not have an existing research-focused writing sample that he or she wishes to submit, the applicant may write a five-page paper on one of the following questions:

MA in Government applicants, please respond to the following:

“If men were angels, no government would be necessary. If angels were to govern men, neither external nor internal controls on government would be necessary. In framing government which is to be administered by men over men, the great difficulty lies in this: You must first enable the government to control the governed; and in the next place oblige it to control itself.” — James Madison, Federalist 51

In this well-known quote, Madison points toward the age-old problem of reconciling democracy and political power. Discuss this problem in reference to some recent policy issues or political events, citing at least three references.

MA in Global Security Studies applicants, please respond to the following:

“(America) goes not abroad in search of monsters to destroy. She is the well-wisher to freedom and independence of all.” — John Quincy Adams

This quote reflects the trends in American national security for much of the nation’s history. Are the implications that can be drawn from the statement consistent with the demands of American national security in the 21st century? Discuss this problem in reference to some recent policy issues or political events, citing at least three references.

MA in Public Management applicants, please respond to the following:

“A memorandum is not written to inform the reader, but to protect the writer.” — Former Secretary of State Dean Acheson

Please discuss whether you think the quote from former Secretary Acheson is accurate or not and why?

Certificate in Nonprofit Management, Certificate in Government Analytics, and Certificate in Intelligence applicants do not need to submit a writing sample.
Master of Arts in Government

government.jhu.edu

COURSE REQUIREMENTS AND CONCENTRATIONS*

- Four core courses (includes thesis courses)
- Eight elective courses

For information on exact dates, times, locations, fees, and instructors for any term, students should consult the Advanced Academic Programs course schedule (advanced.jhu.edu) available several months before each semester begins. All classes are held at the Johns Hopkins University Washington, DC Center at 1717 Massachusetts Ave. NW, close to Dupont Circle. Select online courses are also offered every semester, and the degree may be pursued and completed entirely online as an option for some students.

CURRICULUM

The curriculum of the Master of Arts in Government program is designed for working adult students who have specialized skills in a particular field and desire the broader perspective necessary for leadership in politics and administration. The courses are based on the latest scholarly and scientific knowledge but emphasize the application of such knowledge to practical governmental, political, and policymaking problems of today. Classes are designed to maximize individual attention, encourage student contribution, build analytical skills, and provide the tools for engaging in original research. All of this leads to lively and stimulating seminar discussions and an enriching graduate school experience.

Sequence of Study

Elective courses may be taken in any order, but the core and required courses must be taken in this sequence: Government and Politics, Research and Thesis I, Research and Thesis II, and Research and Thesis III. Students cannot register for these courses out of order. In their first semester, students take the core course, Government and Politics, which introduces students to the basic tenets of government and politics. Students should take the required courses, that is, Research and Thesis I, early in the program (i.e., as their fourth or fifth class), and the third core class, Research and Thesis II shortly after. The final required course of the program is Research and Thesis III, which students take after completing all other core and required courses and electives.

There are three concentrations offered in the government program for students choosing to specialize in one of these specific areas: Political Communication, Security Studies, and new this year, Democracy Studies and Governance. The concentration in Political Communication provides students with the opportunity to study with practitioners in the field: reporters, political operatives, journalists, and campaign, news, and media professionals. The concentration in Security Studies covers the fundamentals of administering and preserving American security. The concentration in Democracy Studies and Governance provides students with an understanding of what makes democracies work and will be applicable to both “old” and “new” democracies, and to countries transitioning to democracy. Students may (but are not required to) identify a concentration in one of the fields after completion of the core courses.

Students must complete the core course, Government and Politics, eight electives, and the three required thesis courses, which include completion of the final thesis paper to be awarded an MA in Government.

Thesis Process

The thesis is a portfolio of three papers that are thematically linked and written during the course of the student’s graduate school career. The papers are accompanied by an introductory critical comment of approximately eight to ten pages and a conclusion of similar length, which both address the contribution that these papers make to the existing literature and further address the way in which the three papers are interrelated.

Students are expected to have written the literature review for their theses in the Government and Politics course prior to enrolling in Research and Thesis I. During Research and Thesis I, students will study research and writing methods in more depth and expand their literature review to write the first paper of their portfolio thesis. In Research and Thesis II, students will, under the supervision of the thesis instructor, write and revise the second and possibly third paper for submission that is appropriate for their thesis portfolio. Students have the option of taking 470.709 Quantitative Methods instead of Research and Thesis II with permission of the instructor. By the conclusion of
Research and Thesis I and II, all students will have at least two of their three required thesis papers completed. The third paper should be well under way in Research and Thesis II also, but it can be reworked and revised during the remaining elective courses. Students will bring these three papers to their final class of the program, Research and Thesis III. In this course, students will work on any small revisions to the three papers and write the critical comment that thematically links the three papers together. The thesis must be successfully defended in order to graduate.

Online Option for Completing the MA in Government Degree
All required courses in the MA in Government program are available online, along with many electives. This allows students to pursue and complete the degree completely online. All course requirements are the same for online and on-the-ground students. Students may opt to take online classes along with on-site classes throughout their course of studies as well. All students taking an online course for the first time must complete an orientation/training session on Blackboard before they begin their class.

CORE COURSES AND THESIS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>470.602</td>
<td>Government and Politics</td>
<td>3</td>
</tr>
<tr>
<td>470.850</td>
<td>Research and Thesis I</td>
<td>3</td>
</tr>
<tr>
<td>470.852</td>
<td>Research and Thesis II</td>
<td>3</td>
</tr>
<tr>
<td>470.709</td>
<td>Quantitative Methods</td>
<td>(3)</td>
</tr>
<tr>
<td>470.800</td>
<td>Research and Thesis III: Government and GIS</td>
<td>(3)</td>
</tr>
</tbody>
</table>

Sample Courses for the Political Communication Concentration

Select four.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>470.604</td>
<td>Social Media and the American Presidency</td>
<td>3</td>
</tr>
<tr>
<td>470.609</td>
<td>Leadership Skills in the 21st Century</td>
<td>3</td>
</tr>
<tr>
<td>470.615</td>
<td>Speechwriting: Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>470.622</td>
<td>Money and Politics</td>
<td>3</td>
</tr>
<tr>
<td>470.626</td>
<td>Understanding the Media: Old and New</td>
<td>3</td>
</tr>
<tr>
<td>470.637</td>
<td>Lobbying and Influence</td>
<td>3</td>
</tr>
<tr>
<td>470.638</td>
<td>Negotiating as a Leadership Skill</td>
<td>3</td>
</tr>
<tr>
<td>470.649</td>
<td>Behind the Numbers: Polling and American Elections</td>
<td>(3)</td>
</tr>
<tr>
<td>470.652</td>
<td>Primaries, Caucuses, Conventions and the General Election</td>
<td>(3)</td>
</tr>
<tr>
<td>470.657</td>
<td>Politics, the Media, and Presidential Campaigns</td>
<td>(3)</td>
</tr>
<tr>
<td>470.687</td>
<td>The Political and Social Media Revolutions</td>
<td>(3)</td>
</tr>
<tr>
<td>470.732</td>
<td>Communications and Congress</td>
<td>(3)</td>
</tr>
<tr>
<td>470.735</td>
<td>Politics and the New Journalism</td>
<td>(3)</td>
</tr>
<tr>
<td>470.737</td>
<td>The Media and Presidential Politics</td>
<td>(3)</td>
</tr>
<tr>
<td>470.747</td>
<td>Campaigns and Elections</td>
<td>(3)</td>
</tr>
<tr>
<td>470.749</td>
<td>Changing News Cycles</td>
<td>(3)</td>
</tr>
<tr>
<td>470.791</td>
<td>Political Writing and Communications</td>
<td>(3)</td>
</tr>
</tbody>
</table>

Sample Courses for the Security Studies Concentration

Select four. Note: Any course offering in the MA in Global Security Studies counts toward this concentration. There are many classes that count. Here is a small sampling:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>470.606</td>
<td>American National Security</td>
<td>(3)</td>
</tr>
<tr>
<td>470.607</td>
<td>Counterintelligence and National Security: 21st Century Challenges</td>
<td>(3)</td>
</tr>
<tr>
<td>470.630</td>
<td>Congress and the Making of Foreign Policy</td>
<td>(3)</td>
</tr>
<tr>
<td>470.640</td>
<td>Challenges of Transnational Security</td>
<td>(3)</td>
</tr>
<tr>
<td>470.644</td>
<td>Democracy and Its Modern Critics</td>
<td>(3)</td>
</tr>
<tr>
<td>470.650</td>
<td>Legal Issues in Intelligence and National Security</td>
<td>(3)</td>
</tr>
<tr>
<td>470.654</td>
<td>Global Trade, Policy and Competition</td>
<td>(3)</td>
</tr>
<tr>
<td>470.655</td>
<td>Warfare by Other Means</td>
<td>(3)</td>
</tr>
<tr>
<td>470.659</td>
<td>Radicalization and Deraidalization in Terror Networks</td>
<td>(3)</td>
</tr>
<tr>
<td>470.662</td>
<td>Religion, Conflict and Peacebuilding</td>
<td>(3)</td>
</tr>
<tr>
<td>470.692</td>
<td>Military Strategy and National Policy</td>
<td>(3)</td>
</tr>
<tr>
<td>470.697</td>
<td>Intelligence and Counterterrorism</td>
<td>(3)</td>
</tr>
<tr>
<td>470.711</td>
<td>Intelligence: From Secrets to Policy</td>
<td>(3)</td>
</tr>
<tr>
<td>470.748</td>
<td>The Art and Practice of Intelligence</td>
<td>(3)</td>
</tr>
<tr>
<td>470.762</td>
<td>US-Mexico Relations: Migration, Trade, and Organized Crime</td>
<td>(3)</td>
</tr>
<tr>
<td>470.768</td>
<td>Nation Building as Security Policy</td>
<td>(3)</td>
</tr>
</tbody>
</table>

Sample Courses for the Democracy Studies and Governance Concentration

Select four.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>470.602</td>
<td>Government and Politics</td>
<td></td>
</tr>
<tr>
<td>470.610</td>
<td>American Political Thought</td>
<td>(3)</td>
</tr>
<tr>
<td>470.617</td>
<td>The Courts and Public Policy</td>
<td>(3)</td>
</tr>
<tr>
<td>470.644</td>
<td>Democracy and Its Modern Critics</td>
<td>(3)</td>
</tr>
<tr>
<td>470.649</td>
<td>The Separation of Powers and Democratic Governance</td>
<td>(3)</td>
</tr>
<tr>
<td>470.651</td>
<td>Corruption and Democratic Governance</td>
<td>(3)</td>
</tr>
<tr>
<td>470.658</td>
<td>Religion and American Political Culture</td>
<td>(3)</td>
</tr>
<tr>
<td>470.661</td>
<td>Constitutional Law</td>
<td>(3)</td>
</tr>
<tr>
<td>470.674</td>
<td>Regulations: Law of Federal Agencies</td>
<td>(3)</td>
</tr>
<tr>
<td>470.684</td>
<td>Legislative Language and Policymaking</td>
<td>(3)</td>
</tr>
<tr>
<td>470.686</td>
<td>Contemporary Congressional Politics</td>
<td>(3)</td>
</tr>
<tr>
<td>470.693</td>
<td>Comparative Democracies</td>
<td>(3)</td>
</tr>
<tr>
<td>470.698</td>
<td>American Exceptionalism</td>
<td>(3)</td>
</tr>
<tr>
<td>470.701</td>
<td>Congress: The First Branch and Why It Matters</td>
<td>(3)</td>
</tr>
<tr>
<td>470.721</td>
<td>Comparative Federalism: The United States and the European Union</td>
<td>(3)</td>
</tr>
<tr>
<td>470.730</td>
<td>Intellectual Property Law</td>
<td>(3)</td>
</tr>
<tr>
<td>470.759</td>
<td>American Political Development</td>
<td>(3)</td>
</tr>
<tr>
<td>470.776</td>
<td>Nationalism in the Democratic Age</td>
<td>(3)</td>
</tr>
</tbody>
</table>

For course descriptions, see page 154.
Management education typically addresses the public and private sectors separately. Universities typically offer the MBA degree for business leadership and the MA, MPP, or MPA for public-sector management. The assumption is that managers working in the public and private sectors are involved with completely different sets of issues and problems. The reality is that both face similar challenges, and managers frequently move from the public sector to the private sector and vice versa.

The MA in Government/MBA uniquely prepares individuals for the combination of public-and-private sector responsibilities they are likely to face during their careers. This program enables those working in government to expand their knowledge and skills in business and management, preparing them to take on leadership roles in nonprofit, public sector, or commercial enterprises. Students in these degrees complete both the professional managerial education requirements of the MBA and the advanced disciplinary requirements of a specialized MA in Government. Graduates of the Johns Hopkins University MA in Government/MBA are capable of integrating rigorous scholarship with business acumen in bringing both intellectual and strategic leadership to the complex challenges of management in government and business in today’s global economy.

The MA in Government/MBA is designed with class schedules to accommodate working adults. All classes and program activities are conveniently located at the JHU Washington, DC Center (near Dupont Circle). Classes are offered in the evening or on Saturday so students do not need to break stride in their careers to attend.

Students who pursue the dual degree will take classes in the government program at the School of Arts and Sciences and in the MBA program at the Carey Business School. They are assigned an adviser from each school who will oversee their course work. To earn the MA in Government/MBA, students must take 60 classes in the government program and 60 classes in the Carey Business School. Students working full time can take up to two courses a semester. Students who do not work full time can take up to four courses a semester. Dual degree recipients receive both diplomas upon completion of both programs.

**ADMISSION REQUIREMENTS**

Please refer to the Center for Advanced Governmental Studies page for specific admissions requirements for the MA in Government/MBA dual degree program.
Official undergraduate and graduate transcripts
International students must submit TOEFL scores and a “course-by-course” credential evaluation of their undergraduate transcript performed by an outside evaluation service.
A writing sample of five to seven pages that is research focused. The purpose of the writing sample is to demonstrate your ability to make and support an argument.

If you do not have an existing research paper that you wish to submit, you may write a five-page paper on the following question:

“If men were angels, no government would be necessary. If angels were to govern men, neither external nor internal controls on government would be necessary. In framing a government which is to be administered by men over men, the great difficulty lies in this: you must first enable the government to control the governed; and in the next place oblige it to control itself.” – James Madison, Federalist 51

In this well-known quote Madison points towards the age-old problem of reconciling democracy and political power. Discuss this problem in reference to some recent policy issues or political events, citing at least three references.

**CURRICULUM**

All dual-degree students are required to complete the following:

**MA in Government Courses**
- 470.602 Government and Politics in the US (3 credits)
- 470.695 Proseminar: Essentials of Public and Private Management (3 credits)
- Eight additional Government courses (3 credits)

Although not required, the following courses are recommended electives for students in the dual degree program:
- 470.609 Leadership Skills in the 21st Century (3 credits)
- 470.616 The Law and Public Institutions (3 credits)
- 470.619 State Politics and Policymaking (3 credits)
- 470.622 Money and Politics (3 credits)
- 470.630 Government, Banking, and the Financial System (3 credits)
- 470.635 Presidential Policymaking (3 credits)
- 470.638 Negotiating as a Leadership Skill (3 credits)
- 470.645 The Budgetary Process (3 credits)
- 470.655 Multinationals and Government in the Age of Globalization (3 credits)
- 470.688 Political Institutions and the Policy Process (3 credits)
- 470.721 Business Law and Corporations in the Global Economy (3 credits)
- 470.728 Influence and Impacts of Nonprofits (3 credits)
- 470.730 Intellectual Property Law (3 credits)
- 470.736 Principles of Nonprofit Management (3 credits)
- 470.744 Trade and Security (3 credits)

Students wishing to earn a concentration must complete four of their electives in the concentration area. Concentrations are offered in Political Communication, Security Studies, and Democracy and Governance Studies. For MA/MBA students, the thesis requirement is optional. If you wish to write a thesis, you must take 470.850 Research and Thesis I, 470.852 Research and Thesis II, and 470.800 Research and Thesis III. These three classes would count toward the eight government electives you must take to complete the MA/MBA. MA/MBA students who successfully complete and defend their theses will be awarded honors at graduation.

For details on these concentrations and a full list of classes and descriptions, see the AAP course catalog or website: advanced.jhu.edu.

**MBA Courses**

All dual-degree students are required to complete the following MBA courses (all courses are two credits):
- 120.601 Business Communication
- 121.610 Negotiation
- 131.601 Leadership Ethics Seminar
- 132.601 Business Law
- 142.620 Leadership in Organizations
- 142.730 Strategic Human Capital
- 210.620 Accounting and Financial Reporting
- 220.610 The Firm and the Macroeconomy
- 220.620 Economics for Decision Making
- 231.620 Corporate Finance
- 232.701 Investments
- 310.620 Information Systems
- 410.620 Marketing Management
- 510.601 Statistical Analysis
- 520.601 Decision Models
- 680.620 Operations Management
- Five Carey electives

For more information, please contact Carey Business School Admissions at carey.admissions@jhu.edu.

For MA in Government course descriptions, see page 154.
MA IN GOVERNMENT /CERTIFICATE IN INTELLIGENCE

Students pursuing an MA in Government may obtain an additional credential by completing a sequence of courses offered by the Post-Baccalaureate Certificate in Intelligence. This combined credential will require students to complete 15 courses (in lieu of 17 to complete both degrees separately). Students are required to take the following courses:

MA in Government Requirements:
- 470.602 Government and Politics
- 470.850 Research and Thesis I
- 470.852 Research and Thesis II
- 470.800 Research and Thesis III
- Six electives of your choice

Five Intelligence Certificate Requirements:
Completion of five courses, one each from the following areas (See Certificate in Intelligence for specific course options.)
> Introductory Courses
> Law and Ethics
> Theory, History, and Context
> Intelligence Operations
> Applications of Intelligence
Master of Arts in Global Security Studies

globalsecurity.jhu.edu

COURSE REQUIREMENTS

> Four core courses
> Five elective courses
> Three thesis courses

CURRICULUM

The curriculum of the JHU Master of Arts in Global Security Studies is designed for working adult students who are looking to develop or expand their expertise in the challenges of security in the 21st century. It challenges students to confront the complexities of the 21st-century security environment with the latest policy and theoretical tools for analysis and action. Particular strengths of the program are in intelligence; terrorism, insurgency, and other forms of “small wars” and armed social movements; energy and environmental security; and the emerging cyber domain and its implications for warfighting, security, privacy, and the economy.

Courses draw from the best in academia and policymaking in order to offer students the cutting edge in intellectual preparedness for meeting the multifaceted challenges of attaining security in an age of complex economic interdependence, global energy and environmental challenges, and multifaceted military vulnerability.

Classes are designed to maximize individual attention, encourage student contribution, build analytical skills, and provide the tools for engaging in original research.

Sequence of Study

Students will take 470.603 Introduction to Global Security Studies in their first semester. This course will expose students to the basic concepts that are important to the field of global security studies and allow them to apply these tools to selected security issues such as terrorism, climate change, and the causes of war. In the other core classes, which should be taken early on, students use these intellectual tools as they explore the three pillars of the degree: strategic studies, energy and environmental security, and economic security. After taking Introduction to Global Security Studies, it is generally good practice to front-load the other core classes. However, the other core and elective courses may be taken in any order.

In their second or third semester, students should take 470.851 Introduction to Qualitative Methods, the first step in the research study process. After that, students should take either 470.854 Fundamentals of Quantitative Methods or Historical Methods (course number TBD). With this sound basis in methodology, students will be prepared to write a journal article-length study in their final semester when they take Research Study Seminar (course number TBD).

Students may pursue an area of concentration in one of the fields listed below. An area of concentration requires that at least four of the elective courses be from the list approved for that concentration. All concentration courses also count as general electives for students not pursuing an area of concentration.

Research Study Process

This program does not require a thesis. However, it does require the completion of a rigorous research study of journal article length. The research study should make use of the qualitative and quantitative research methods that students will have learned in 470.851 Introduction to Qualitative Methods, and 470.603 Fundamentals of Quantitative Methods or Historical Methods (course number TBD). Students will write and defend this work in their final semester in the program. Students must successfully defend their research study in order to graduate.

CORE COURSES

Students must complete four core courses.

> 470.603 Introduction to Global Security Studies — This class should be taken in your first semester.
> 470.605 Global Political Economy
> 470.642 Military Strategy and National Policy
RESEARCH STUDY COURSES

Students must complete a three course research study sequence.

> 470.851 Introduction to Qualitative Methods in Social Science - This course should be taken in the second or third semester.

> 470.854 Fundamentals of Quantitative Methods; OR 470.709 Quantitative Methods (with permission from the instructor); OR Historical Methods (Course number TBD)

> Research Study Seminar (Course number TBD) - This class must be taken as the final semester of study. Prerequisite: Students must have passed 470.851. Introduction to Qualitative Methods in Social Science as well as 470.603 Fundamentals Qualitative Methods or Historical Methods.

SAMPLE ELECTIVE COURSES FOR AREAS OF CONCENTRATION

Students may pursue an area of concentration in one of the fields listed below. A complete list of concentration courses is available on our website. A selected list of electives pursuant to the concentrations is below. Please consult with your adviser if in doubt about the applicability of a course to a particular concentration.

**Strategic Studies Concentration**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>406.661</td>
<td>Technology and Terrorism</td>
</tr>
<tr>
<td>406.681</td>
<td>Technology of Weapons of Mass Destruction (3 credits)</td>
</tr>
<tr>
<td>406.683</td>
<td>Weapons of War: The Technology and Uses of Weapons (3 credits)</td>
</tr>
<tr>
<td>470.611</td>
<td>Introduction to Terrorism Studies (3 credits)</td>
</tr>
<tr>
<td>470.640</td>
<td>Challenges of Transnational Security (3 credits)</td>
</tr>
<tr>
<td>470.622</td>
<td>Defense Policy (3 credits)</td>
</tr>
<tr>
<td>470.659</td>
<td>Radicalization and Deradicalization in Terror Networks (3 credits)</td>
</tr>
<tr>
<td>470.663</td>
<td>Chinese Security: Strategy of a Rising Power (3 credits)</td>
</tr>
<tr>
<td>470.664</td>
<td>Tracking World Crisis: A Net Assessment Approach (3 credits)</td>
</tr>
<tr>
<td>470.665</td>
<td>Warfare by Other Means: Espionage and Covert Action in Foreign Policy (3 credits)</td>
</tr>
<tr>
<td>470.668</td>
<td>Politics and Process in American Foreign Policy (3 credits)</td>
</tr>
<tr>
<td>470.676</td>
<td>From al-Qaeda to Islamic State: Understanding the Roots of the Global Jihad Movement (3 credits)</td>
</tr>
<tr>
<td>470.679</td>
<td>Armed Social Movements: Terrorism Insurgency and Crime (3 credits)</td>
</tr>
<tr>
<td>470.685</td>
<td>The Challenge of Change: Innovation in Military Affairs (3 credits)</td>
</tr>
<tr>
<td>470.693</td>
<td>Comparative Democracies (3 credits)</td>
</tr>
<tr>
<td>470.697</td>
<td>Intelligence and Counterterrorism (3 credits)</td>
</tr>
<tr>
<td>470.704</td>
<td>Strategies in Insurgent and Asymmetric Warfare (3 credits)</td>
</tr>
<tr>
<td>470.711</td>
<td>Intelligence: From Secrets to Policy (3 credits)</td>
</tr>
<tr>
<td>470.713</td>
<td>Resisting Tyranny: Strategic Nonviolent Conflict (3 credits)</td>
</tr>
<tr>
<td>470.722</td>
<td>Intelligence and War (3 credits)</td>
</tr>
<tr>
<td>470.740</td>
<td>Conflict and Security in Cyberspace (3 credits)</td>
</tr>
<tr>
<td>470.746</td>
<td>Iran: Security Policy of a Revolutionary State (3 credits)</td>
</tr>
<tr>
<td>470.751</td>
<td>Politics and Security in the Middle East (3 credits)</td>
</tr>
<tr>
<td>470.760</td>
<td>Comparative Intelligence Systems (3 credits)</td>
</tr>
<tr>
<td>470.766</td>
<td>Economic Growth: Politics of Development in Asia, Africa and Beyond (3 credits)</td>
</tr>
<tr>
<td>470.797</td>
<td>Introduction to Homeland Security Intelligence (3 credits)</td>
</tr>
<tr>
<td>470.785</td>
<td>The American Way of War (3 credits)</td>
</tr>
</tbody>
</table>

**Energy and Environmental Security Concentration**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>420.624</td>
<td>Environmental Policymaking and Policy Analysis (3 credits)</td>
</tr>
<tr>
<td>425.602</td>
<td>Science of Climate Change and its Impact (3 credits)</td>
</tr>
<tr>
<td>420.650</td>
<td>International Environmental Policy (3 credits)</td>
</tr>
<tr>
<td>420.665</td>
<td>Climate Change on the Front Lines: The Study of Adaptation in Developing Countries (3 credits)</td>
</tr>
<tr>
<td>425.601</td>
<td>Principles and Applications of Energy Technology (3 credits)</td>
</tr>
<tr>
<td>425.603</td>
<td>Climate Change Policy Analysis (3 credits)</td>
</tr>
<tr>
<td>430.601</td>
<td>Geographic Information Systems (3 credits)</td>
</tr>
<tr>
<td>430.602</td>
<td>Remote Sensing; Earth Observing Systems and Applications (3 credits)</td>
</tr>
<tr>
<td>470.601</td>
<td>Climate Change and National Security (3 credits)</td>
</tr>
<tr>
<td>470.657</td>
<td>Energy, Security, and Defense (3 credits)</td>
</tr>
<tr>
<td>470.664</td>
<td>Tracking World Crisis: A Net Assessment Approach (3 credits)</td>
</tr>
</tbody>
</table>

**FURTHER ON ELECTIVES**

This is not a comprehensive list of electives, merely rather a sampling. All 470 courses count for the GSS elective requirement. All 406 courses that are offered under the rubric of the Certificate in Science, Technology and International Security also count toward the GSS degree. So, too, do many 420 courses offered by the Environmental Sciences and Policy program, 425 courses offered by the Energy Policy and Climate program, and some 430 courses offered by the Geographic Information Systems program.

Electives should be chosen in consultation with the student's adviser. Students may also take up to two relevant courses offerings in the School of Public Health, the School of Advanced International Studies, and other graduate programs in the Krieger School of Arts and Sciences.
MA IN GLOBAL SECURITY STUDIES / CERTIFICATE IN INTELLIGENCE

Students pursuing a Master of Arts in Global Security Studies may obtain an additional credential by completing a sequence of courses offered by the Post-Baccalaureate Certificate in Intelligence. This combined credential will require students to complete 15 courses (in lieu of 17 to complete both degrees separately). Students are required to take the following courses:

**MA in Global Security Studies Requirements:**

- **470.603** Introduction to Global Security Studies (3 credits)
- **470.605** Global Political Economy (3 credits)
- **470.692** Military Strategy and National Security (3 credits)
- **470.773** Energy and Environmental Security (3 credits) OR
- **470.601** Climate Change and National Security (3 credits) OR
- **470.657** Energy, Security, and Defense (3 credits)
- **470.851** Introduction to Qualitative Methods in Social Science (3 credits) - This course should be taken in the second or third semester.
- **470.854** Fundamentals of Quantitative Methods (3 credits) OR
- **470.709** Quantitative Methods (3 credits)-Must have permission from the instructor. OR
  - Historical Methods (Course number TBD) (3 credits)
- **470.855** Research Study Seminar (3 credits) - This class must be taken as the final semester of study. Prerequisite: Students must have passed 470.851 Introduction to Qualitative Methods in Social Science as well as 470.854 Fundamentals of Quantitative Methods or Historical Methods.

Three electives.

**Five Intelligence Certificate Requirements:**

Completion of five courses, one each from the following areas (See Certificate in Intelligence for specific course options):

- Introductory Courses
- Law and Ethics
- Theory, History, and Context
- Intelligence Operations
- Applications of Intelligence

For course descriptions with prefix 406 please see page 230. For prefix 420, please see page 116. For prefix 425, please see page 105. For prefix 430, please see page 132. For prefix 470, please see page 154. Please note that not all courses are available each semester.

For information on exact dates, times, locations, fees, and instructors for any particular term, students should consult the Advanced Academic Programs course schedule (advanced.jhu.edu) available a few months before each semester begins. Courses are held at the Johns Hopkins University Washington, DC Center at 1717 Massachusetts Ave. close to Dupont Circle and also online.
Master of Arts in Public Management

COURSE REQUIREMENTS

- Five core courses, including capstone
- Seven elective courses
- Capstone Course

For more information about core and elective courses, please visit publicmanagement.jhu.edu. Please note that not all courses are available each semester.

Students can locate further information on exact dates, times, locations, fees, and instructors for any term by accessing the Advanced Academic Programs course schedule at advanced.jhu.edu. Each schedule is available for several months before the semester or term begins. Classes are held at the Johns Hopkins University Washington, D.C. Center at 1717 Massachusetts Ave. NW, close to Dupont Circle or online. The degree can now be completed on-campus or online (not all courses are offered online).

Students can also choose to complete the degree with a mix of on-campus and online courses. Please see the website for a comprehensive list of approved elective courses.

CURRICULUM

The MA in Public Management program (MPM) equips students with the strategic skills needed to meet today’s challenges in the public sector. This is accomplished by a rigorous and demanding curriculum taught by leading academics and practitioners in the fields of public policy and administration.

This innovative degree recognizes the interdependence of governmental and nonprofit sectors and their common ground in mission-driven performance. Students will gain an appreciation for these issues through their core courses and their electives. Twelve courses, including a capstone project, are necessary to complete the degree.

The degree program encompasses both the analytical and administrative side of public policy and management. The MA in Public Management educates students in several key disciplines: financial management, policy analysis, tax and budget policy, quantitative methods, and public administration. Students learn to apply the latest theory, scientific findings, and new management methods to help solve real-world governance and policy issues.

The curriculum is designed for working professionals in government, the public policy sector (including think tanks and advocacy organizations), and nonprofits. Courses may be taken at a full or part time pace. All undergraduate majors are welcome. Students can take any combination of on-campus and online courses, or all on-campus or all online, to complete their degree.

The Public Management program is endorsed by the Maryland Higher Education Commission and is a member of the Network of Schools of Public Policy, Affairs, and Administration (NAS PAA).

Sequence of Study

Students should make every effort to take the core course Public Policy and the Policy Process in their first semester. Students are strongly encouraged to complete the other core course requirements as early in their program of study as possible. The final required course of the program is Capstone for Public Management, which students take in their final semester. Students expecting to graduate at the completion of the summer semester should take capstone during the prior spring semester.

Capstone

The capstone process is an essential component of the MA in Public Management. It is the culmination of graduate work in the program and the final product of the degree. The capstone process is an opportunity for students to examine an in-depth, important policy or management question, with the ultimate end of developing a real solution to a problem. In the semester prior to taking the capstone course and conducting the project, students identify a project topic. The final capstone report will consist of one paper on a topic agreed to by a capstone adviser. Papers are written in the form of a decision memorandum of 35 to 40 pages in length.
CORE COURSES AND CAPSTONE

All students must successfully complete five core courses:
- 470.608 Public Policy Evaluation and the Policy Process (3 credits)
- 470.631 Economics for Public Decision-Making (3 credits)
- 470.854 Fundamentals of Quantitative Methods (3 credits)
- 470.627 Financial Management & Analysis in the Public Sector (3 credits) OR
- 470.695 Proseminar: Essentials of Public and Private Management (3 credits) OR
- 470.728 Fundamentals of Nonprofits and Nonprofit Management (3 credits)

CAPSTONE

470.860 Capstone for Public Management (3 credits)

ELECTIVES

Electives need to be chosen in consultation with the student’s adviser and should accommodate professional and/or personal goals. Students (with the permission of the program director) may take up to two relevant course offerings from other parts of Johns Hopkins University, including the School of Public Health, the School of Advanced International Studies, and other programs in the School of Arts and Sciences.

SAMPLE ELECTIVES

- 470.616 The Law and Public Institutions (3 credits)
- 470.618 Congressional Policymaking (3 credits)
- 470.619 State Politics and Policymaking (3 credits)
- 470.621 Public Policy and Participatory Government (3 credits)
- 470.629 The Politics of Health Care Policy (3 credits)
- 470.630 Government, Banking, and the Financial System (3 credits)
- 470.634 Contemporary Terrorism and the American Response (3 credits)
- 470.635 Presidential Policymaking (3 credits)
- 470.638 Negotiating as a Leadership Skill (3 credits)
- 470.645 The Budgetary Process (3 credits)
- 470.646 Poverty Law and Social Policy in the U.S. (3 credits)
- 470.660 Program Evaluation (3 credits)
- 470.667 The Administrative State: How Washington Regulates (3 credits)
- 470.670 The Practice & Politics of U.S. Tax Policy (3 credits)
- 470.674 Regulations: Law of Federal Agencies (3 credits)
- 470.684 Legislative Language and Policymaking (3 credits)
- 470.688 Political Institutions and the Policy Process (3 credits)
- 470.692 Military Strategy & National Policy (3 credits)
- 470.726 Education Policy and Federalism (3 credits)
- 470.728 Influence and Impact of Nonprofits (3 credits)
- 470.730 Intellectual Property Law (3 credits)
- 470.742 Models of Public Policy Analysis (3 credits)
- 470.744 Trade and Security (3 credits)
- 470.754 Global Climate Change and U.S. Energy Security (3 credits)
- 470.771 Climate Change Economics (3 credits)
- 470.773 Energy and Environmental Security (3 credits)
- 470.774 Nonprofit Governance and Executive Leadership (3 credits)
- 470.778 Federal Contracting Law (3 credits)

MA IN PUBLIC MANAGEMENT / CERTIFICATE IN NONPROFIT MANAGEMENT

Students pursuing an MA in Public Management may obtain an additional credential by completing a sequence of courses offered by the Post-Baccalaureate Certificate in Nonprofit Management. This combined credential recognizes the interdependence of the governmental and nonprofit sectors and their common ground in mission-driven performance. Students who complete it will be prepared to move among the public, private, and nonprofit sectors or work for agencies that span them. This combined credential will require students to complete 16 courses (in lieu of 18 to complete both degrees separately). In addition to five electives from the public management curriculum, students are required to take the following courses:

Six MA in Public Management Requirements:
- 470.608 Public Policy Evaluation and the Policy Process (3 credits)
- 470.631 Economics for Public Decision-Making (3 credits)
- 470.728 Fundamentals of Nonprofits and Nonprofit Management (3 credits)
- 470.798 Financial Management and Analysis in Nonprofits (3 credits)
- 470.854 Fundamentals of Quantitative Methods (3 credits)
- 470.860 Capstone for Public Management (3 credits)

Four Nonprofit Certificate Requirements
(Choose four from the following list of courses):
- 470.623 Nonprofit Program Development and Evaluation (3 credits)
- 470.625 Resource Development and Marketing in Nonprofits (3 credits)
- 470.666 Institutional Fundraising: Raising Maximum Dollars from Government Agencies, Corporations, and Foundations (3 credits)
- 470.682 Mission Meets Profit: An Exploration and Building of a Social Enterprise (3 credits)
- 470.689 Overview of Global Public and Nonprofit Relationship (3 credits)
- 470.774 Nonprofit Governance and Executive Leadership (3 credits)
- 470.789 INGO/NGOs and Civil Society in Conflict Zones (3 credits)
Note: If students want to transfer from the Post-Baccalaureate Certificate in Nonprofit Management to the MA in Public Management, all four nonprofit courses would count toward their master’s.

**MA IN PUBLIC MANAGEMENT / CERTIFICATE IN INTELLIGENCE**

Students pursuing an MA in Public Management may obtain an additional credential by completing a sequence of courses offered by the Post-Baccalaureate Certificate in Intelligence. This combined credential will require students to complete 15 courses (in lieu of 17 to complete both degrees separately). In addition to four electives from the public management curriculum, students are required to take the following courses:

**Six MA in Public Management Requirements:**
- 470.608 Public Policy Evaluation and the Policy Process (3 credits)
- 470.631 Economics for Public Decision-Making (3 credits)
- 470.854 Fundamentals of Quantitative Methods (3 credits)
- 470.627 Financial Management and Analysis in the Public Sector (3 credits) OR
- 470.798 Financial Management and Analysis in Nonprofits (3 credits)
- 470.695 Proseminar: Essentials of Public and Private Management (3 credits) OR
- 470.728 Fundamentals of Nonprofits and Nonprofit Management (3 credits)
- 470.860 Capstone for Public Management (3 credits)

**Five Intelligence Certificate Requirements:**
Completion of five courses, one each from the following areas (See Certificate in Intelligence for specific course options):
- Introductory Courses
- Law and Ethics
- Theory, History, and Context
- Intelligence Operations
- Applications of Intelligence

**Six MA in Public Management Core Courses:**
- 470.608 Public Policy Evaluation and the Policy Process (3 credits)
- 470.631 Economics for Public Decision-Making (3 credits)
- 470.854 Fundamentals of Quantitative Methods (3 credits)
- 470.627 Financial Management and Analysis in the Public Sector (3 credits) OR
- 470.798 Financial Management and Analysis in Nonprofits (3 credits)
- 470.695 Proseminar: Essentials of Public and Private Management (3 credits) OR
- 470.728 Fundamentals of Nonprofits and Nonprofit Management (3 credits)
- 470.860 Capstone for Public Management (3 credits)

**Two Certificate in Government Analytics Core Courses:**
- 470.681 Political Analysis and Statistics (3 credits)
- 470.709 Quantitative Methods (3 credits)

For course descriptions, see page 154.

**MA IN PUBLIC MANAGEMENT / CERTIFICATE IN GOVERNMENT ANALYTICS**

Students pursuing a MA in Public Management may obtain an additional credential by completing a sequence of courses offered by the Post-Baccalaureate Certificate in Government Analytics. This combined credential will require students to complete 15 courses (in lieu of 17 to complete both degrees separately). In addition to four electives from the public management curriculum and three electives from the government analytics curriculum, students are required to take the following courses:
Master of Science in Government Analytics
advanced.jhu.edu/govanalytics

DEGREE REQUIREMENTS
Students complete 12 courses to earn their degree.

> Five core courses (includes capstone project)
> Seven elective courses

For more information about core and elective courses, please see the course descriptions on page 154. Please note that not all courses are available each term.

Students can locate further information on exact dates, times, locations, fees, and instructors for any term by accessing the Advanced Academic Programs course schedule at advanced.jhu.edu. Each schedule is available for several months before the semester or term begins. Courses are primarily offered online, though a few on-site courses are offered each term. On-site courses are held at the Johns Hopkins University Washington, DC Center at 1717 Massachusetts Ave. NW, close to Dupont Circle.

CURRICULUM
The Johns Hopkins MS in Government Analytics prepares students to undertake sophisticated quantitative analyses to address political, policy, and governance challenges. No prior coursework in quantitative methods is necessary.

Students will develop broadly applicable, foundational skills in quantitative methods as well as expertise in statistical analysis, geospatial analysis, political behavior, and policy analysis or public management. Twelve courses, including a capstone project, are required to complete the degree.

The schedule for completing the degree is flexible. The degree can be completed fully online, and most courses are offered only online. All online courses are offered asynchronously, meaning students do not need to log in at a required time to take the course. Coursework is completed through weekly lesson modules that students log into at times that are convenient and within the course schedule. A few courses are offered on-site each term at our Washington, DC Center, which is located near Dupont Circle. Classes are held on weekday evenings. Students are welcome to take a combination of on-site courses and online courses if they wish.

Sequence of Study
Most students who work full-time take two courses per term. It is recommended that students begin the program by taking 470.681 Statistics and Political Analysis along with one elective followed by 470.709 Quantitative Methods with one elective.

Students should then work through the additional core and elective requirements. The final required course, the Capstone Seminar (470.862), should be completed during the student’s final term.

Concentrations
There are four concentrations offered through the MS in Government Analytics. The concentration in Statistical Analysis focuses on the use of statistics to make government-related decisions. The concentration in Geospatial Analysis focuses on the applied use of spatially-distributed data. The concentration in Political Behavior and Policy Analysis prepares students to evaluate campaigns, elections, political institutions, and government programs using quantitative methods. Finally, the concentration in Public Management provides students with the tools and skills needed to solve management issues related to policy, finance, and administration. Pursuing a concentration is optional. To earn a concentration, four of the student’s electives must be in the concentration area.

Capstone
In the Capstone Seminar (470.862), students will develop and execute an original data analysis project. The purpose of this project is to address a political, policy, or governance challenge through a thoughtful and rigorous data analysis. Students will present the results of their analysis in writing and offer actionable recommendations.

CORE COURSES
Students must take five core courses (including the Capstone Seminar):
1. 470.681 Statistics and Political Analysis (3 credits)
2. 470.709 Quantitative Methods (3 credits)
3. 470.710 Advanced Quantitative Methods (3 credits)
4. One of the following:
  430.615 Big Data Analytics: Tools and Techniques (4 credits)
  470.660 Program Evaluation (3 credits)
  470.673 Data Visualization (3 credits)
  470.694 Big Data Management System (3 credits)
  470.699 Applied Performance Analytics (3 credits)
  470.738 Time Series Models and Forecasting (3 credits)

5. 470.862 Capstone Seminar: Development and Execution of a Data Analysis Project (3 credits)

ELECTIVES

With approval of the program director, students may also choose electives from selected degree programs within Advanced Academic Programs, including Government, Global Security Studies, Applied Economics, Communication and Energy Policy and Climate.

Sample Electives
  430.601 Geographic Information Systems (4 credits)
  430.617 Demographics Modeling with GIS (4 credits)
  470.631 Economics for Public Decision Making (3 credits)
  470.643 Text as Data (3 credits)
  470.667 Machine Learning and Neural Networks (3 credits)
  470.708 Unleashing Open Data with Python (3 credits)
  470.731 Privacy in a Data-driven Society (3 credits)
  470.743 Data Mining and Predictive Analytics (3 credits)
  470.758 Data-Driven Campaigns and Elections (3 credits)
  470.764 Survey Methodology (3 credits)
  470.769 Data Science for Public Policy (3 credits)

For course descriptions with a 430 prefix, see page 132. For course descriptions with a 470 prefix, see page 154.

MS IN GOVERNMENT ANALYTICS / CERTIFICATE IN INTELLIGENCE

Students pursuing an MS in Government Analytics may obtain an additional credential by completing a sequence of courses offered by the Post-Baccalaureate Certificate in Intelligence. This combined credential will require students to complete 15 courses (in lieu of 17 to complete both degrees separately). Students are required to take the following courses:

Five Intelligence Certificate Requirements:
Completion of five courses, one each from the following areas (See Certificate in Intelligence for specific course options).
> Introductory Courses
> Law and Ethics
> Theory, History, and Context
> Intelligence Operations
> Applications of Intelligence
Certificate in Government Analytics
advanced.jhu.edu/govanalytics/cert

COURSE REQUIREMENTS

Two core courses:
- 470.681 Statistics and Political Analysis
- 470.709 Quantitative Methods

Three elective courses in one or more of the following specialty areas:
> Statistical analysis
> Geospatial analysis
> Political behavior and policy analysis
> Public management

Students will work with the program director to determine which electives are appropriate for the student's selected specialty area(s). For more information about core and elective courses, please see the course descriptions on page 154. Please note that not all courses are available each term.

Students can locate further information on exact dates, times, locations, fees, and instructors for any term by accessing the Advanced Academic Programs course schedule at advanced.jhu.edu. Each schedule is available for several months before the semester or term begins. Courses are primarily offered online, though a few on-site courses are offered each term. All on-site courses are held at the Johns Hopkins University Washington, DC Center at 1717 Massachusetts Ave. NW, close to Dupont Circle.

CURRICULUM

The Johns Hopkins Certificate in Government Analytics provides students with the knowledge and skill set needed to perform sophisticated analyses, draw substantive conclusions, and communicate results for the purpose of improving the function of government. No prior coursework in quantitative methods is necessary. Students will develop foundational skills and expertise in a specialty area of analysis. Five courses are required to complete the program.

The schedule for completing the program is flexible. The program can be completed fully online, and most courses are offered only online. All online courses are offered asynchronously, meaning students do not need to log in at a required time to take the course. Coursework is completed through weekly lesson modules that students log into at times that are convenient and within the course schedule. A few courses are offered on-site each term at our Washington, DC Center, which is located near Dupont Circle. Classes are held on weekday evenings. Students are welcome to take a combination of on-site courses and online courses if they wish.

Sequence of Study

Most students who work full-time take two courses per term. It is recommended that students begin the program by taking 470.681 Statistics and Political Analysis along with one elective. In the following term, it is recommended that students take 470.709 Quantitative Methods along with one elective. Students can then complete the last elective in their final term of the program.

PROGRAM ADVISING

Jennifer Bachner, Ph.D.
Director
jbachner@jhu.edu
202.663.5831

..
Certificate in Intelligence
advanced.jhu.edu/intelligence

The Johns Hopkins Post-Baccalaureate Certificate in Intelligence is designed for students who are interested in intelligence, whether as national security professionals or as citizens and taxpayers. It is especially useful for people seeking a job in the Intelligence Community or who are already in it and wish to position themselves for advancement.

The certificate can stand on its own as a credential, or students can pair it with the MA in Global Security Studies, MA in Government, MS in Government Analytics, or MA in Public Management for a combined credential. (See the sections for those master's degrees for further details.) Students availing themselves of one of these options can count two of their intelligence studies courses toward their Master's degree elective requirements.

ADMISSION REQUIREMENTS

- AAP application and fee
- Official undergraduate transcript indicating a minimum grade-point average of 3.0 on a 4.0 scale
- Official graduate transcripts, if any
- A current résumé
- Two letters of recommendation
- A statement of purpose outlining why you wish to study at JHU and how studying at JHU will help you realize your ambitions

COURSE REQUIREMENTS

Students must pass one course from each of five categories:

Introduction
470.620 Introduction to Intelligence in the Five Eyes Community (3 credits)
470.711 Intelligence: From Secrets to Policy (3 credits)
470.748 The Art and Practice of Intelligence (3 credits)

History/Theory/Context
470.620 Introduction to Intelligence in the Five Eyes Community (If not used to satisfy "Introduction" requirement. (3 credits)
406.667 Social Science, National Security, and Intelligence (3 credits)
470.680 The Rise and Fall of Intelligence (3 credits)
470.760 Comparative Intelligence Systems (3 credits)

Law and Ethics
470.650 Legal Issues in Intelligence and National Security (3 credits)
470.696 Ethics and Privacy in Intelligence Operations (3 credits)
470.731 Privacy in a Data-Driven Society (3 credits)
470.795 The Constitution and National Security (3 credits)

Operations
430.601 Geographic Information Systems (4 credits)
430.602 Remote Sensing: Earth Observing Systems and Applications (4 credits)
470.607 Counterintelligence and National Security: 21st Century Challenges (3 credits)
470.665 Warfare by Other Means: Espionage and Covert Action in Foreign Policy (3 credits)
470.719 Technical Collection of Intelligence (3 credits)
70.740 Cyber Policy, Strategy, Conflict and Deterrence (3 credits)
470.752 Intelligence Analysis (3 credits)

Applications
470.668 The Politics and Process of American Foreign Policy (3 credits)
470.697 Intelligence and Counter-Terrorism (3 credits)
470.722 Intelligence and War (3 credits)
470.797 Introduction to Homeland Security Intelligence (3 credits)

COURSE DESCRIPTIONS

Course descriptions for intelligence studies courses are in other sections of this catalog. Please refer to the appropriate section.

- Courses with a 406 prefix are national security studies courses; see page 230.
- Courses with a 430 prefix are geographic information systems courses; see page 132.
- Courses with a 470 prefix are global security studies courses; see page 154.

Please refer to the Advanced Academic Programs Course schedule (advanced.jhu.edu) for exact dates, times, locations, fees, and instructors.

PROGRAM ADVISING

Mark Stout
mstout4@jhu.edu
202.663.5978
Certificate in Nonprofit Management
nonprofit.jhu.edu

The fully online Certificate in Nonprofit Management recognizes the substantial role nonprofits play in the formulation and delivery of public services, and as vehicles for citizen influence and expression. The course work focuses on building the specific analytical and management skills needed by those assuming leadership roles as executive staff or board members in a variety of nonprofit fields. All the courses feature a global perspective for relevance in today's world of interconnected economies and communication.

For students already working in nonprofit subspecialties, such as arts and culture, health, environmental conservation, or international development, the courses will show how their fields fit into the larger nonprofit sector and how the larger forces affect their own leadership and management challenges. The courses are also relevant for students pursuing careers in government agencies that require extensive interaction with nonprofits in the U.S. or other countries.

For students in other countries, the courses offer a greater understanding of the role and potential of nongovernmental organizations, and convey the best practices emerging from the American experience and from other countries with an advanced or growing nongovernmental sector.

Students are able to take courses at a full- or part-time pace. The curriculum is designed for working professionals in the government and nonprofit sectors who are looking to expand their expertise in nonprofit management with the latest skills and approaches taught by faculty members at the forefront of their field.

COURSE REQUIREMENTS

Six online courses are necessary to complete the certificate. It is strongly recommended that students take 470.728 Fundamentals of Nonprofits and Nonprofit Management and 470.798 Financial Management and Analysis in Nonprofits before enrolling in the four remaining courses. These two courses are offered every semester. Students may complete the certificate on its own or in addition to designated combined degree programs at Johns Hopkins University.

Students may select six of the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>470.623</td>
<td>Nonprofit Program Development and Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>470.625</td>
<td>Resource Development and Marketing in Nonprofits</td>
<td>3</td>
</tr>
<tr>
<td>470.666</td>
<td>Institutional Fundraising: Raising Maximum Dollars from Government Agencies, Corporations, and Foundations</td>
<td>3</td>
</tr>
<tr>
<td>470.682</td>
<td>Mission Meets Profit: An Exploration and Building of a Social Enterprise</td>
<td>3</td>
</tr>
<tr>
<td>470.689</td>
<td>NGOs in Development and Global Policy-Making (formerly Overview of Global Public and Nonprofit Relationship)</td>
<td>3</td>
</tr>
<tr>
<td>470.728</td>
<td>Fundamentals of Nonprofits and Nonprofit Management (formerly Influence and Impact of Nonprofits)</td>
<td>3</td>
</tr>
<tr>
<td>470.736</td>
<td>Principles of Nonprofit Management</td>
<td>3</td>
</tr>
<tr>
<td>470.774</td>
<td>Nonprofit Governance &amp; Executive Leadership</td>
<td>3</td>
</tr>
<tr>
<td>470.789</td>
<td>INGO/NGOs and Civil Society in Conflict Zones</td>
<td>3</td>
</tr>
<tr>
<td>470.798</td>
<td>Financial Management and Analysis in Nonprofits</td>
<td>3</td>
</tr>
</tbody>
</table>

Certificate In Nonprofit Management/ Masters Dual Degree

Students pursuing a Certificate in Nonprofit Management who are interested in furthering their education may enroll in the combined degree program offered with MA programs in Public Management, Museum Studies, or Communication. This enables students to earn both the MA degree and a graduate certificate. Those interested have the option to apply to the combined MA through Advanced Academic Programs. Current students can submit a Change of Program request. Please see page 13 for more information on that process.

For more information on specific dual degree programs, please see below:
Public Management p. 146
Museum Studies p. 212
Communication p. 78
ONLINE LEARNING

All online classes are offered as asynchronous learning experiences, allowing maximum flexibility in a student’s schedule. Course content is delivered mainly via text notes, voice-over PowerPoints, streaming video, and threaded discussions to provide a connection between students and faculty. Classes are kept small (15 students on average) to encourage active community building among fellow students and students and faculty. Pre-arranged real-time online meetings allow for direct access to faculty members.

An orientation course introduces the students to the online learning tools and is required before taking the first online class.

For course descriptions, see page 154.
Governmental Studies Course Descriptions
Government, Global Security Studies, Public Management, Government Analytics, Intelligence, and Nonprofit Management

470.011 Graduate Writing Workshop (Non-credit)
This intensive writing course offers students a foundation in essay composition and provides an in-depth review of sentence structure, grammar, and punctuation. Designed for those students who need to improve their writing skills, the curriculum in Graduate Writing Techniques examines the various techniques writers use to compose their sentences, to establish syntactic relationships within paragraphs, to draft thesis and transitional sentences, and to relate syntactic structure to ideas.

470.020 Directed Research (Non-credit)
Required for those who have completed all of their course work, including the Research and Thesis class, but are still working on their thesis. Details of this offering will be posted soon.

470.302 Introduction to Graduate Work in Government (Non-credit)
This course is an introduction to graduate work and will not count toward your degree, but it is designed to help students maximize their performance and excel in graduate studies. The course will combine classwork with one-on-one advising and tutoring. The course will cover such topics as research, writing, citation, argument, using evidence, study habits, and managing a graduate-level workload. Teacher and student will meet at the beginning of the semester to assess areas of greatest need and tailor the course to meet them.

470.601 Climate Change and National Security (3 credits)
This course provides an in-depth examination of how the effects of climate change could impact national security, international relations, and global stability. Students will begin by examining and discussing the current body of academic literature. As the semester progresses, students will learn and practice how to use cross-disciplinary resources and tools to envision potential relationships between climate change effects and security outcomes.

470.602 Government & Politics (3 credits)
This course is an introduction to government and politics through the study of the government of the United States. All governments combine coercion and legitimacy. In a stable and legitimate system of government, coercion is hardly noticed. Government comes to be seen as a source of benefits. The purpose of the course is to look behind institutions, practices, and benefits to appreciate how, for what, and for whom we are governed. We shall examine some of the major institutions of American government, some of America’s political processes, and some of the key forces competing for power in the U.S. to see how decisions in the areas of economic, social, and foreign policy are reached. (This is a core course of the Government program but is open to all students.)

470.603 Introduction to Global Security Studies (3 credits)
This course introduces students to the basic concepts of global security studies, including theories of international relations, perception and misperception, theories of foreign policy, the varying concepts of security, and the elements of national power. It also includes a brief introduction to social movement theory. It applies these conceptual tools to selected security issues such as terrorism, climate change, and the causes of war. (Core course for MA in Global Security Studies.)

470.604 Social Media and The Presidency (3 credits)
This course will investigate the impact that digital technology has had on the institution of the American presidency. The adoption of the internet in the 21st century, both as a tool and as an information distribution mechanism, has had an astonishing impact on the Office of the Presidency. This course is designed to have students operationalize theoretical concepts and apply them to real world situations. Students will engage with scholarly research, analytical arguments, and real-time case studies on the effective use of social media in all aspects of the presidency: campaigning, public debate, electoral processes, and democracy more broadly. In that spirit, we will examine how the first president of the social media age, Taught by a member of the first White House Office of Digital Strategy, the primary objective of this course is to provide students will the tools and skills to be informed consumers of political social media, as well as to equip them to participate in the political digital conversation.

470.605 Global Political Economy (3 credits)
In the wake of the financial crisis, bank bailouts, and stimulus plans, the relationship between American economic power and national security is especially salient. In this course, students investigate core topics in international political economy, analyzing the security implications of each. Topics include trade relations, international finance, monetary relations, poverty, and development. (Core course for the MA in Global Security Studies. Recommended elective for MA in Public Management)

470.606 American National Security (3 credits)
American National Security in the 21st century encourages students to assess U.S. power and the factors that affect our ability to exercise power in the 21st century. The class provides a systematic overview of the complex global environment in which America pursues its interests, encompassing topics such as terrorism, weapons of mass destruction, conventional state-based threats, economic stability, civil war, and more. (Core course for the MA in Global Security Studies.)
470.607 Counternelligence and National Security: 21st Century Challenges (3 credits)
Counternelligence information regarding and operations against foreign intelligence services has always been central to the intelligence process. In many places and at various times, it has been clearly the most significant part of that process. For reasons that will be discussed during the semester, this has not been true in American intelligence for the last half century or so. This class will examine the doctrine and processes of counternelligence through the 20th century, with the second half of the class pivoting to address the challenges posed by a volatile information and communications environment, a geopolitical environment in which non-states operate as both potential threats and potential partners, and in which insider threats may be as great as those emanating from foreign actors. Finally, the course will address the challenges of operating effective counternelligence operations in a manner that respects democratic processes and values.

470.608 Public Policy Evaluation & the Policy Process (3 credits)
This course is designed to introduce students to the public policymaking process, to the basics of policy analysis, and to the substance of some of today’s major policy debates. The first half of the course focuses on establishing a framework in which to analyze public policy formulation within the United States. The class also reviews the tools for developing and implementing policy. The second half of the course turns to policy analysis of some critical contemporary issues. Building on earlier readings, we will study current debates in economic/tax policy, education, health care, social security, and national security. (Core requirement for the MA in Public Management. Elective option for Government Analytics students)

470.609 Leadership Skills in the 21st Century (3 credits)
This course will assist leaders in identifying their personal approach to leadership; provide tips on motivating staff members by building trusting relationships and shoring up their credibility; suggest influence and persuasion strategies that leaders need to employ when working with bosses, colleagues, direct reports, and critical stakeholders, including funding agencies; develop strategies to build effective work teams; and consider approaches to monitor organizational performance in an ongoing fashion. (Recommended for students in MA in Government and MA in Public Management programs.)

470.610 American Political Thought (3 credits)
This course focuses on the development of these principles of equality and liberty, beginning with the founding period and ending with the “rebirth of freedom” at the close of the Civil War. In other words, we will examine the many crises along the way toward the realization of America’s principles, from the early debates over federalism and slavery, to the crisis of nullification, to the Civil War. Other themes will also be examined, including the development of American character and democratic culture. We will study these themes through an examination of primary source materials.

470.611 Introduction to Terrorism Studies (3 credits)
This course provide an overview of the principal areas important to the study of terrorism. The course offers a variety of academic, policy, and operational models, theories, approaches, and concepts regarding the definitions of terrorism, the nature and functioning of various terrorist groups across the globe, and a variety of domestic and international governmental operational and policy responses. Through this exploration, students will be able to identify patterns of behavior of both terrorist groups and governmental responses, and will also be able to identify gaps, and principal areas of improvements in how we understand, and respond to this important security challenge.

470.612 Bureaucratic Politics (3 credits)
This seminar will examine the political support for bureaucracy, how bureaucracy functions in contemporary government and society, and selected current controversies over the purpose and reach of bureaucracy. How does bureaucracy enhance or frustrate liberal democratic ideals? We will take up case studies involving current political issues, such as civil rights enforcement, the war on terror, the role of regulatory agencies, judicial policymaking, relevant student experiences, and the instructor’s own experience in various federal and state agencies.

470.613 Managing Risk and Performance: Improving Decision-Making in Government Agencies (3 credits)
The United States has experienced the most significant failure of its financial system since the Great Depression. Differences in governance and management between the survivors and the others are instructive not only for financial firms but for government agencies and private companies in other sectors of the economy. This course seeks to present learnings that are potentially relevant to government managers and organizations. The basic lesson, of course, is that low-probability events with devastating consequences do happen. Nicolas Nassim Taleb (2007) calls such events “black swans.” He argues that they take place much more frequently than people expect. Managers must take the possibility of black swans into account even when times are good; that’s one factor that distinguishes the survivors from the rest. The federal government and private sector have learned this from Katrina; the massive 2010 Gulf oil spill; homeland security events, such as Sept. 11; and the Great Recession that emerged from the financial crisis. All of these occurred within a single decade. Students will be expected to produce a research paper on an approved topic relating to (1) a cross-cutting theme of governance and risk management at one or more private companies, (2) government regulation and supervision of risk management at one or more private companies, or (3) a cross-cutting theme of governance and risk management at government agencies. Students will be encouraged to make the course an interactive one and to share their personal knowledge of successes and failures of governance and risk management. The syllabus can be accessed from the Governmental Studies course descriptions Web page.
470.614 American Liberal Political Thought (3 credits)
This course examines the development of American liberalism, beginning with its intellectual foundation in 17th century Europe and ending with contemporary American liberal thought. Readings are from John Locke, Jean Jacques Rousseau, Thomas Paine, Thomas Jefferson, John Stuart Mill, Woodrow Wilson, John Dewey, Franklin D. Roosevelt, Martin Luther King Jr., John Rawls, Betty Friedan, Ronald Dworkin, and others. Students consider what it means to be a “liberal” today.

470.615 Speechwriting: Theory and Practice (3 credits)
The theory and practice of speechwriting are the focus of our study of the great political speeches of all time and especially those of the American political tradition. We will examine the content, structure, and purpose of high rhetoric ranging from Pericles to Solzhenitsyn, from Abraham Lincoln, Frederick Douglass, and Franklin D. Roosevelt to contemporary politicians. Based on their knowledge of the best models, students will draft and deliver their own speeches.

470.616 The Law and Public Institutions (3 credits)
Since laws determine the missions of federal departments and agencies and their ability to carry out these missions, it is crucial that students of American government have a solid understanding of these laws. Focusing on specific institutions and cases, students become familiar with major laws, regulations, procedures, judicial decisions, and their practical consequences for the operation of the federal government. Students also investigate the relationship of government to the private sector.

470.617 The Courts and Public Policy (3 credits)
Americans traditionally have viewed the courts as—in the words of a constitutional scholar—the least dangerous branch of government. They are seen as reflectors, not agents, of change. But in an age of government downsizing, the role of the courts bears renewed examination. Students explore the historical and philosophical roots for the notion that American courts, and whether the lawyers who appear before them, can and should make law and policy, and the alternatives to this function. Students consider prominent areas of public policy that have been shaped by the courts, such as civil rights, family and domestic law, environmental and safety regulation, and the regulation of business and commerce. This course counts toward the Legal Studies concentration.

470.618 Congress Policymaking (3 credits)
This course deals with the origins of legislation and how bills are processed through subcommittee, committee, and floor activities. Students are introduced to the many variables that influence the progress of a given bill. Students discuss House and Senate leadership and the ways in which congressional leaders contribute to overall policy outcomes.

470.620 Introduction to Intelligence in the Five Eyes Community (3 credits)
This course provides students with an overview of intelligence structures within the Five Eyes community (US, UK, Canada, Australia, New Zealand). It covers both foreign and domestic agencies, be they civilian, military or police; HUMINT or SIGINT-enabled; security-intelligence or foreign-intelligence oriented; and tactically or strategically-focused. The course will compare how the various Five Eyes security or intelligence services set priorities and objectives, define national interests (versus shared requirements), develop tactical intelligence, create actionable insights, and how they craft timely and relevant assessments for both domestic and foreign partners. Students are expected to be able to draw conclusions on the value of different types of intelligence, from tactical operations intended to mitigate threat to life cases, to strategic insights relating to proliferation or espionage cases. Upon completing the course, students will understand the dynamics that exist amongst operators and analysts, as well as partners within and outside of the alliance, between domestic intelligence clients and foreign agencies, in regards to sensitive national interests and those of the international partnership.

470.621 Implementing Democracy: Public Action, Policy Tools, and Outcomes (3 credits)
(Formerly Public Policy and Participatory Government) This course will focus on the connection between democracy and public action and its impact on policymaking. The drive for more openness and transparency in government continues and is part of a set of relatively new policy tools primarily used as alternatives to regulation. Evaluating the choice and effectiveness of these policy instruments and others, such as disclosure, will allow students to identify and examine the criteria of “good governance.” The role of the public in the policymaking process and the new kinds of participation possible in the technological age are examined as well. Case studies of policy areas, such as health care, food safety, and environmental protection, help to assess what more public involvement means for the policy process.

470.622 Money and Politics (3 credits)
This course considers the historical and contemporary relationships between money and government. In what ways do moneyed interests have distinctive influences on American politics? Does this threaten the vibrancy of our representative democracy? Are recent controversies over campaign finance reform and lobbying reform signs that American government is in trouble? This course is reading-, writing-, and discussion-intensive, and we consider the large academic literature on this subject, as well as the reflections of journalists and political practitioners. Election law and regulations on money in politics are always changing, and so part of the course is designed to give students tools to track these developments. The overall goal of the course is to foster an understanding of the money/politics relationship in ways that facilitate the evaluation of American democracy.

470.623 Nonprofit Program Development and Evaluation (3 credits)
(Formerly Program Development & Evaluation in Nonprofits.) A major goal of this course is to help students become more proficient in recognizing, evaluating, and encouraging the kinds of benefits or outcomes intended by our society’s variety of nonprofit and public programs. We will examine what needs and opportunities are addressed by four major types of programs: those serving individuals, those serving communities, those serving networks or systems, and those serving other organizations. Evaluating each requires different
lenses and different tools; we will explore the role of culture and context in choosing particular approaches to evaluation. A view of programs as interconnected rather than isolated will be encouraged. A second goal is to help students become more proficient in managing an evaluation process: We will explore purposes and uses of evaluation, the essential elements of an evaluation inquiry, and ways to communicate and use evaluation results. We will explore the variety of quantitative and qualitative strategies useful for evaluating progress in an organization’s attainment of its intended outcomes or benefits. Students can expect to become more proficient in discussing issues of nonprofit and public “program effectiveness,” and strategies for improving nonprofit and public program designs. (Elective course for the Certificate in Nonprofit Management.)

470.625 Resource Development and Marketing in Nonprofits (3 credits)
(Formerly Resource Development and Marketing in Nonprofits.) The goal of this course is to prepare future nonprofit leaders and board members with the international resource development and marketing fundamentals that help every nonprofit thrive. The course focuses on how to create and nurture an organizational culture where everyone on the staff and board understands, embraces, and acts on his or her role in developing strategic relationships with funders, potential funders, and media professionals. You will gain an understanding of the process, the metrics that drive the process, and the milestone markers that lead to success. You will explore how to develop a board and/or cadre of volunteers who give generously, share expertise freely, connect you to the right government officials and media leaders, and invite others to join them. Data-driven decision-making and all aspects of fund development, marketing, and communications will be woven throughout the course. Led by an internationally recognized practitioner, consultant, and master teacher, the course will use scenarios, discussion, social media, audio, and video clips so that you will walk away with the knowledge you need to secure private and government funding and social capital as a CEO, senior staff member, board chair, or member, and the confidence to do it all well. (Elective course for the Certificate in Nonprofit Management.)

470.626 Understanding the Media: Old and New (3 credits)
No one who works inside the beltway, whether in government or the private sector, can escape the impact of the mass media. This course helps students understand the role and practices of the news media. It teaches critical skills in analyzing and interpreting the news and in assessing its impact on government and public policy. Students explore media ethics and First Amendment issues, and hear from several guest lecturers who share their expertise.

470.627 Financial Management & Analysis in the Public Sector (3 credits)
The primary emphasis of this class will be to teach students how to make more informed business decisions through the use of financial management accounting information. Management accounting is concerned with the information provided managers to plan, manage control, and assess an entity’s activities and performance. Managerial accounting concepts are universal and can be applied to service, government, and nonprofit organizations. This class assumes no formal exposure to management accounting (or financial accounting, for that matter) and as such will focus on how to organize and use information to run/measure/operate a public entity or program. (Core course for the MA in Public Management. This course counts toward the Economic Security concentration (GSS). Elective option for Government Analytics students).

470.628 Parties, Campaigns, and Elections (3 credits)
Situating recent elections in broader historical context, this course examines the structures, activities, and functions of American political parties and their roles in campaign and electoral processes. What strategies do parties employ, and how are individual campaigns organized? What roles do ideology, interest, and party organization play in connecting political elites and mobilizing voters? How do political parties function in an electoral context increasingly dominated by candidate-centered campaigns, mass media politics, professional consultants, and independent voters?

470.629 The Politics of Health Care Policy (3 credits)
This course introduces students to the political actors and influences that determine the nature of health care policy. Particular emphasis is placed upon the implementation of Obamacare and the possible reforms and replacements offered by Republicans and the new Administration.

470.630 Congress and the Making of Foreign Policy (3 credits)
This class will examine the role of Congress in the making of American foreign policy. In particular, this class will discuss the role of Congress in war powers, economic sanctions, human rights advocacy, the approval of international agreements including treaties, international affairs budgets and spending, investigations and oversight of the conduct of foreign policy by the executive branch as well as the impact of Congress on the general direction of American foreign policies and priorities. Special attention will be given to the role of Congress in U.S. policy toward Iran over the past few decades, the use of military force in Iraq and Syria, the role of the legislative branch in U.S policy toward China and Taiwan and the promotion of human rights as a component of American foreign policy. The class will seek to examine the specific actions of Congress on these matters, and their causes and consequences. The class will use books, articles and original source material from committee deliberations and floor action. As we examine these topics, we will come back to larger themes – the balance of power between the executive and legislative branches, the impact of partisan and bureaucratic politics, and the changing role of the United States on the world stage. All this will be discussed with a mind to the role of foreign policy practitioners.

470.631 Economics for Public Decision-Making (3 credits)
Economic thinking provides an important set of tools for almost every aspect of public policymaking. This course aims to offer students a basic understanding of economics and its importance in public policymaking. The first half of the course will offer students an understanding of microeconomic and macroeconomic theory, including a discussion of when markets
can work to achieve policy goals and when “market failures” call for government intervention. The second half of the class will use these economic tools and theories in order to survey several specific policy areas, including health policy, tax policy, and the national debt. (Core course for the MA in Public Management. This course counts toward the Economic Security concentration (GSS). Elective option for Government Analytics students.)

470.634 The Rise of Violent Islamist Extremism and the American Response (3 credits)
This course will examine the effort of the United States and its Western allies to collect on, analyze, and assist in the defeat of modern, violent Islamist extremism—specifically terrorism committed by al-Qa’ida and its associated networks. The course will first examine definitions of terrorism, the rise of modern Islamist radicalism, extremism, and counterterrorism such extremism. The second component will be an examination of modern, terrorist interest in WMD (in particular, al-Qa’ida’s interest in acquiring nuclear, chemical, and biological weapons), as well as concepts of terrorist WMD employment doctrine and U.S. efforts to combat WMD Terrorism. The third component will be an examination of cyber terrorism—its definitions, how it could occur, and what the United States can and cannot do to prevent it. The final, fourth component of the course is an examination of the debates surrounding intelligence reform as it relates to U.S. counterterrorism efforts.

470.635 Presidential Policymaking (3 credits)
(Formerly Executive Politics and Policymaking) The founders may have envisioned Congress as the premier branch of the federal government, but in the 20th century, the president and the executive branch have typically occupied that position. This course examines presidential and bureaucratic power in the American political system. Students explore the political and policymaking dynamics at the top executive levels and within the bureaucracy. They also investigate the factors that account for variations in the power exercised by officials and consider the relationship between the executive branch and other centers of power in American politics. Finally, students will learn the processes and tools utilized by policymakers in the executive branch.

470.636 Political Communications: The National Stage (3 credits)
This course teaches the skills to both participate in and understand modern media and examines how communications influence public opinion. Guest speakers with senior-level experience in modern communications policy will discuss their roles in how the media and communication strategies influence public opinion. The course will address competitive writing, communications strategy, communication planning and execution, news analysis, and basic rules of media relations. A comparison of executive and legislative branch communications and strategies, the importance of visuals in modern communications, and how communications has changed over time will also be examined.

470.637 Lobbying and Influence (3 credits)
This course will explore the role of interest groups and lobbyists in the American political process. We will discuss the basics of the policymaking process, with a particular focus on how policymakers respond to different outside pressures. We will examine the ways in which these outside pressures (the lobbyists) try to influence the policymaking process and what determines whether or not they are successful. We will investigate whether the tens of thousands of lobbyists roaming the streets of Washington improve or detract from the quality of American democracy. Students should expect to come away from this class with a greater understanding of why we get the political outcomes we do and some ideas about how they might be able to change those outcomes, should they want to get involved.

470.638 Negotiating as a Leadership Skill (3 credits)
Conflict is part of organizational life. People in public-sector agencies and nonprofit and for-profit organizations disagree over the meaning of regulations, the use of financial resources, office space, leave time, and many other issues. Managers must have the ability to diagnose disputes and negotiate effectively to resolve conflicts. This course provides the theoretical background and conceptual framework needed for successful negotiation and mediation. Through presentations and discussions, students become familiar with the tools necessary for conflict resolution in their agencies and organizations. Analysis of a party’s interests, identification of the necessary style, awareness of communication skills, and planning and feedback are part of the process of becoming an accomplished negotiator. (Recommended elective for MA in Public Management).

470.639 Open Government: Transparency, Technology, and Citizen Engagement
“We acknowledge that people all around the world are demanding more openness in government. They are calling for greater civic participation in public affairs and seeking ways to make their governments more transparent, responsive, accountable, and effective.” So reads the Open Government Declaration, signed by 57 countries, including the United States. This class is an exploration of what it means for governments to become more open. Big questions include: What do we mean by “open”? What role does technology play? What happens when governments open up? What is the role of citizen engagement? How transparent should government be? Our discussions will range from the municipal to the national to the global stage. Students should expect to come away from the course with a better understanding of the promises and limits of open government, as well as some frameworks for implementation.

470.640 Challenges of Transnational Security (3 credits)
This course focuses on transnational security issues and considers how many of these myriad challenges constitute threats to global peace and security. The combined effects of issues such as drug, weapons, and human trafficking, piracy, terrorism, infectious diseases, and deliberate environmental destruction, along with such critical enablers as corruption, and money movements, are not strangers on the world stage. What is new is their global reach and destructive potential. As a result, these issues have made policy makers consider different conceptions of security and, at times, to move beyond sole considerations of state sovereignty into the realm of human security. Not only are transnational security issues varied in nature and scope, but their effects often are obscured
by the fact that many are nascent with gradual and long-term consequences. Further, while some transnational issues may not constitute direct threats to global security, they may threaten the world economy, and quality of life of its citizens. Still others compound and reinforce each other, generating mutations of the original threats. This course will examine a small number of these transnational security issues and relevant policy-making efforts.


Today’s federal reliance on private contractors to perform the basic work of government is neither an accident nor a recent development. It is the predictable and predicted product of a great mid-20th century reform in American government. This course will examine the past and the present of this ongoing reform, place it in historical and comparative (cross-country) perspective, and provide students with an opportunity to consider and debate the paths that Congress, the president, and citizens may take to assure that the public interest is served as private actors increasingly perform the work of government.

470.642 Muslim Politics and American Interests (3 credits)

This course explores the governance and politics of Muslim countries and evaluates U.S. strategic interests in those countries in light of their domestic politics. Students will compare and contrast how different Muslim countries deal with issues such as individual liberty, secularism, the role of women in public life, and democratic participation. We focus on two main questions: What accounts for the wide variety of outcomes in the Muslim world on these issues, and what implications does this diversity have for U.S. foreign policy options? During the course of this investigation, we will touch on the politics, economics, and society of Saudi Arabia, Iran, Pakistan, Indonesia, Egypt, and Turkey, and explore examples from other Muslim states and societies as well.

470.643 Text as Data (3 credits)

Text is not straightforward. In this course, students will develop the tools necessary to collect, analyze, and visualize large amounts of text. The course begins with a hands-on introduction to the programming concepts necessary to collect and process textual data, then proceeds to the key statistical concepts in machine learning and statistics used to analyze text as data. Throughout the course, students develop a research project that culminates in the online display of results from a large-scale textual analysis. Prerequisite: 470.681 Statistics and Political Analysis.

470.644 Democracy and Its Modern Critics (3 credits)

Much of international politics in the last century can be described as a conflict between liberal democracy and its modern critics. During this period, the values and political structures of liberal democracy have been extended to more parts of the world than ever before. Yet the same era also saw the emergence of powerful challengers to liberal democracy from both the right and the left. The resulting clash of ideologies defined such conflicts as World War II and the Cold War. In this course, we will survey the intellectual roots of fascism, nationalism, socialism, and communism. We will also examine the question of Islam and democracy, looking at both its proponents and its radical critics in the Islamic world. Among those whose writings we will examine are Karl Marx, V.I. Lenin, Benito Mussolini, Carl Schmitt, Charles Maurras, Syed Qutb, Ali Shariati, Muktedar Khan, and Ruhollah Khomeini. (This course counts toward the Security Studies concentration.)

470.645 The Budgetary Process (3 credits)

The federal budget process is an enormously complex mixture of administrative routines and mechanisms designed to bias decisions, avoid blame, or reduce conflict. This course explores the structures of federal budgeting in terms of its varied goals and in the context of the wider governing process. The course will review the budgetary process in both the executive and congressional branching, as well as the interaction of those two systems. In order to gain understanding of the difficult policy choices and political pressures policymakers face, students will be asked to do a simulation of a budget process within the executive branch. The role of entitlements, scoring issues, and tax policy will be examined in the context of the debate over budget policy. The course will start with a short primer on finance theory. (Recommended elective for MA in Public Management. Elective option for Government Analytics students.)

470.646 Poverty, Inequality, Opportunity: Theoretical Foundations and Policy Implications (3 credits)

This course examines enduring issues in political theory—including poverty, inequality, opportunity, citizenship, compassion, obligation, justice, and the role of government, markets, and charity—and their expression in contemporary social policy. The course provides foundations for understanding the theoretical and political dimensions of social policy—and the implications for policy solutions.

470.650 Legal Issues in Intelligence and National Security (3 credits)

This class will examine the interplay between the laws and the practices and policies of the United States’ intelligence community and national security system, both foreign and domestic. While discussion of the history of intelligence activities and laws dating from the origins of our colonial days will necessarily shape the framework of the class, the focus shall particularly be on current debates and challenges faced by the United States in the 21st century.

470.651 Corruption and Democratic Governance (3 credits)

Corruption is ubiquitous. It is a universal phenomenon that has always been around and that can be found almost anywhere. Recent years have seen much focus on the relationship between it and democratic governance. Indeed, corruption and politics more generally are inextricably and universally entwined. In this seminar, we will take an in-depth look at the relationship between the two. We will ask: What is corruption? Is it always the same thing everywhere, or does it vary depending on context or place? Do pork barrel politics and political clientelism count as corruption? What are the implications of corruption? Is it necessarily always a bad thing, or can it be beneficial? Is the corruption experienced in developed countries qualitatively
different from that in developing ones such that democracy suffers more in developing countries? We will seek to answer these and other questions by taking a critical look at the politics of corruption. We will look at the origins, extent, character, and significance of corruption from both a developed and developing country perspective. We will cover various theories relating to corruption and look at a number of empirical cases.

470.652 Primaries, Caucuses, Conventions, and the General Election (3 credits)
Valuable lessons can be learned about governing from the experience of other countries as, for example, from the radical changes in the former Soviet bloc, the evolution of less developed countries, and the extraordinary experiments in government in China, India, and Russia. This course deals with the crucial problems of public management, including economic development, social services delivery, public regulation, and performance of governments themselves. Students compare U.S. practices with those in other countries and discuss the practical problems of delivering public services in environments far more difficult than in the U.S. Students examine new approaches to government efficiency, shifts of roles to the private sector, intergovernmental devolution, and management innovation as they are tested in governments around the world.

470.653 Russian National Security Policy (3 credits)
Russia plays a key role in most international issues and openly campaigns to realign the international system away from what it sees as American domination. This course considers the substance and process of Russian national security policy. It acquaints students with the main instruments and mechanisms available to Russian leaders to advance the country’s national interests and key policy priorities. The course considers how Russia formulates and conducts its national security policy, the history that informs it, the political culture that sustain it, the ideas and interests that drive it, and the people and institutions responsible for it. The course addresses Russia’s role in key global and regional issues and its relations with major powers. It places special emphasis on the wars in Ukraine and Syria, Russian concepts of information war, and on Russian military reform.

470.654 Deterrence in the 21st Century (3 credits)
This course will comprise a comprehensive examination of what deterrence is and what it will require in the 21st century. It will seek to grapple with and provide insights on a range of fundamental questions of theoretical and policy import including, what comprises deterrence in the years ahead? How should decision makers understand the many new relevant domains and capabilities (not just nuclear, but space, cyber, missile defenses, advanced conventional) in which deterrence issues and concerns may well have to be paramount in their minds? What are the roles and requirements of extended deterrence in the emerging geopolitical environment? How might deterrence come to play in emerging areas such as hybrid warfare? How might deterrence fail? And what are the intentional and unintentional escalation paths and dynamics, including cross-domain dynamics, likely to be at work in crises and conflicts ahead?

470.655 Multinationals and Governments in the Age of Globalization (3 credits)
In this course, the main themes and issues that characterize the relationship between the issues of development, democracy, and globalization are introduced and examined. The first part of the course focuses on the issue of development and investigates issues such as whether there is such a thing as political development in the same way as we think about economic development. The second section of the course explores whether the process of economic development actually fares better or worse under democratic regimes, and if in fact there is any necessary connection between democracy and successful economic development. In the third and final part of the course, students analyze globalization as the spread of integrated markets, increasingly mobile capital, and common economic policies and practices, and ask whether this “new” world economic order enhances or inhibits prospects for development and democracy.

470.656 Presidential Power and Politics (3 credits)
This course is intended to expose students to various approaches political scientists have taken to the study of the American presidency. It will also focus on institutional contributions various presidents have made to the contemporary office. In addition to the assigned texts, the instructors and the students will pay attention to the 2009 presidential contributions and key developments during the 44th president’s “first 100 days” and beyond.

470.657 Energy, Security, and Defense (3 credits)
This course is a seminar-based overview of the role of energy in national security. Using a range of U.S. and non-U.S. case studies, students will review the roles of energy in grand strategy, the role of energy in conflict, and, finally, as a logistical enabler of military operations.

470.658 Religion and American Political Culture (3 credits)
The relationship between religion and politics in the American context is one of peculiar complexity in the American context. This course has three main objectives: 1) to examine in general terms the role of religion in American public and political life as reflected in the debates concerning the use of religious symbolism and discourse in the public sphere; 2) to analyze how religiously informed moral argument has helped to shape public debate on key issues of public policy, including the issues of civil rights, abortion, war and peace, and economic policy; and 3) to provide the necessary historical and philosophical context to help understand the present-day intersection of religion and politics, and to see how previous generations of Americans approached similar problems.

470.659 Radicalization and Deradicalization in Terror Networks (3 credits)
This course will explore some of the most contested and controversial aspects in contemporary security studies. There are a number of contentious and wide-ranging debates around ideas like radicalization not least concerning its definition, causes, and effects. This course will also prompt you to consider broader issues, such as whether there is a causal link between extremism and violent extremism? Why do some radicalized
individuals to embrace terrorism, when other don’t? And should security officials concern themselves with radicalization, or only with its violent offshoots? This course will unpack many of these debates, exploring academic and theoretical literature surrounding the issues of radicalization, recruitment, and deradicalization in modern terrorist networks. It will focus primarily on cases in Europe and the United States, while also exploring new phenomena such as homegrown, self-starter, and lone wolf terrorism.

470.664 Tracking World Crisis: A Net Assessment Approach (1 credit)
Net assessment began during the Cold War as a threat-based framework for analyzing the national security strategy of the United States. Yet the idea of a holistic approach to strategic threats transports well to other big challenges. Perhaps the biggest challenge we face is a world system crisis in which the global network of networks is overstressed. Such a crisis is not hypothetical: world networks have broken down many times before. Moreover there is a great deal of stress building up in the world system today. The goal of the course is to identify the dynamics of world system stress in the near-to-mid-term, and postulate how the mechanisms that produce this stress might interact to precipitate a global crisis. We will examine several historical case studies, as well as a range of threats to global networks, culminating in the class-development of models to identify both strategic warning indicators of crisis and potential pathways for the emergence of world crisis.

470.665 Warfare by Other Means: Espionage and Covert Action in Foreign Policy (1 credit)
This course focuses on clandestine operations and covert action, a part of the world of strategic intelligence. It explores these subjects both conceptually and historically, covering the philosophy and the mechanics of such operations, as well as how they have been used over time, including the World War II era, the Cold War, and the post 9/11 world. Students will drill down into case studies that lead to a kind of cost-benefit assessment of various types of clandestine operations and covert action. By the end of the course, students will be able to run their own policy calculi, assessing the advantages and disadvantages of clandestine operations and covert action for national security.

470.666 Institutional Fundraising: Raising Maximum Dollars from Government Agencies, Corporations & Foundations (1 credit)
In this hands-on course, we’ll help you understand the fundamentals of securing funds from institutional donors. As a staff or board leader of a non-profit, understanding the ins and outs of raising funds for priority projects and capacity building from government agencies, corporations and foundations will add to your toolkit for moving your organization forward. We’ll cover how this aspect of fundraising fits into your overall fundraising strategy and plan. We’ll help you identify the right potential funders for important projects, learn how to land capacity-building funds you can use to grow and sustain your organization, cover the basics of relationship-building with institutional decision-makers, help you use data to build credibility with funders, create pitch-perfect corporate presentations and dive into the process of writing winning proposals and applications. Finally, we’ll cover fulfillment and stewardship. (Elective course for the Certificate in Nonprofit Management.)

470.667 Machine Learning and Neural Networks (1 credit)
Machine learning and, more broadly, artificial intelligence, has recently had a series of unprecedented successes in performing tasks such as image recognition and autonomously playing video games at a higher level of accuracy and performance than humans. These successes are driven by accelerated developments in machine learning, notably neural networks. This course covers a variety of machine learning algorithms from linear regression to nonlinear neural networks. Students will learn to implement these algorithms and understand how they work. Further, students will learn how to select and implement an appropriate algorithm depending on the type of dataset they have, and will be able to use the algorithm to generate predictions. (Prerequisite: 470.681 Statistics and Political Analysis.)

470.668 The Politics and Process of American Foreign Policy (1 credit)
Overuse is not the only problem with the maxim that American “politics stop at the water’s edge.” The slogan has simply never been true. American foreign policy has always been a result not just of the crises and opportunities the nation has faced but its unique politics and policy processes. American national interests are determined through the democratic processes established by the Constitution and other legislation and affected by the politics that drive the nation’s elections, its conversations, and its foreign policies. These politics and processes have been remarkably consistent since the founding, even as the nation’s interests have grown significantly. A better understanding of both the politics and processes of American foreign policy will help students appreciate how the country’s policies are made today and will be made in the future.

470.669 Math for Data Scientists (1 credit)
This course reviews the mathematical principles that are fundamental to quantitative analysis. The course covers functions, probability theory, integral and derivative calculus, and matrix algebra.

470.670 The Practice & Politics of U.S. Tax Policy (1 credit)
Benjamin Franklin famously observed that “nothing can be said to be certain, except death and taxes.” Since Franklin’s day, however, both the form and prevalence of taxation have undergone a dramatic global transformation. This course will review the history of U.S. federal taxation and delve into the practical mechanics of taxation. It will provide students with an understanding of the processes, institutions, and political influences that shape tax policy. Finally, it will examine alternative methods of taxation and consider what the future may hold for federal tax policy. (Recommended elective for MA in Public Management)

470.671 Risk Management in Government Agencies (1 credit)
The demand for robust and resilient risk management practices is increasing in the public sector as organizations continue to struggle with explicitly integrating risks into their executive
decision making processes. OMB's recent revision of A-123 places additional pressure on this imperative. The objective of this course is to introduce students to fundamental risk management and measurement practices and demonstrate their relevance to the government sector. It will help students understand risk management principles and practices and how they might apply to their organization. The goal is to give students a comprehensive view of both the risk management processes and some of the key measurement tools for understanding and mitigating operational, credit, market and enterprise risks exposures.

470.672 Statecraft and Soft Power (3 credits)
Statecraft and Soft Power deals with the growing role of soft power in world affairs. We will analyze how countries, particularly the U.S., are responding to major contemporary issues through public diplomacy, foreign assistance, and increased partnerships with NGOs. The course will help participants develop skills applicable in several career fields, ranging from analysis of public opinion, media, and culture, to strategic planning and effective communication. We will also discuss other elements of soft power, such as foreign assistance, the conduct of exchanges, and capacity building. The course will include decision-making simulations and workshops in strategic planning and crisis management.

470.673 Data Visualization (3 credits)
This course instructs students in various visualization techniques and software. Students will learn how to (1) ask interesting questions about politics; (2) identify data that can be used to answer those questions; (3) collect, clean, and document the data; (4) explore and analyze the data with statistical and graphical techniques; (5) create compelling, informative, and accurate visualizations; and (6) present these visualizations to educated audiences. (Option for a Government Analytics core course.)

470.674 Advances Data Visualization (3 credits)
This course advances students' understanding of modern data visualization by introducing concepts and tools that enable unconstrained graphical representation of information. Students will learn to create any visualization they can imagine with the expressive and powerful D3 library, used by organizations like the New York Times, the Guardian, and the Urban Institute. The course will examine the design and development of dynamic, interactive presentations that allow for personalized and non-linear modes of data exploration. Each student will publish a final project live on the web, employing the same tools and processes used by professional information designers and web developers, including HTML, CSS, Javascript, version control, and rapid application development. (Prerequisite: 470.673 Data Visualization. Note: This course requires students to bring a laptop to on-site class meetings.)

470.676 Understanding Islamist Politics and Terrorism (3 credits)
Since the 1920s, Islamist groups have used violent and non-violent methods to shape the political destinies of Muslim-majority countries. Typically, these groups are studied in isolation from one another, but in reality, they form an entire ecosystem in constant communication and competition with one another and with outsiders. This course will explore the interactions of Islamist groups and attempt to discern the key factors that drive their political behavior. We will survey what the classical Islamic tradition has to say about politics, detail the three dominant ideologies of Sunni Islamist political actors (Deobandism, Salafism, and the Muslim Brotherhood), and look at a series of country case studies. Upon completion of the course, students should be able to identify the major trends of Islamist activism in a Muslim-majority country and explain why the local Islamist groups behave the way they do.

470.678 Nation Security Leadership (3 credits)
The purpose of this course is to analyze the civilian and military leadership of the principal departments and agencies of the government that are responsible for the nation's security. Attention will be placed upon the processes through which civilian (senior and mid-level political appointees, civil service) and military leaders are selected and evaluated, the major leadership and management challenges currently facing leaders, culture and competence clashes and the inevitable tension in the civilian-military relationship, and efforts to improve professionalism in a rapidly changing security environment. An important objective is to inform the students on the legal, political, operational, budgetary, and other factors that influence senior officials in the making of defense/homeland security strategies and policies and on the decision-making methodologies employed.

470.679 Armed Social Movements: Terrorism Insurgency and Crime (3 credits)
Drawing on the social movement literature, this course examines the emergence of irregular armed groups and their decisions to use violence. It explains how social movements turn violent, how violence dictates their nature, and what this nature can tell us in terms of group strengths and weaknesses. It provides the students with the analytical tools needed to distinguish between terrorism, insurgency, and crime—by focusing and understanding group strategies, behavior, and capabilities. Students will thus be familiarized with the theory on armed group formation and evolution, but the course goes further by counterposing such theory to the complexities of practice through the consideration of key case studies. The course ends with an overview of state strategies intended to counter a wide variety of threats. Particular attention is paid to the notion of operational art and lines of effort to underline the potential and meaning of counterterrorism and counterinsurgency.

470.680 The Rise and Fall of Intelligence (3 credits)
This course emphasizes recent changes in U.S. intelligence and assesses the ways in which persistent and emerging issues in the field are helping or hindering the United States in achieving policy objectives. The goal is to provide answers to three questions: How does U.S. intelligence work in the modern world? What are the larger dilemmas facing U.S. intelligence overseers and those who use intelligence; and how are these realities likely to shape the future of the Intelligence community? The approach will be both historical and topical. The history of intelligence offers a surprising number of illustrative cases and themes, many of which can now be examined in detail using official records and contrarian views,
Statistics and Political Analysis (3 credits)
Introduces students to the concepts central to social science research design and methods used to summarize and present quantitative data. Applications using political and public policy data will be featured. Topics covered include research question formulation, cross tabulations, controlled comparisons, hypothesis testing, and bivariate regression analysis. In addition, students will learn to use R, a powerful software program that is popular among political consulting firms, think tanks, and government agencies. (Government Analytics core course. The course is at the introductory level; there is no prerequisite.)

Mission Meets Profit: An Exploration and Building of a Social Enterprise (3 credits)
The goal of this course is a comprehensive examination of social enterprises—organizations that, broadly speaking, “apply commercial strategies to maximize improvements in human and environmental well-being.” Social enterprises are a relatively new, 21st century phenomenon, and are typically referred to as hybrids of nonprofits and for-profits. While they are similar to nonprofits in that their missions and social and/or environmental objectives drive their very existence, social enterprises can have different structures than traditional 501(c)(3)s—some much more complex, legally and otherwise. Throughout the course we will learn about the various types of social enterprises that exist, comparing US models to models operating internationally, and analyze their pros and cons, challenges and opportunities. We will also explore how social enterprises challenge traditional business and nonprofit paradigms, what role social enterprises have come to play in international development, and finally, how to go about developing your own social enterprise. (Elective course for the Certificate in Nonprofit Management.)

Scandal Management, Ethics, and Public Policy (3 credits)
This course explores the role of ethical values and reasoning in scandal management and public policy from the standpoint of elected officials, nonprofit leaders, and “you,” the public manager. Theoretical perspectives are applied to practical cases concerning privacy, safety, race and affirmative action, pornography and cybersecurity, downsizing in the public sector, and leadership, among other topics. Historical and contemporary cases are discussed. Special attention is given to communication issues, public relations, and the language of ethics.

Legislative Language and Policymaking (3 credits)
This course examines the process of drafting legislation and the consequences of legislative language in the implementation and adjudication of federal policies. Focusing on the various stages of the legislative process, this course considers the expert and political sources of the legislative language in the U.S. Congress and the importance of language in coalition building for policy passage. Examining the interactions of Congress with the other branches of government, the course also considers how presidents, the executive branch, and the judiciary interpret statutory language.

The Challenge of Change: Innovation in Military Affairs (3 credits)
Change is perennial in national security and military affairs, but knowing how, why, and when to embrace change is both difficult and vital. Strategies and tactics may be outdated, new ideas may be resisted, and science and technology continue to change our world faster than we can optimize. The paradox deepens with context: innovation in peacetime has one logic while innovation in war has another. This course unravels the nature of change in military affairs through four themes: ideas, materials, human capital and structure, and, appreciation of the enemy. The course explores these themes through a series of case studies from around the world. Topics include civilian development/military application of science and technology; learning from failure and success (including from other nations); institutional reactions to change; procurement and the role of industry; and, the impact and limitations of individual champions of change.

Contemporary Congressional Politics (3 credits)
What are the political forces that shape the contemporary Congress, and how does Congress, in turn, re-shape American politics? This course considers how political, social, and technological changes outside the institution help to explain contemporary congressional politics. Topics include Congress’s role in the separation of powers, its responsiveness to interest groups, ideology and partisanship; competitiveness in congressional elections and constituency representation; and contemporary media politics.

The Political and Social Media Revolutions (3 credits)
Extraordinary innovations in personal communications technology are remaking American political life. Social media is now broadly popular across all social boundaries. Collapsing business models are restructuring media of all sorts. And the fast-growing power and reach of targeting are revolutionizing elections. In some ways, these changes hark back to pre-Gutenberg eras, when virtually all communication was social. In other ways, they repeat a classically American story in which each successive wave of popular enfranchisement was helped along by something new and more powerful in the ways a continental people kept up with the news—and stayed in touch with one another. But in enabling individuals to interrelate locally and globally simultaneously and in real time, they are without precedent. Examining these changes from each of these perspectives will be the subject of this course. (This course counts toward the Concentration in Political Communication in the MA in Government.)

Political Institutions and the Policy Process (3 credits)
Bridging the divide between political science theories of policymaking and the actual workings of the policy process...
in the institutions of national government, this course examines the individual contributions of each of the legislative, executive, and judicial branches of government, as well as the interactions and struggles between those branches. How do these various institutions set the policy agenda, develop and deliberate policy alternatives, make authoritative policy decisions, and implement those decisions? In what ways are the interactions between these institutions best considered conflict or cooperation? Also, how do outside actors and institutions— the media, interest groups, public opinion, parties, and campaigns—affect policymaking in these various institutional settings? Drawing on the constitutional design and historical development of these institutions as well as contemporary practice, this course examines the purposes, processes, and outcomes of policymaking from an institutional perspective.

470.689  NGOs in Development and Global Policy-Making  (3 credits)
(Formerly Overview of Global Public and Nonprofit Relationship). This course provides an overview of the role of both national and international non-governmental organizations (NGOs) in processes of development, humanitarian response, and the promotion of human rights and active citizenship. The last decade has been one of rapid change in which NGO relationships with government, the private sector, and donors has been in a state of flux, with unprecedented challenges raised about the legitimacy and effectiveness of NGO actors. The course will look at how systemic changes the evolution of transnational advocacy, the aid effectiveness process, the emergence of new development actors from countries (such as India, China and Brazil) to the primacy of the private sector has influenced NGOs. (Elective course for the Certificate in Nonprofit Management.)

470.690  Political Campaigns and the Media  (3 credits)
The purpose of this course is to understand the important interaction of politics and the media during political campaigns. Issues that eventually become policy when a candidate is victorious and wins office, usually were identified during a political campaign to win votes from various constituencies. The course will examine how the candidate decides on particular topics to stress and how the media decides to cover or not cover certain topics in the campaigns. The class will focus on particular foreign policy issues, such as the war on terrorism and the war in Iraq. It will also examine how the candidates, staffs, consultants, and the media handle these topics.

470.691  Digital Citizenship  (3 credits)
This course will explore the technological and political implications of digital identity, its relation to various models of national identity, and the emerging forms of political participation based, in part, on the increasing importance of social software and related tools. We will examine the differences between digital identity and “conventional” identity (an aggregate model instead of a genealogical and geographical-based model) and the transition into a digital environment (biometrics, etc.). Special emphasis will be given to the political and cultural factors shaping the conception of identity.

470.692  Military Strategy & National Policy  (3 credits)
“War is the extension of politics by other means.” This course aims to understand how and why states use force in pursuit of their national interest. This class will study the classical theories of warfare, including Clausewitz and Sun Tzu. Case studies in warfare from the 19th and 20th centuries will be used to develop a model of how states have traditionally used war to accomplish their political aims. In addition, the technological and political shifts of the last decade will be explored to determine what they imply about how states can and will use force in the future as a part of their comprehensive national security policies. (Core course for the MA in Global Security Studies.)

470.693  Comparative Democracies  (3 credits)
This course uses the comparative method to look at the varieties of democracies that exist today. In the course, we will ask what is democracy, how do we measure it, and how does it vary across space and time? We will look at how democracy manifests in different constitutional forms e.g. parliamentary versus presidential. We will examine how different electoral and party systems influence variation in outcome within the set of democracies, and how social cleavages interact with, and are molded by, these systems. Further, we will use the answers to these questions to explore the issue of democratic consolidation and to ask why some countries become and stay democratic, while others do not. Case studies will be drawn from Europe, Latin America and Asia.

470.694  Big Data Management Systems  (3 credits)
This course introduces students to big data management systems such as the Hadoop system, MongoDB, Amazon AWS, and Microsoft Azure. The course covers the basics of the Apache Hadoop platform and Hadoop ecosystem; the Hadoop distributed file system (HDFS); MapReduce; common big data tools such as Pig (a procedural data processing language for Hadoop parallel computation), Hive (a declarative SQL-like language to handle Hadoop jobs), HBase (the most popular NoSQL database), and YARN. MongoDB is a popular NoSQL database that handles documents in a free schema design, which gives the developer great flexibility to store and use data. We cover aspects of the cloud computing model with respect to virtualization, multititenancy, privacy, security, and cloud data management. (Prerequisite: 470.763 Database Management Systems)

470.695  Proseminar: Essentials of Public and Private Management  (3 credits)
The purpose of the class is to help equip students to operate effectively in both the public and private sectors. The class will cover three major topics: (1) an overview of managing public and private organizations, with special attention to their differing missions, capabilities, and environments; (2) a survey of important relationships between the public and private sectors; and (3) the need for improved coordination between the public and private sectors to achieve important public purposes. Students will be encouraged to make the course an interactive one and to share their personal knowledge in the context of the issues discussed. Students will be expected to complete a significant paper on a relevant topic approved by the instructor. (Core course for the MA in Public Management and the MA in Government/MBA program)
470.696 Ethics and Privacy in Intelligence Operations (3 credits)
This course will address the ethical dilemmas and privacy issues that challenge intelligence and government decision-makers in an increasingly complex operational and technological environment. We will examine basic moral, ethical, and privacy considerations from all sides at several key points in intelligence operations, from collection to covert action. The course will analyze the evolving nature of privacy concerns worldwide, with an emphasis on the balance between individual rights and national security needs as executed by intelligence agencies. Students will examine the policy implications inherent in seeking to address these issues. The readings will include diverse and opposing viewpoints as well as practicums and simulations to allow debate of the key positions in real-world situations. (Prior enrollment in 406.665 The Art and Practice of Intelligence or 470.711 Intelligence: From Secrets to Policy is strongly encouraged.)

470.697 Intelligence and Counterterrorism (3 credits)
Counterterrorism is essentially an intelligence war. By definition, both sides use small forces and clandestine means, hiding their presence and activities not only from each other, but often from friends and allies as well. This course will explore the many roles of intelligence in every facet of counterterrorism, and ask students to evaluate their practical, legal, and moral effects and implications. It will also look at the terrorists’ own intelligence activities and the “intelligence race” between terrorists and counterterrorists. There are no prerequisites for this course. However, students would be well-served to have a basic familiarity with intelligence and terrorism before the class starts.

470.698 American Exceptionalism (3 credits)
This course will seek to give students a deeper understanding of where the idea of American exceptionalism comes from and what its implications are for America, both domestically and abroad. Students will gain this understanding from reading classic works in the area that trace America’s political development, starting with its Puritan heritage. Early American works will be studied from this period, along with Alexis de Tocqueville’s Democracy in America. Seminal works of modern political science scholarship on this question will also be assigned, including works from Seymour Martin Lipset, Louis Hartz, Daniel Boorstin, and others. The course will then extrapolate from these historic roots to contemporary issues of America’s foreign policy and rationale for its foreign interventions. The course will conclude with questions of America’s standing in the world, which has, in recent years, declined, and seek to understand why this is so and what it means for the future understanding of American exceptionalism.

470.699 Applied Performance Analytics (3 credits)
Data are everywhere, and many elected officials and government managers understand they need it. But how can they use data to solve problems and shape policy? What is the best way to make decisions based on a data analysis? How do you communicate those decisions, and the rationale behind them, to employees, citizens and stakeholders? This course provides students with an experiential learning opportunity based on a real-world scenario. Students begin by studying foundational concepts and techniques of data collection, analytics, and decision support. They also learn how to navigate multiple interests, asymmetrical information, and competing political agendas as they make difficult decisions about resource allocation and public policy. Along the way, they learn how to turn insights into action by effectively communicating the results of analysis to busy executives and decision makers at all levels of the organization. Their work culminates in a showcase event where the class presents their recommended solutions to government practitioners, who review and critique their proposal.

470.701 Congress: Why the First Branch Matters (3 credits)
Congress is the First Branch, “the People’s Branch,” and one of the most powerful legislatures the world has ever known. At this moment in history, however, the people do not assess the institution favorably and political scientists and pundits have declared it the “broken branch.” Is Congress “broken” or merely reflective of our political times? In an era of “unorthodox lawmakers” is a return to “regular order” and “textbook lawmaking” realistic or a fantasy? This course will discuss these questions in the context of the evolving nature of Congress as an institution. The class will examine the institutional development of Congress and explore changes in its representative and legislative functions, as well as constitutional responsibility of holding the “power of the purse.” Congress remains a dynamic institution and it behooves citizens to understand its complexity and centrality to governance in the U.S.

470.702 Introduction to Law and Legal Methodology (3 credits)
This course is taught by a sitting federal trial judge and introduces students to the fundamentals of legal analysis. Students will interpret the Constitution, statutes, and case law. The course will cover how the federal court system works and will read and dissect several Supreme Court, circuit, and trial court decisions. Students will learn how to “brief” a case to extract its essence, and will understand what the holding and the principles articulated by the court are as well as the procedural posture of the case. The objective of the course is to train students in the fundamentals of how to approach the study of law.

470.704 Strategies in Insurgent and Asymmetric Warfare (3 credits)
This class examines the phenomenon of irregular warfare—of insurgencies and counterinsurgencies in particular—through a historical lens. The course will give students insight into the origins, objectives, strategies, and tactics of irregular wars, as well as the principles of counterinsurgency theory and practice. Through the course, you will analyze current irregular wars, understand what caused them and whether they are likely to be successful or unsuccessful, and see how they can be combated.

470.705 The Majesty of the Law: Judicial Process in America (3 credits)
This course considers the philosophical underpinnings of the judiciary, including its origins in Article III of the U.S. Constitution and its reliance on foundational principles of the
rule of law and the independence of the judiciary. The class will examine the placement of the judiciary within American policy, focusing heavily on the concepts of separation of powers and federalism. In this context, we will consider the relationships between the U.S. courts and the other branches of government, as well as the various levels of court jurisdiction from the local county court to the U.S. Supreme Court. The class will analyze the modern judiciary, including its size, scope, jurisdiction, and functioning, and discuss Hamilton's notion that this is the “least dangerous” branch of government, possessing neither the “sword nor the purse.” Indeed, the budgetary challenges confronting the modern judiciary will be examined as well as various enforcement issues. Finally, the future of the judiciary will be assessed, and the effect that technology is already having on this important branch of government will also be addressed.

470.706 Federalism: The Interplay Between States and Capitol Hill (3 credits)
State governments are the laboratories of policy innovation and in turn often fuel action at the federal level. There are many meaningful lessons from successes in state government policymaking that could be informative to policymakers on Capitol Hill. What is the nature of the relationship between legislators on the federal level and legislators on the state level? What are the incentives or disincentives for members of Congress to interact with state legislators or vice versa? This course will address the general principles of federalism, the interplay between Congress and the state legislatures, and the role that state legislatures play in shaping and driving policy discussions on Capitol Hill. The class will provide an in-depth analysis of specific policy issues that are currently debated on both Capitol Hill and in the state legislatures in order to facilitate a comparison and critical examination of the public policy debate at the federal and state levels. A visit to the Maryland General Assembly for a visit with the governor and legislative leaders is planned.

470.708 Unleashing Open Data With Python (3 credits)
Learning the basics of the computing language Python empowers people to retrieve and analyze data in new ways. During the course, students with no prior coding experience will learn how to gather and analyze data in ways that are not possible without the assistance of programming. After covering the fundamentals of syntax and logical thinking, students learn how to read, create, and edit files. Then, building on that knowledge, students interact with online resources through Web scraping and APIs. Finally, students will use the data they collected to create their own analysis and publish their research to a website. The class equips students to add programming components to their future work, giving them an advantage in a competitive workplace.

470.709 Quantitative Methods (3 credits)
Students will learn how to construct and evaluate multivariate regression models, which are useful for answering causal questions about issues related to political behavior, policy, and governance. Topics include multivariate regression, interaction terms, measures of fit, internal and external validity, and logistic and probit regression. The focus of the course is on using statistical methods in an applied manner. The course will also introduce students to Stata, a widely used statistical software program. Recommended prerequisite: Political Analysis and Statistics. (Formerly Introduction to Quantitative Research Methods. Core course for MA in Government Analytics. May be taken in place of 470.852 Research and Thesis II with permission from the instructor)

470.710 Advanced Quantitative Methods (3 credits)
Extends the concepts taught in Quantitative Methods. Provides students with the tools needed to construct and evaluate advanced regression models. Topics include logs and polynomials, instrumental variables, fixed effects, time series and forecasting models, dynamic causal effect models and regression discontinuity models. (Government Analytics core course. Prerequisite: 470.709 Quantitative Methods).

470.711 Intelligence: From Secrets to Policy (3 credits)
This course examines the role that intelligence plays in the formation of national security policy. The course explores the forces and events that have shaped U.S. intelligence. It examines the steps involved in producing intelligence from requirements through collection, analysis and the actual making of policy. The role of intelligence in the major intelligence issues facing the United States today will be discussed as well. The main text for the course will be Dr. Lowenthal's book of the same title published by CQ Press, which has been called the “best introduction to the role of the U.S. intelligence community in the national security policymaking process.” (This course counts toward the Homeland Security Concentration).

470.712 The American Civil Trial (3 credits)
This course, taught by a sitting federal trial judge, will introduce students to the trial as a critical element of the American legal system. Using a civil trial as a model, students will explore the procedures leading up to trial—motions practice and discovery—and the format of the trial itself, from opening statements to evidentiary issues, direct and cross examination, expert testimony, and closing argument. Students will read excerpts from actual trial and pretrial proceedings, and summaries of some noteworthy American trials. The course will give students a practical understanding and a unique perspective of the workings of the American legal system.

470.713 Resisting Tyranny: Strategic Nonviolent Conflict (3 credits)
War practitioners, policy makers, and security studies scholars study asymmetric warfare to understand why poorly armed insurgents effectively resist and even defeat technologically advanced and materially stronger armies. This course studies a perfect asymmetry in nonviolent warfare where unarmed ordinary people are able to effectively challenge and eventually defeat a fully armed, resource-rich regimes. In fact, historically, nonviolent movements have been twice as effective against violent regimes as armed insurgencies. This course will consider skills of organized populations in inter-state and intra-state conflicts, including anti-dictatorship, anti-occupation, anti-corruption, anti-violence struggles and analyze how disciplined civilians use nonviolent strategies and tactics to galvanize large and diverse participation, place their violent opponents in a dilemma, make repression backfire and cause defections among adversaries’ pillars of support.
470.714 Policy Making in the U.S. and Latin America: Perceptions and Misconceptions (3 credits)

Formerly taught partly in Mexico, this summer it will be taught solely in D.C. with new course material. The course will introduce students to major political trends in Latin America and the state of U.S. relationships with countries in the region, with a focus on U.S.-Latin American relations (highlighting Mexico, Argentina, Bolivia, Brazil, Chile, and Guatemala). The course will cover both the history of the countries and the U.S. relationship with each.

470.715 Political Conventions: History and Relevance (3 credits)

The course will look at the presidential candidates, possible vice presidential candidates, the platform, and the major domestic and foreign policy issues that will be important during the general election. The course will also look at the role of the delegates, the campaigns, and the media at the conventions. Other topics of discussion will include how conventions help the national political parties survive and reorganize themselves as viable institutions. We will examine how delegates are chosen, what their roles are at the conventions, and what role the superdelegates will play. An important point of examination is whether party platforms and the goals of the presidential nominees agree and why often the nominee goes his own way without regard to the party position on the issues.

470.716 Road to the White House: The General Election (3 credits)

This course examines all aspects of the presidential contest, including looking at the role and views of the candidates on the leading domestic and foreign policy issues of the campaign. The class will analyze the role of the media, the impact of the Internet, and the financial requirements of the campaign. The course will assess the pivotal role of the campaign managers, consultants, and key outside advisers from the worlds of politics, business, and entertainment.

470.717 Risk, Politics, and Public Policy (3 credits)

The future is an unknown land for individuals and for governments. It poses opportunities for gains and possibilities of losses. The risks of losses include terrorist acts, wars, natural catastrophes, poor health, and many other misfortunates. Individuals, including public officials, perceive risks in different ways, and this class will look at classical, behavioral, and cultural theories of risk perception. Governments assess and manage collective risks, often with regard to politics and the concerns of voters. This course will examine the use and evaluate such collective responses to risk. The course will be of use to students interested in homeland security, foreign affairs, environmental policy, health care, social security, and financial market regulation.

470.720 Science and Government (3 credits)

Science forms the heart of many of our most contentious national issues, from climate change to stem cell research, from teaching evolution to exploring space. Americans view science with both suspicion and awe. We support science watchdog organizations while we also support increased spending on scientific and medical research. We worry that science opens Pandora’s Box, yet we look to scientists and engineers to provide solutions in fields such as medicine and alternative energy. This course examines this national paradox by exploring the interrelations among government, the scientific community, and concerned citizens. Because of its role as both patron and regulator, the federal government is the chief actor in these science dramas. Through lectures, readings, and discussion, the course will focus on government research agencies, such as NIH and NASA, at federally sponsored research in universities and companies, at major science initiatives, such as the Human Genome Project and the National Nanotechnology Initiative, and at oversight organizations both within government and without. The course will pursue the questions of why and how the government supports so much science, and what role science and engineering play in the nation’s social and political aspirations.

470.721 Comparative Federalism: The United States and the European Union (3 credits)

Federalism—the division of power and sovereignty between a central authority and local governments—has emerged as one of the most important themes of contemporary Western politics in both the United States and Europe. For the United States, the division of power between the federal and state governments lies at the very heart of the American Constitution. At the same time, disputes over the precise balance of federal and state power have been major fault lines in American politics since Federalists and anti-Federalists at the time of the founding. For Europe, the destruction of two world wars showed the destructive side of nationalism and acted as an impetus to leverage Europe’s common history and cultural inheritance to forge a supranational political and economic union dedicated to peace and prosperity. Since the end of the Cold War and the Treaty of Maastricht, the process of European integration has sped up rapidly, resulting in a common European currency as well as common legal and political institutions. At the same time, concerns about the perceived loss of sovereignty, national identity, and democratic accountability have led in some places to backlashes against Brussels and resurgent nationalism. There is also the broader question of the European Union’s goals and identity—is it principally an economic union, or is it a superstate in the making? In this course, we will explore Federalism in its institutional, legal, philosophical, and historical aspects in both America and Europe.

470.722 Intelligence and War (3 credits)

“Intelligence and War” will examine the use and misuse of intelligence in the warning of, preparation for, and conduct of war. It will highlight its endemic nature, and its applicability to prevailing in as well as preventing armed conflict. The evolution of intelligence capabilities will be reviewed, and its current status and relevance examined.

470.723 Western Political and Constitutional Thought (3 credits)

This is intended as a broad survey of Western political thought, particularly as it developed in the European historical context from the classical era to the 20th century. The thinkers we will discuss can be thought of as engaged in what Robert Hutchins called a “great conversation” across the centuries on the central questions of political philosophy. These questions include: What are the purposes of government? What is the best form
of government? How are justice and liberty best realized in a political system? What are rights, and where do they come from? What is sovereignty, and in whom does it reside? What principles make political authority legitimate? Is disobedience to political authority ever justified? In many ways, these questions are perennial ones, as relevant in our own time as in the distant past. Moreover, the divergent systems of thought developed to answer these questions continue to shape much of contemporary political life, e.g., democracy, constitutionalism, liberalism, socialism, and conservatism. Among the political philosophers who will be examined are Plato, Aristotle, Augustine, Thomas Aquinas, Machiavelli, John Locke, Edmund Burke, Thomas Hobbes, Jean Jacques Rousseau, Friedrich Nietzsche, Karl Marx, Hannah Arendt, and Leo Strauss.

470.724 The Politics and Economics of Postwar Reconstruction (3 credits)
This course examines the challenges of peace-building, state-building, and development in contemporary post-conflict contexts. From rebuilding the economy and strengthening institutions to overcoming the legacies of violence, donors, diplomats, and military forces are confronting the core political struggles of modern statehood. This course will examine current research and practice to explore the elements of postwar economic and political development on the ground, including peacekeeping, security and justice, economic policy, governance, public participation, and reconciliation. It will also examine the policymaking processes in donor countries and international organizations that affect the role of foreign aid and intervention. Country case studies will serve to explore the tensions, trade-offs, and dilemmas inherent in these contexts.

470.726 Education Policy and Federalism (3 credits)
This course will explore contemporary issues in education policy, with a focus on the evolving relationships between federal, state, and local governments in guiding America’s schools. Topics will include the successes and failures of the soon-to-be-reauthorized federal No Child Left Behind Act, debates over the wisdom of national academic standards, the legal environment for public school finance, the growing role of nongovernmental organizations like Teach for America and collective bargaining in education, and the political dynamics of education reform. The course will include group discussions and papers in which students will be required to select and defend specific policy positions in the areas discussed. (Recommended elective for MA in Public Management).

470.727 Equality Law (3 credits)
This course will consider how the 14th Amendment and related statutory innovations have promoted equality among citizens. Students will read U.S. Supreme Court opinions that established or modified precedents governing the constitutional meaning and enforcement of equality. Students will also study judicial interpretation and application of public policies designed to complement 14th Amendment guarantees, such as Title VII of the Civil Rights Act of 1964 and Title IX of the Education Amendments of 1972. Through an examination of legal controversies over rights, resources, differentiation, and stratification, students will become familiar with the role of law in mediating citizenship and social relations, and will expand their understanding of the interpretive work of the Supreme Court.

470.728 Fundamentals of Nonprofits and Nonprofit Management (3 credits)
(Formerly Influence and Impact of Nonprofits). The goal of this course is to convey the history, size and impact of the nonprofit and philanthropic sector while providing the fundamentals of nonprofit management and the founding of a nonprofit organization. Successful nonprofits today must have strong management systems in place in order to assure quality programs for service and impact. These systems include management of finances, strategic planning, human resources, information technology, marketing, performance measures and other aspects of operations. The course will help the student understand the current thinking regarding “best practices” in managing and improving nonprofit organizations and appreciate the interplay of environmental and organizational factors that influence managerial decision-making. Throughout the course, there will be a comparative perspective that looks at the scope and status of nongovernmental organizations in other countries and the influences on those organizations by their own governments, foreign aid and international philanthropy. (Core course for MA in Public Management. Elective course for the Certificate in Nonprofit Management.)

470.729 The Presidency and Congress (3 credits)
This course examines the dynamics of the separation of powers, focusing on the two elected branches. We will study the tensions and conspiracies between and within those branches and look at competing notions of leadership, partisanship, representation, and constitutional government by focusing on the institutions, the revolutions within them, the crises that have defined them, and the character of the men and women who have shaped them. This course counts toward the Concentration in Legal Studies.

470.730 Intellectual Property Law (3 credits)
This course, taught by a sitting federal judge, will survey intellectual property law, including patent, copyright, and trademark law. The course will cover the basics of intellectual property and will be taught like a law school class, using the case method. The course will also introduce students to the fundamentals of legal analysis. There will be no exam; students will be required to write a paper.

470.732 Communications and Congress (3 credits)
This course will examine how Congress communicates with the American people through the eyes of a press guy. It will teach students how to construct a sound bite just as it teaches the history of Congressional relations with the Fourth Estate. How do you go about writing a press release, talking to a reporter, driving a message, and navigating the confusing world of Capitol Hill? What’s it like being a press secretary for a member of Congress? In addition to these contemporary applied skills, historical approach will be taken in considering the evolution of Congress as an institution. Contemporary examples, where appropriate, will be used to underscore points made in the texts. (This counts toward the Political Communication Concentration for the MA in Government.)
470.735 Politics and the Media (3 credits)
Quickly accelerating changes in the ways get our news are compelling newsmakers and journalists alike to rethink their craft, and their relationships with their audiences, with repercussions for policy, politics, and public discourse. This course will examine how innovations, like social networking, mobile platforms, behavioral targeting, etc., are providing journalists and political leaders with new ways to interact with citizens. It will look at how the rapid migration of consumers to the Web is leading news organizations of all types to rethink how they organize, pay for, and think about themselves.

Students in this course will use real-time news developments in the nation's capital as a laboratory for observing the evolving ways news sources and reporters and the public interact. Questions to be considered include whether this digitized and networked environment has implications for the pace and character of changes in public policy. The course will invite practitioners in journalism and politics who are dealing with these developments daily to share their sense of where all this is leading. (This course counts toward the Political Communication Concentration for the MA in Government.)

470.737 The Media and Presidential Politics (3 credits)
(This course counts toward the Political Communication Concentration.) This class will look at presidential politics during presidential campaigns and how the candidates work with and against the media. All forms of media, from print reporting to television to the new applications of the Internet and beyond, will be explored and discussed as we pay particular attention to the role the media plays in conveying the president's message to the public. The course will follow key events in the Obama administration, such as, for example, the financial meltdown or growing American involvement in Afghanistan, and use them as case studies to better understand the interaction among politicians, policymakers, and the media.

We will also look back at former presidents and previous presidential campaigns to compare with the current Obama administration and the 2008 presidential campaign. We will analyze how the 2016 presidential campaigns are just beginning and how the media is now covering possible potential rivals.

470.738 Time Series Models and Forecasting (3 credits)
Examines statistical models used to investigate the performance of variables over time and predict their performance in the future. Topics include autocorrelation, moving averages and smoothing, exponential smoothing, autoregressions, seasonality, and interrupted time series designs. (Prerequisite: Quantitative Methods. Option for a Government Analytics core course.)

470.739 Emergency Management and Communications (3 credits)
A series of unforeseen and unprecedented emergencies in recent years have posed steep challenges to private businesses, nonprofit institutions, and local, state, and federal government. Terrorist attacks, pandemics, natural disasters, financial collapse, and other crises pose unique challenges to policymakers. Increasingly, people in authority have had to implement plans, make announcements, and order evacuations, often on short notice and bereft of effective tools. This has caused the public, private, and nonprofit sectors to invest more resources in preparation. This course will examine approaches that have been taken with an eye toward minimizing damages and enhancing the security of the greatest number of people. It will examine some that have succeeded and others that have not. On occasion, those who have been on the front lines in emergency situations will appear in class to enhance students' appreciation of the extent of these potential threats and to share their ideas as to how they might best be handled. Readings will focus on case studies of historical and contemporary emergency situations and how policymakers addressed them.

470.740 Cyber Policy, Strategy, Conflict and Deterrence (3 credits)
This course will provide an overview of current issues in the cyber realm, focusing on policy and conflict from a U.S. and international perspective. We will begin with an understanding of the power inherent in cyberspace and consider the policy issues facing the civilian, military, intelligence and private business sectors in dealing with offensive and defensive cyber activity. Through the use of case studies, we will examine previous and ongoing cyber conflicts to understand their impacts on international relations. We will analyze the roles of several different types of cyber actors including state actors, non-state actors such as criminal and terror groups and private sector/business responses. This course will also examine the issue of cyber deterrence, and the unique aspects of offensive and defensive cyber activities by all cyber actors. A technical background is not required and basic aspects of cyber operations will be discussed and demonstrated as part of the introductory class sessions.

470.741 Democracy, Elections, and U.S. Foreign Policy (3 credits)
Elections have been described as the primary vehicle for launching and reasserting democracy in any country. Few, however, have considered the connection between the two. In this course, students will consider initially the various ways by which democracy has been defined, asking: What is democracy, why is it important, and what "values" related to it should be upheld in holding elections? Students will also look at different electoral systems used for organizing elections around the world. Do these systems make a difference to election outcomes? Are there consequences for choosing one over another? Real-world examples, including the controversy surrounding the 2000 American presidential election, will be used to consider whether greater attention should be paid to the linkage between democracy and elections. (This course counts toward the Concentration in Security Studies.)

470.743 Data Mining and Predictive Analytics (3 credits)
Many government agencies engage in data mining to detect unforeseen patterns and advanced analytics, such as classification techniques, to predict future outcomes. In this course, students will utilize IBM SPSS Modeler to investigate patterns and derive predictions in areas such as fraud, health care, fundraising, human resources, and others. In addition, students will learn to build segmentation models using clustering techniques in an applied manner. Integration with other statistical tools and visualization options will be discussed. (Recommended prerequisites or co-requisites: Statistics and Policy Analysis, Quantitative Methods.)
470.744 Trade and Security (3 credits)
Since World War II, American trade policy has been implemented through agreements with a growing array of foreign governments to encourage global economic integration by lowering barriers to international trade. The course will begin with a look at the foundation of this approach to trade policy at the end of World War II and the relationship the Roosevelt and Truman administrations saw between integration and security policy. It will then introduce students to the American trade regime of the early 21st century and the WTO, and examine the ways the U.S. governments has adapted this regime to regional challenges arising from relationships with Japan, China, and the Muslim world, and to policy issues, like resource dependence, sanctions and export controls. The course will have a midterm exam on America’s trade regime and the concepts that have shaped it, and a final paper, in which students will examine an issue of their choice in depth. (Recommended elective for MA in Public Management).

470.746 Iran: Security Policy of a Revolutionary State (3 credits)
This course will provide the analytical and contextual skills required to understand the current political and security situation of Iran. After laying out the context of the Iranian Revolution through a brief examination of the Pahlavi years, the course then weaves together Iran’s political, military, diplomatic, social, economic development during the turbulent years between Iran’s 1978-1979 revolution and the 2015 nuclear agreement covering a time period of roughly 1941 to the present day. This course covers three main inter-related topics: the history and development of the modern Iranian state; the interaction between state and society in modern Iran; and Iran’s diplomatic history in the 20th and 21st centuries. The course concludes with a discussion of Iran’s present-day foreign, security, and defense structures and processes.

470.748 The Art & Practice of Intelligence (3 credits)
This course will examine what intelligence is and how it is done. It will place a strong emphasis on effort on the limits of the possible, including limits on knowledge, ethical limits, and political limits. Drawing on historical examples, the course will look at the various types of intelligence collection and how they interact with each other. It will explore the analytic process and the interface between analysts and policymakers. It will examine the connections between intelligence and policy formulation and execution in various aspects of the national security realm. The class will conclude with a brief exploration of differing concepts and practices in other countries.

470.749 Running for Office Changing News Cycles (3 credits)
You can see yourself now – taking the oath of office, giving speeches, and making critical decisions impacting thousands or millions of people. But how do you get there? This class provides a practical guide for students who are interested in exploring a run for elected office. Students will learn how to assess if and when they are ready to run, which office to run for, and most importantly, develop the critical skills needed as a candidate to wage and win a contested campaign. These skills include writing a campaign plan and budget, hiring staff and consultants, learning how to raise funds, and working with the media. This class dispels the myth that only those independently wealthy can serve in office by giving students a real understanding of what it takes to run and win.

470.751 Politics and Security in the Middle East (3 credits)
This course will cover key topics relating to Middle East politics and security, with a particular emphasis on emerging dynamics of the region in the wake of the Arab uprisings. The course will explore several key themes, such as the rise of sectarianism, evolving trends in Islamist militancy, and the status of social movements and Identity politics in the Middle East. It will also address long-standing issues, such as the ongoing Israeli-Palestinian conflict and Iran’s role in the region. Finally, the course will also examine U.S. policy responses to the changing political and security landscape of the Middle East. Classes will alternate between broader, theme-related sessions and country-specific cases.

470.752 Intelligence Analysis (3 credits)
Intelligence analysis is fundamentally about understanding and communicating what can be known, not known, and surmised, as it can best be determined, to decision-makers. Students will learn the basic skills of the intelligence analysis trade and have the opportunity to practice them through work on a semester-long project with current intelligence and national security applications. Students will also grapple with the complex psychological, political, organizational, ethical, and legal issues surrounding intelligence analysis both now and in the past. (Counts toward Security Studies Concentration.)

470.753 Problems in State and Local Government: Can They Be Fixed? (3 credits)
State and local budget and tax systems are not optimal—and in many cases, not functional—for 21st-century governance. This course will look at aspects of budget and revenue systems that could be modernized and improved, and how that might be accomplished. Areas studied will include use of budget projections; tax expenditure policies; sales, income, and property tax issues; and business taxation, as well as issues of whether and/or how use of newer technologies and newer ways of doing business should be taxed. It also will consider some current trends that could further undermine governance, such as proposals to write specific funding formulas into state constitutions. Issues and trends will be considered across states, and students will be assigned specific states to study in depth and discuss during class time. Both policy solutions and the interest groups and political strategies that are necessary to achieve solutions will be discussed. The course will begin with a brief introduction to state and local finance.

470.754 Global Climate Change and U.S. Energy Security (3 credits)
While the world negotiates a new climate change treaty, the U.S. continues to work through its domestic climate change policy. Twenty states have developed statewide climate planning initiatives, and there are regional policy initiatives as well. At the federal level, legislation to address climate policy and energy security is being debated in Congress. In addition, as a follow-up to a 2007 Supreme Court ruling, the U.S. Environmental Protection Agency is moving forward with a number of regulatory actions to address greenhouse gas emissions. This
course will address each of these international and national efforts and their implications for the further development of climate change and energy security policy in the U.S. The economic and social issues associated with these policies will be examined as well.

470.757 Nonfiction Writing and Politics (3 credits)
Clear and persuasive writing is often essential in Washington, and this course will introduce students to three of the most important forms of nonfiction writing: opinion journalism, magazine writing, and personal essay and memoir writing. Students will be required to produce finished work in each of these genres, and read and critique each other’s efforts. They will also be expected to read and bring to class examples of successful nonfiction writing. The section of the course on opinion journalism will analyze editorial and op-ed writing, and discuss how to make an argument that is convincing even to those who do not share one’s point of view. The section on magazine writing will focus on the organization and structure of successful magazine pieces, such as those appearing in such publications as The New Yorker, Vanity Fair and The Weekly Standard. The section on memoir writing will examine narrative structure and techniques useful to a writer who seeks to tell his own story.

470.758 Data-Driven Campaigns and Elections (3 credits)
This course examines how campaigns increasingly rely on data and analytics to inform their voter mobilization and persuasion strategies. Campaigns are leveraging massive databases that contain information on voters’ spending, political engagement, and media consumption habits. Using this information, campaigns can make smart decisions about which television/print ad slots to purchase and which voters to target in get-out-the-vote efforts.

470.759 American Political Development (3 credits)
This course examines the factors that promote stability and change in American politics. Broad in historical scope, this course considers the development of the American state and its institutions as well as the continuities and complexities of American political culture by analyzing key moments of institution building and policy change from the American founding to the present. Key questions include: What explains the character of the American state? What are the consequences of the American state and its policies? Is America “exceptional” in these and other regards? What roles and functions do political institutions perform? What roles do culture, ideas, and rhetoric play in social, political, and economic life? How have these various roles and functions changed over time?

470.760 Comparative Intelligence Systems (3 credits)
Do all countries conduct their intelligence activities in the same way? If not, what are the reasons for the differences? This class will consider theoretical ways of understanding and assessing national intelligence systems. It will look at political, historical, and cultural factors that may influence the development and functions of nations’ intelligence agencies and systems. The class will include an examination of the “ways of intelligence” of the United States, the United Kingdom, the USSR/Russia, Germany, China, and Iraq, among others.

470.762 U.S.- Mexico Relations: Migration, Trade, and Organized Crime (3 credits)
The “immigration issue” with Mexico is being hotly debated as America continues to struggle with immigration policy reform in the post-9/11 era. Other important policy areas of mutual interest to Mexico and America as neighbors are trade, security, and environmental and energy issues. This course will explore and compare the government and politics of each country, important cultural differences impacting their governing styles, and attempts at cooperation to address critical policy areas. The course will include at least six videoconference sessions with faculty members and students at CIDE University in Mexico City. There also will be one videoconference session connecting the class with both CIDE and Fudan University (Shanghai, China) to discuss trade and global governance issues that are of interest to all three nations.

470.765 Mass Media and American Politics (3 credits)
While the mass media is not formally part of our government, it exerts a powerful influence upon it by shaping public attitudes, helping citizens learn about the world, and allowing public officials to communicate with citizens and with each other. This is an exciting time to be learning about the political role of the mass media. The rise of the Internet, the growth of 24-hour cable news, and the decline of the “Big Three” television networks have created a much more fluid and stimulating media environment than existed just a decade or two ago. But this course is not simply about the role played by the mass media in a political system. It will also cover how political actors inside and outside of government try to shape media outputs and how they try to use the press to accomplish their own goals. We will also look at how blogging and YouTube have blurred the lines between journalism and activism, and have enabled ordinary citizens to play increased roles in the civic dialogue. The primary purpose of this course is to analyze the role of the media in American politics and its relationship with the public, business, government, and candidates for office in a democratic society. We will do this by first examining the role and structure of the news media as a political and economic institution, and how it is being transformed by the Internet. We will also examine the conventions and controversies associated with the journalism profession, including news reporting and the newsgathering process, questions of bias and objectivity, and investigative journalism.

470.766 Economic Growth: The Politics of Development in Asia, Africa and Beyond (3 credits)
What makes some countries grow while others do not? What accounts for successful economic development versus stagnation? As these questions become ever more relevant in an increasingly globalized world, this course offers an introduction to the topic. The class will provide an overview of the main classic and current theories of economic development. It will then go on to explore specific current issues in development, including development aid, role of international organizations, sustainable development, corruption, institution building, and regime type. Specific case studies will be examined including China and India, the East Asian “tigers”, development failures in Africa, and mixed outcomes in Latin America.
470.769 Data Science for Public Policy (3 credits)
In practice, data offices are no longer in the basement with the servers and the boiler room; they’re on the top floor next to the executive staff. The modern policy analyst needs a strong understanding of how to use data and how data can inform strong decision-making. To this end, the course has two goals: 1) arm students with a high-level understanding of how federal and state agencies are using and should use data, and 2) provide a strong foundation of cutting-edge data science skills.

470.770 Transatlantic Learning: Lessons From European Energy & Environmental Policy (3 credits)
This course offers a new perspective about environmental, climate, energy, and urban development policies and cooperation with Europe: reviews and analyzes these policies, their development, and their performance; and assesses their potential applications to the U.S. Urban themes are the focus of this class, given the leadership and progress of many European cities, particularly in the areas of renewable energy, energy efficiency, transportation, "green" buildings, water infrastructure, and brownfields redevelopment. For example, we will study, among other themes and projects, energy-efficient housing and buildings policies in Freiburg, brownfields redevelopment in the Ruhr Valley, green infrastructure practices in Stuttgart, and renewable energy policies in Copenhagen and their potential transfer to the U.S. We will then explore issues about how energy strategies of Stuttgart can be integrated into energy planning in Northern Virginia, how storm water management practices in Berlin can be applied to Washington, D.C., and how light rail systems in Freiburg can be adopted in Baltimore. At the end of this course, students will be aware of the key European environmental and energy policies supporting these innovations and will appreciate how U.S. cities can learn from them.

470.771 Climate Change Economics (3 credits)
This course will examine the key issues, concepts, and applications of economic analysis to climate change mitigation and adaptation policy development and implementation at the subnational and national levels. It will include concepts, techniques, and case histories of microeconomic, macroeconomic, and distributional impact analysis as applied to specific sector-based policies and measures and related policy instruments, as well as broader approaches for assessment and management of economic security. Emphasis will be on comprehensive understanding and skill development as applied to real-world policy and business applications, including current economic, energy and environmental issues, and assessments. Students do not need advanced economic, science, policy, or quantitative training for the course but should have basic exposure to concepts and skills in these areas to support learning experiences and skill development.

470.773 Energy and Environmental Security (3 credits)
This course surveys the multiple and overlapping aspects of energy and environmental security. Students analyze the contentious proposition that increased competition for environmental and energy resources threaten national security. The course also examines how such threats may be mitigated. (Core course for the MA in Global Security Studies.)

470.774 Nonprofit Governance & Executive Leadership (3 credits)
This course advances our understanding of self-governing nonprofit organizations by focusing on the responsibilities, expectations, challenges, and opportunities of nonprofit boards and their executive leadership. This course covers the basic responsibilities of nonprofit boards according to law, custom, and best practices, and it includes ethical concepts, public attitudes, and contemporary legislative and regulatory issues. The course explores theories of effective governance and executive leadership that have had wide influence, and how ethical considerations relate to perceptions of excellence and shape the way staff and volunteer leaders manage people and money. In the discussions, there will be opportunities to compare the role of boards in US nonprofit groups with those in other countries. (Elective course for the Certificate in Nonprofit Management.)

470.775 Women and Gender in Law and Policy (3 credits)
This course will examine policy issues and controversies affecting women based on gender. While gender will be the primary category of analysis, it is not a unitary category. Statuses and affiliations based on race, class, sexuality, age and other characteristics intersect with gender and diversify women's gender experiences. Accordingly, the course will explore policy assumptions and imperatives that address or reflect differences among women, and will consider how policies can affect differently situated women differently. Readings and discussions will focus primarily on policy issues that bear directly on women's equality: women’s constitutional status, employment and the workplace, educational equity, poverty and economic insecurity, reproductive and family rights, intimate violence, and sexual coercion. As we examine policies in these areas, we will also consider when and whether women have played a role in policy developments affecting women.

470.776 Nationalism in the Democratic Age (3 credits)
Nationalism and democracy have been two of the most significant forces shaping the contemporary world. The sense of nationality has provided peoples with a strong sense of shared belonging based around the ideas of a common language, land, and heritage. It has sometimes fueled the demand for collective freedom and democratic self-determination. At the same time, it has been a volatile force generating conflicts within and between nations across the globe. In Europe, the effort at forging a common European identity must confront the challenge of resurgent nationalism in traditional countries like Britain, France, and Austria. Meanwhile, traditional states like Britain and Spain must themselves confront secessionist nationalism in Scotland, Catalonia, and elsewhere. The modern Middle East has been shaped in part by the conflicting goals of two major nationalist movements: Arab nationalism and Zionism. In Asia, nationalism is emerging as a dominant theme as countries like China and India rise to political and military power. In spite of economic globalization and the development of international laws and institutions, it is pivotal to understand nationalism if we are to understand world politics today.
470.778 Federal Contracting Law (3 credits)
This course is designed to provide students with an understanding of the nuts and bolts of the formation and performance of government contracts. Every year, the federal government spends approximately $190 billion contracting for supplies, services, construction, research, and development. The course, taught by a sitting federal trial judge, will examine the federal procurement process from a legal vantage. Students will gain an understanding of the competitive contract award process as well as issues surrounding performance of government contracts, including socioeconomic policies that affect the award of government contracts, such as small business set-asides and incentives to procure from domestic sources. The course will include bid protests and contract disputes.

470.780 21st-Century Media: Revolution or Evolution? (3 credits)
This course will explore historical norms and changing theories about the role of the media/press in society, using comparative analysis of different time periods. While media outlets are losing some independence, this is not necessarily the end of the world, as the need to increase partnerships, including with non-media entities, is a fact of life in a modern, diversified marketplace. In some cases where newspapers or other news outlets are owned by larger industrial, commercial, or even ideological/political interests, the trend actually has an element of returning to the roots of what the press was in the past. The course will use case studies to examine major newspapers that are or were part of larger non-media conglomerates, print publications like the National Review and The New Republic that rely on foundations or major donors for funding, and networks that need to be part of larger entertainment/online empires to survive. We will also study the phenomenon of the “leaner, meaner” biogosphere and whether it can be a reliable or profitable model.

470.781 Development of Climate, Energy, and Security Plans (3 credits)
This course will examine the key issues, concepts, and techniques associated with the formal development and implementation of consensus-based policy agreements to advance and integrate climate, energy, and economic security plans at the subnational, national, and international levels. Students will learn the essentials of translating science to policy plans and programs across a wide array of economic sectors, policy instruments, and levels of government as applied to culturally, economically, and geographically diverse regions. Issues and techniques will be discussed in relation to legislation, executive, and administrative action. Students will focus on theory, advanced techniques, and real-world cases in states and provinces, in addition to national and international policy agreements. Students are not required to have advanced backgrounds in economics, science, law, policy, or negotiation but should have basic familiarity with these issues and skill areas to enable learning and performance in a highly integrative environment.

470.782 The Practice of Public Diplomacy and Statecraft (3 credits)
This course is designed to help participants gain insights and some mastery over the public dimension of national security policy formulation and implementation. (Much of the knowledge and skills imparted in the course will be applicable to domestic and transnational affairs as well.) The course will highlight the role of the public and public opinion in the conduct of national security affairs. In addition to practical skills, participants will gain a greater appreciation of the limits as well as the potential strengths of public diplomacy. The course will deal with current international strategic communication challenges, ranging from Afghanistan to transnational environmental and health concerns.

470.783 Presidential Primaries and the Media (3 credits)
The national media plays a pivotal role in the early days of presidential campaigns. We will look at the role the media, e.g., the cable television channels, the newspapers and magazines, the bloggers and the Internet, play in promoting or demoting presidential candidates as they gear up to run for the Oval Office. The media can literally make or break a presidential candidate in the early stages of his or her campaign. The course will look at how the presidential candidates court the media, in particular, the communications and media operations of campaigns, and how the media courts the candidates. We will compare the 2016 presidential campaign with other presidential contests in American history.

470.785 The American Way of War (3 credits)
This course is an overview of U.S. military history and policy, with particular emphasis on how the nation has thought about, prepared for, and conducted its wars. As such, it examines the interaction of the military, cultural, social, material, institutional, and international factors that have shaped a putative “American way of war.” The course aims to address three key questions: 1. How has the American form of government shaped the way the United States fights its wars? 2. How have those responsible for the actual conduct of war, especially the military profession, thought about war as a phenomenon? 3. Has the intersection of these two questions produced, as Russell Weigley has claimed, a uniquely “American way of war”? The course will consider how the American conceptualization and practice of war have reflected the intertwined views of political leaders, military intellectuals, and military practitioners. We will start by looking at the way in which the American Revolution engendered the governmental and military institutions of the United States, the “architecture” that has shaped the American way of war ever since. America’s Revolutionary generation understood that war was a fact of international life, and that the survival of the infant republic depended on developing and maintaining the potential to make war. Indeed, the unprecedented ability of the United States to wage war while still preserving liberty is the greatest legacy of the America Revolutionary generation. The American Civil War constituted the greatest test of the founders’ legacy and also constituted the transition to “modern war,” which required the creation of a mass armies and the total mobilization of the nation’s people and resources. But the United States has always faced the threat of irregular warfare, from the frontier to the Philippines and the Caribbean. The cases we will
examine demonstrate the degree to which those responsible for preparing the United States for war have been successful in balancing requirements across the spectrum of conflict.

470.787 Current Issues in Health Care Reform (3 credits)
This course will provide an introduction to the U.S. health care system, with a focus on current debates in health policy: How much do we spend on health care, and why are costs growing? How are the major public programs structured, and do they need to be fundamentally reformed in order to reduce the federal budget deficit? How will implementation of the Affordable Care Act affect the insurance market? Will it raise or lower costs? What can be done to improve quality of care? We will explore a range of perspectives on these controversial issues, including the views of policymakers, academic researchers, and economists, and the role of public opinion.

470.788 National Security and Individual Rights (3 credits)
This course looks broadly at national security and individual rights to deepen our appreciation of the historical and institutional values that protect a constitutional democracy. The framers did not pin their hopes on a single leader to protect the nation, even in times of crisis. They had fought in the Revolutionary War against England to secure their independence and knew the dangers that emergencies bring. They decided, after a close study of history and much debate, that countries are more secure when they separate power and follow a deliberative process of making public policy. Their whole experience rebelled against the idea of concentrating power, either in a president or a Supreme Court. What events, particularly after World War II, have caused us to lose sight of those basic understandings? What damage has been done to constitutional government? How can we better respect and protect democratic values?

470.789 INGO/NGOs and Civil Society in Conflict Zones (3 credits)
Since the end of the Cold War the world has seen a scourge of civil conflicts emerging across the globe, such as in Bosnia, Rwanda, Darfur, DR, South Sudan, and now Syria, global conflicts have put enormous pressure on intergovernmental bodies and governments. Whether too slow to respond, afflicted by political restraints or hindered by bureaucracy, the restrictions on international agencies and governments have often placed NGOs at the fore of response. Partnering with both national governments, military, and international agencies, NGOs have gained recognition for their role in diplomacy, conflict resolution, and peacebuilding. NGOs have gained a prominent role at helping to defuse, mitigate, and prevent conflicts strengthening their influence and recognition. This course will provide an overview on the role that international organizations and civil society (including community based organizations) can have in conflict or post-conflict torn countries. Students will learn how to build strategic partnerships when working with local organizations and NGOs. (Elective course for the Certificate in Nonprofit Management.)

470.791 Political Writing and Communications (3 credits)
“Get me a press release for the candidate ASAP,” barks your boss, the campaign manager. You take a swig of your favorite caffeinated beverage and look at your screen; what will you write? This course will provide students the skills and tools they need to succeed in this situation and others. In this class, students will learn the art of political writing and communications where practitioners use speed, brevity, and pith to ensure that their points are conveyed and understood. The course will give students a foundation of strategy and message development, focusing in particular on communications tools, like press releases, media advisories, speeches, memos, and tweets. All of the coursework and assignments will be based on political or public affairs issues. At the end of this writing-intensive course, students should have the skills they need to work in communications, whether it be on a political campaign, on the Hill, or at a public affairs agency.

470.793 The Influence of Public Opinion on Public Policy and American Democracy (3 credits)
Public opinion is an essential consideration for all governments. This is particularly true in a democratic polity. In a democracy, a candidate cannot hope to win office, or keep that office if elected, without understanding the opinions of his or her constituents. Further, citizens are expected to influence the public policymaking process by expressing their opinions to their elected officials. This course will explore public opinion from the perspective of both elected officials and private citizens. We will investigate the origins, structure, and influence of public opinion. We will examine recent polls to better understand the methods used to measure, interpret, and present public opinion. Finally, we will analyze current opinion in three major policy areas: foreign policy, the economy, and social issues. This course counts toward the Concentration in Political Communication. Elective option for Government. Analytics students.

470.796 News Media and Presidential Nominations (3 credits)
Theodore White wrote, “A primary fight … is America’s most original contribution to the art of democracy.” This course will explore how the news media covers presidential primaries and caucuses, and how that coverage affects the selection of a standard bearer. The course will attempt to put into historical context the 2012 GOP nomination battle, look at how the role of news organizations in covering the fight for delegates is changing along with the media environment, and explore the emergent role of social media in deciding nominations. The class will look at the origins of the modern presidential selection process and how the news media, particularly television, contributed to its emergence. The course will study recent nomination battles, including Clinton versus Obama in 2008 and Bush versus McCain in 2000, as well as pivotal earlier contests, including RFK versus Humphrey in 1968, Reagan versus Ford in 1976, and Mondale versus Hart in 1984, among others. The course will look at the role played by polling, televised debates, the early contests in Iowa and New Hampshire, and media portrayals of candidate character and positions, as well as the often unintended effects of party rule changes. We will also look at the impact of the “invisible primary” on the party’s eventual choice of a nominee. This course counts toward the Concentration in Political Communication.
470.797 Introduction to Homeland Security Intelligence (3 credits)
This course provides students with an intellectual foundation for understanding the concepts underpinning homeland security intelligence, as well as an overview of the US national homeland security framework including organization and policies. It examines the underlying intellectual constructs used to frame the comprehension of security issues, intelligence based on those issues and the development of policies and strategies that lead to implementing programs that protect the United States infrastructure and its people from attack. Over the term, students will be challenged to examine the various paradigms that shape homeland security intelligence and critically apply them to contemporary homeland security challenges and examine how well or poorly these paradigms are reflected in current responses, organizations and policies.

470.798 Financial Management and Analysis in Nonprofits (3 credits)
This course surveys the basic tools for financial management and analysis through the lens of a nonprofit leader. Whether students are interested in a career in nonprofit organizations or in working with nonprofit organizations in other capacities, students will learn to be an informed consumer of financial information and an educated user of financial tools. Students will put themselves into the shoes of a nonprofit leader, understand how financial information and tools play an important role in evaluation and decision-making processes, and ask critical questions using the financial information and tools before making decisions and take actions. The course starts with an internal perspective before turning the focus externally: This course is not intended to make students financial experts. Rather, it will provide basic knowledge for students to ask the right questions, know where to get information and answers, and work effectively with financial experts in the field. (Core course for MA in Public Management. Elective course for the Certificate in Nonprofit Management.)

470.799 State Politics: A Year in the Life (3 credits)
In this course, each student will be assigned to track a particular state as new legislative sessions begin. During the semester, students will examine the key issues that the legislatures, governors, and other branches of state government take up, and how social issues, budgets, and other challenges are met. Students will explore what makes a state “red” or “blue”, and what it means for citizens in those states. Of particular interest are states with governors and other state officials who may have aspirations for the White House and states with new political leaders elected the previous fall.

470.800 Research & Thesis III: Government and GSS (3 credits)
(Directed research in an appropriate subject determined in consultation with the student's adviser is the focus of this final course. Students are expected to propose research topics based on their coursework and/or on material derived from professional experience. Class meetings are designed to give guidance in the clarification of issues, collection of data, assembly of various parts, and the final writing of the thesis. Graduation is subject to approval of the thesis by the thesis committee. Students may enroll in this course only after they have completed all other 11 courses required for the degree, although for financial aid reasons, they may take their last elective along with this course. Research and Thesis III is offered in all three terms—in the summer, fall, and spring—to provide as much scheduling flexibility as possible. (Core course for the MA in Government.)

Prerequisite: Students must have passed either Research and Thesis II or Research and Thesis II: Global Security Studies, or have passed 470.709 Introduction to Quantitative Methods.

470.830 Practicum in Government and Politics (3 credits)
One of the great strengths of the Government Program is that it brings theory and practice together, and recognizes that it is often from work experience that students gather useful and practical insights and information that can be applied to academic work. This course is designed for students who have an internship or who work in a field that will allow them to use that work experience to conduct research that may be applied to their theses. Permission of instructor is required.

470.850 Research & Thesis I (3 credits)
The purpose of this core course in the Government program is for students to refine their thesis topic, develop their research design, and complete a working outline for their thesis. Students will begin to research and write their thesis during this class in earnest. The course format is working sessions focused on specific research-oriented tasks. Emphasis will be placed on completing the literature review and methodology sections of the thesis. Students will also complete by semester end a preliminary chapter of their thesis papers and work with the professor to develop a plan for the other two papers that will comprise the portfolio thesis. (Core course for the MA in Government.)

470.851 Introduction to Qualitative Methods in Social Science (3 credits)
This course is the first in the Research Study sequence for the Global Security Studies program. The goals of this course are: 1) to help students be producers of scholarly knowledge, 2) to prepare students for later parts of the research study process, and 3) to prepare students to understand and critique others’ uses of various methods. The first part of the course will address fundamental issues, such as measurement, causation, and inference. The second part of the course will address research design, data collection, and analysis, focusing on specific methodological tools including case study analysis, interviews, content analysis, participant observation, survey research, etc.

470.852 Research and Thesis II (3 credits)
This directed research course is designed to help students complete the second paper of their thesis portfolio (and in some cases, if a student has two papers ready for revision, both their second and third papers). Students will work closely with the instructor to revise a current paper, turning it into a research paper that i) is tightly linked to the theme of the student’s first paper and overall thesis portfolio, and ii) meets research and writing standards for being included in the thesis portfolio. Class meetings are designed to give guidance on the methods of research and on the clarity and focus of the research question the student is pursuing. (Core course for the MA in Government. Please note that 470.709 Introduction to Quantitative Methods
may be substituted for this requirement with permission from the instructor. Prerequisite: Students must have passed Research and Thesis I or Research and Thesis I: Global Security Studies.)

470.853 Research & Thesis II: Global Security Studies (3 credits)
In this course, students will work closely with the instructor to complete the second paper of the thesis portfolio and to make substantial headway on the third paper of the portfolio. Students must pass Research and Thesis I before enrolling in this course. Students may enroll in 470.709 Introduction to Quantitative Research Methods instead of Research and Thesis II with the permission of the instructor.

470.854 Fundamentals of Quantitative Methods (3 credits)
The main purpose of this class is to train students to be informed consumers of quantitative studies, in addition to teaching the tools of basic statistical work. The emphasis in this class is on application and understanding of existing results, rather than on theory or derivations. The course material will cover basic descriptive statistics, inferential statistics, and data collection. The key learning objective is for students to finish the class with a better understanding of the statistical and econometric results they may encounter, both in papers they read in other classes, as well as in the course of their work. The second key objective is for students to have the skills to employ basic quantitative tools in their own work in the fields of public policy and global security studies. As much as possible, assignments and readings used in class will be drawn from the public policy and security fields. There is no mathematical or statistical pre-requisite for the class. (Core course for the MA in Public Management and the MA in Global Security Studies.)

470.855 Research Study Seminar
This is the final course of the MA in Global Security Studies. Students use rigorous methods to research and write a journal article-length research study which they then defend.

470.860 Capstone for Public Management (3 credits)
This is the final required course in the MA in Public Management program, and students can only take the capstone course in their final semester and after having completed all the other core requirements (Students graduating in the summer semester must take the course in the preceding spring semester). In the semester prior to taking the capstone course and conducting the project, students identify a project topic. The adviser for the paper will be the faculty member teaching the course. To complete the course, students must write a 30- to 35-page capstone paper. (Prerequisites include completion of all Public Management core courses.)

470.861 Capstone Continuation
Required for those who have completed all of their coursework and have taken the capstone course for either Public Management or Government Analytics but have not yet completed their capstone paper.

470.862 Capstone Seminar: Development and Execution of a Data Analysis Project (3 credits)
This course guides students through the process of developing and executing an original data analysis project aimed at addressing a public policy, political or governance challenge. (Prerequisites: 470.681 Statistics and Political Analysis, 470.709 Quantitative Methods, 470.710 Advanced Quantitative Methods.)

470.888 Thesis Continuation (Noncredit)
Required for those who have completed all of their course work, including the Research and Thesis class, but are still working on their thesis. Details of this offering will be posted soon.
Individualized Genomics and Health is a rapidly growing area of research and applied science. The growth is due in large part to our increasing dependence on DNA and RNA sequence analysis of human and microbial genomes for diagnosis and treatment of disease. This emerging field requires a workforce with multi-disciplinary skills in bioinformatics, bioscience, regulatory science, policy and ethics. The goal of this degree program is to produce a highly skilled workforce with the theoretical knowledge and practical skills to meet the demands of the academic, research, and business communities.

As the field of Individualized Genomics and Health requires practitioners to have multiple competencies, the core of the Master’s degree will include foundation courses in Epigenetics, Human Molecular Genetics, Ethical, Legal and Regulatory aspects of individualized genomics, bioinformatics and individual genome analysis. After completion of the core requirements, students may choose to concentrate in Laboratory Diagnostics, Genomics, Regulatory Science or Policy or choose a general concentration. Specifically, the degree program consists of six core courses, three concentration courses and one elective.

**Program Objectives:**

Students will be able to:

- Explain the molecular and genetic basis for human disease including the role of epigenetics
- Analyze a human genome to identify possible indicators of health and disease
- Apply bioinformatics tools to the analysis of human DNA sequences
- Explain the ethical, legal and regulatory aspects of individualized genomics and health
- Understand the laboratory methods required to identifying genes responsible for disease

**Application Documents:**

- AAP application and fee
- A résumé or curriculum vitae
- Official undergraduate transcript
- 500-word statement of purpose
- TOEFL score for international students (minimum score on Internet-based test is 100)

Students are required to take six core courses, three concentration courses, and one elective

**Program Outline:**

**Core Courses**

- 410.610 Epigenetics and Gene Organization and Expression (4 credits)
- 410.612 Human Molecular Genetics (4 credits)
- 410.629 Genes and Disease (4 credits)
- 410.633 Introduction to Bioinformatics (4 credits)
- 410.736 Personalized Medicine and Genomics (4 credits)
- 410.760 Ethical, Legal and Regulatory Aspects of Personalized Medicine (4 credits)

**Concentrations**

- **Lab Diagnostics** (students choose 3)
  - 410.641 Clinical and Molecular Diagnostics (4 credits)
  - 410.656 Recombinant DNA Lab (4 credits)
  - 410.659 Advanced Recombinant DNA Lab (4 credits)
  - 410.666 Next Generation Sequencing and Analysis (4 credits)
  - 410.671 Gene Expression Data Analysis and Visualization (4 credits)

- **Genomics** (students choose 3)
  - 410.634 Practical Computer Concepts for Bioinformatics (4 credits)
  - 410.635 Bioinformatics: Tools for Genome Analysis (4 credits)
  - 410.666 Next Generation Sequencing and Analysis (4 credits)
  - 410.671 Gene Expression Data Analysis (4 credits)
  - 410.709 Cancer Genomics (4 credits)
  - 410.734 Practical Introduction to Metagenomics (4 credits)
  - 410.761 Pharmacogenomics (4 credits)

**Admission Requirements**

A 4-year bachelor's degree in the life sciences or engineering and pre-requisite courses completed in:

- Organic Chemistry or 410.302 Bio-Organic Chemistry
- Biochemistry or 410.601 Biochemistry
- Advanced Cell Biology 1, or 410.603 Advanced Cell Biology
- Molecular Biology, or 410.602 Molecular Biology
- Biostatistics or 410.645 Biostatistics
Regulatory  (Choose 3)
410.676  Food and Drug Law  (4 credits)
410.702  Biomedical Software Regulation  (4 credits)
410.721  In Vitro Diagnostic Regulation  (4 credits)

Policy  (Choose 3)
410.708  Medical Product Reimbursement  (4 credits)
410.721  In Vitro Diagnostic Regulation  (4 credits)
410.762  Ethics in Personalized Medicine  (4 credits)
410.763  Legal Aspects of Personalized Medicine  (4 credits)
410.764  Healthcare Economics  (4 credits)

General concentration
Pick three courses from the above concentrations.

One Elective
Any course in the Biotechnology program.
Please consult advisor.
Established in 1962, the MLA program is recognized nationally for the quality of its teaching and the breadth of its course offerings. The 10-course program enables degree candidates to pursue intellectual growth while advancing their professional and academic goals. The program features small, interactive seminars both locally and online led by distinguished Johns Hopkins University faculty; seminars may also be taught by leading experts from cultural, artistic, government, and academic institutions throughout the region and around the world. Local institutions include the Walters Art Museum, the Peabody Institute, Maryland Institute College of Art, the Maryland State Archives and, farther afield, the State Department and the National Archives. This challenging and rewarding program attracts people from diverse backgrounds and at various stages of their personal and professional lives. MLA students interact with professors and one another in a stimulating learning environment, both on the ground at the Homewood campus and online in an asynchronous format compatible with all work schedules and time zones. In consultation with advisers, candidates for the Master of Liberal Arts degree may choose to concentrate their studies in specific areas of the Liberal Arts or explore a wide range of subjects, including political science, art history, religion & philosophy, world cultures and ethnicities, history, music, literature, the sciences and, most recently, digital humanities.

Whether degree candidates define a specific focus or take a more wide-ranging approach to their program of study, the Master of Liberal Arts program places interdisciplinary scholarship at its core, fostering greater understanding of the philosophical, historical, scientific, and aesthetic dimensions of the world’s great thinkers and civilizations.

ADMISSION REQUIREMENTS

In addition to the materials and credentials required for all programs, the Master of Liberal Arts requires:

Credentials

A grade-point average of at least 3.0 on a 4.0 scale in the latter half of undergraduate studies is expected for degree candidacy (extenuating circumstances will be taken into consideration and should be explained in the statement of purpose described below).
Advanced Standing

Advanced Standing allows students who have completed graduate-level courses in a comparable Master of Liberal Arts Program, MA Program or Certificate Program at an accredited institution to be exempt from taking up to two courses (six credit hours) towards degree completion. To be considered for Advanced Standing, you must have received a grade of A or A+ in the course(s) for which you are requesting Advanced Standing, and the request for Advanced Standing must be made as part of your application to the MLA Program. A separate syllabus for each of up to two courses, including the name of the institution and the program attended, should be attached to your application form. You are welcome to contact the Program Director before submitting your application to determine whether courses you want to have considered for Advanced Standing fall within the MLA Program’s guidelines.

No Application deadline

Applications are accepted year-round and students may apply to enroll for summer, fall or spring semesters. Although there are no strict application deadlines, we recommend that all application materials be submitted at least 6 weeks prior to the start of the semester (international students should apply at least 3 months before the semester starts). For more information about our application process, click here.

Applicants who have questions regarding admissibility should contact the MLA Program Director.

LIMITED FELLOWSHIPS AVAILABLE FOR MLA STUDENTS

After successfully completing two courses, fully-admitted students may apply for limited private, campus-based fellowships; successful applicants receive partial tuition on a course by course basis. Application forms are available from the MLA Program Director.

COURSE REQUIREMENTS

Ten three-credit hour courses, including:

> One interdisciplinary core within the first three courses
> Eight electives, in addition to the core course, and a three-credit Thesis or Internship for the Capstone
> Nine electives in addition to the core course, and a one-credit Graduate Portfolio for the Capstone.

Courses described in this catalog are representative of the broad range of MLA offerings. For information on exact dates, times, fees, and instructors, students should consult the course schedule available at advanced.jhu.edu.

UNIVERSITY OF CAMBRIDGE SUMMER PROGRAMME

Since 1992, students in the MLA program have had the option of taking one summer course at the University of Cambridge in England to transfer as an MLA elective. For details about registration, which is not done through the MLA program, please review the website at the link below and contact the MLA program director for further details: https://www.ice.cam.ac.uk/courses/international-summer-programmes/how-apply

Credit for one successfully completed course will be applied to your degree once we receive your transcript.

CERTIFICATE OF ADVANCED GRADUATE STUDY IN LIBERAL ARTS

The Certificate of Advanced Graduate Study in Liberal Arts is open to students who have earned a Master of Liberal Arts degree from JHU or an equivalent degree from another institution. It consists of 10 courses. Applicants must submit the standard application, though JHU MLA graduates need not send any additional materials beyond the application or pay an application fee.

INTERDISCIPLINARY CORES

One IC course (see examples listed below) is required within the student’s first three semesters. Core courses are offered both on campus and online and may also be taken as electives.

COURSE DESCRIPTIONS

Core Courses

450.610 Twice-Told Tales: Classic Texts and Their Contemporary Retellings (3 credits)

This course offers a comparative study of classic texts and their modern or contemporary retellings—in literature and on stage and screen—with a focus on how these ancient stories, which have endured through the ages and helped define our sense of what it means to be human, have been refashioned to reflect modern realities. Examining “second stories” provides the pleasure of seeing the familiar from a fresh and surprising perspective (e.g., the wanderings of Odysseus seen through the eyes of his stay-at-home wife, Penelope) and also allows us to study the cultural content of the tales through a bifocal lens. How does the political protest of Sophocles’ Antigone change its thrust when it is retold by a 20th-century French existentialist writer? Or how does the political protest of Sophocles’ Antigone change its thrust when it is retold by a 20th-century French existentialist writer during the Nazi occupation of France? Our twice-told pairings are Homer’s Odyssey and Margaret Atwood’s Penelopiad; Sophocles’ Antigone and Anouilh’s Antigone; Shakespeare’s The Tempest and Frederick Buechner’s The Storm; and Virginia Woolf’s Mrs. Dalloway and Michael Cunningham’s The Hours. Note: This course satisfies the interdisciplinary core requirement.
450.621  The Self in Question: Readings in Lit & Psychology (3 credits)
What is the nature of the self? For Plato, the self is a sleeping giant; for Buddha, it is an illusion; for Freud, it is instinctual hunger; for Schopenhauer, irrational will; for B.F. Skinner, it is a machine; for R. Buckminster Fuller, it is a verb; for Sartre, it is a useless passion. Thinkers throughout the ages have probed the riddle of our human identity, and today, the dimensions of this age-old quest have been expanded to include the formative roles of gender, class, race, and culture. From selves in the making to selves under siege, from the lonely, existential self to the transpersonal, communal self, in this class, we explore questions of selfhood from the perspectives of literature and psychology—two key disciplines devoted to understanding the perplexities of human nature. This course satisfies the interdisciplinary core requirement. (Available online).

450.683  The History of the Book from the Ancient World to the Digital Humanities (3 credits)
“What is the future of the book?” This course will tackle that question in two distinct ways. First, we will delve into the distant historical past together and explore the circumstances governing the transmission of knowledge itself, from its origins in Bronze Age cuneiform, hieroglyphic and Semitic-language manuscripts, up to the Greco-Roman period, in the form of inscribed tablets, papyrus rolls, and epigraphic fragments. The next portion of the course will address the medieval “manuscript revolution,” marking the epochal technological transition to the codex book-form still in use today. Here we will address the progress of paleography—the forensic development of Western handwriting over time—and the proliferation of book illustration and illumination alongside the parallel development of traditional sacred and novel secular textual genres, partly made possible through these same innovations in book production. In the interest of presenting an especially focused study over the final half of the course, we will then move from the late Middle Ages to the “Printing Revolution,” from the middle of the 15th c. up to the close of the 17th c. We will hone in on the first era of “information overload” (before our present-day digital revolution) and its broader cultural impact on the cultures of book history and the reception of knowledge over time. This course satisfies the interdisciplinary core requirement. (Available online).

450.756  Navigating the Underworld: Homer’s Odyssey, Dante’s Inferno, and Milton’s Paradise Lost (3 credits)
Long before Socrates and Plato mapped the course of underground rivers as pictured in the Phaedo, poets and philosophers had been fascinated by the metaphorical implications the earth’s mysterious subterranean landscapes. Flowing through this netherworld under various names were rivers that remain familiar today—Acheron, Cocytus, Phlegethon, Lethe, and Styx. Our goal in this course will be to follow in detail the course of these rivers through the vastly different landscapes created by three epic poets: the grey world of Shades in the watery depths of Homer’s Odyssey; the elaborately structured geography of punishment in Dante’s Inferno; and, finally, the strangely contiguous landscapes of Hell and Eden in Milton’s Paradise Lost. Along the way, we will touch briefly on descriptions of the underworld in other Western classics; as a class, we will also investigate parallel stories of subterranean rivers in the literature and mythology of world cultures. This course satisfies the interdisciplinary core requirement. (Available online)

450.673  Monstrosity and Metamorphosis: Imagining Animals in Early Art & Literature (3 credits)
From man’s earliest artistic expressions on the walls of caves, animals have figured centrally in the human imagination. One can argue, in fact, that much of early art and literature does not differentiate fully between the human and the animal, that human self-awareness evolved, in part, through interactions with animals, and through the imaginative fusion of human and animal forms. This seminar will study the representation of animals, and human/animal hybrids, in cave painting, in Sumerian art, in Egyptian mythology, in classical mythology (Cretan Minotaur, tales from The Odyssey, tales from Ovid’s Metamorphoses), in the Anglo-Saxon epic Beowulf, in a selection from Chaucer’s The Canterbury Tales, and in the monstrous creatures that decorate the margins of medieval manuscripts in the Christian West. The seminar will use a blog for the posting of texts and images, and will require a research paper. This course satisfies the interdisciplinary Core course requirement. (Available online)

Elective Courses
The following course descriptions are representative of the types of elective courses offered every semester. Please see the website for the actual course schedule for each semester.

450.601  Forbidden Knowledge: the “Metaphysical Rebel” in Myth and Literature (3 credits)
But from the tree of the knowledge of good and evil you shall not eat” (Gen. 2:17). This interdisciplinary course explores the theme of forbidden knowledge in the various forms it takes in the Bible, the Epic of Gilgamesh, Greek tragedy, folklore and folk tale, and in western literary classics ranging from Milton’s Paradise Lost through the versions of the Faust story in Marlowe, Goethe, and Thomas Mann, to short stories by Nathaniel Hawthorne, and Mary Shelley’s Frankenstein. What do we make of the parallels between the Greek hero Prometheus and the Biblical Satan? How are we to understand the figure of Dr. Frankenstein as “the Modern Prometheus”? Does Faust’s pursuit of conventionally forbidden areas of knowledge anticipate 20th and 21st century quests to unveil the secrets of nuclear power, or of artificial intelligence, or of genetic engineering of the human genome? In addition to our literary readings, we will discuss a variety of operas and other relevant musical works; films from Bride of Frankenstein and Dr. Strangelove, to Hannibal; and transgressive visual imagery from Paleolithic cave art to the work of contemporary performance artists in a collective quest to find and define the boundaries of “the forbidden.”

450.602  Markup Languages for Humanities Research (3 credits)
This course aims to train students to mark up (historical) documents by making use of a set of markup languages such as XML and (X) HTML. In addition to learning the basics of these languages, students will be introduced to and work
with existing standards such as TEI and will learn to develop their own schemas. Ample time will be devoted to broader questions regarding the conceptualization of primary sources in digital environments, the ways in which these sources can be conceived of as data, the relationship between our scholarly questions and the data sets that we create, and the methods used to make this data available online. Ultimately, this course will provide students with a set of tools and skills necessary for the development of their own DH research projects based on the ability to handle various markup languages as well as a thorough understanding of the ways in which these languages can be used to translate physical documents into digital formats. (Available online)

450.606 Ethics for a Multicultural World (3 credits)
This course will address the ethical dilemmas and privacy issues that challenge intelligence and government decision makers in an increasingly complex operational and technological environment. We will examine basic moral, ethical and privacy considerations from all sides at several key points in intelligence operations from collection to covert action. The course will analyze the evolving nature of privacy concerns worldwide, with an emphasis on the balance between individual rights and national security needs as executed by intelligence agencies. Students will examine the policy implications inherent in seeking to address these issues. The readings will include diverse and opposing viewpoints as well as practicums and simulations to allow debate of the key positions in “real world” situations. (Available online)

450.607 Through a Glass, Darkly: American Film Noir (3 credits)
The term film noir, French for “black film,” was first applied to Hollywood films by French critic Nino Frank in 1946. Unrecognized by the American film industry as a distinct formula during the classic period of Hollywood (1930-1960), Cinema historians and critics defined the category retrospectively to describe the distinctive style look and feel of many American films made during the 1930s, 1940s, and 1950s. The course examines the cultural origins, unique elements, underlying values, and major auteurs of both American noir and international noir filmmakers. Film noir was defined through the general themes of alienation, existentialism, loneliness, cynicism, pessimism, despair, paranoia and entrapment, coupled with a gritty and distinctive visual style and mood. We will screen and discuss select noir films and develop skills of viewing and analyzing them closely. Topics include the emerging field of film theory and criticism in the early 1960s, literary origins and style; male and female roles; film and society in the years after WWII; German expressionism and Nazism in Germany as major influences on early Noir; early gangster films; and the role of the “auteur” in the definition of the form. Among the films considered are Fritz Lang’s M (Germany-1931), John Huston’s The Maltese Falcon (U.S. - 1941), Orson Welles’ Citizen Kane (U.S. - 1941) and Touch of Evil (U.S. - 1958), Robert Aldrich’s Kiss Me Deadly (U.S. - 1955), and Francois Truffaut’s Shoot the Piano Player (France - 1960). The course will conclude with analysis of neo-noir films like Sam Fuller’s Underworld U.S.A. (U.S. - 1961) and John Frankenheimer’s The Manchurian Candidate (U.S. - 1962) among many others.

450.608 Judaism, Christianity, Islam (3 credits)
Despite over 1,000 years of conflict both external and internal, Judaism, Christianity and Islam share doctrines and practices. Students will examine the essential teachings of the three great Abrahamic religions concerning revelation, scripture, sacred geography, worship, prophecy, holy war, divine justice and judgment, blasphemy (including sacrilegious humor), and the afterlife. Readings will include selections from the Bible, Qur’an, St. Augustine’s The City of God, Moses Maimonides’ The Guide for the Perplexed, The Alchemy of Happiness by Abu Hamid Muhammad al-Ghazzali, as well as the contemporary classics What Do Jews Believe? by Rabbi David Ariel, Introduction to Christianity by Joseph Cardinal Ratzinger (Pope Benedict XVI), and The Heart of Islam: Enduring Values for Humanity by Seyyed Hossein Nasr. Visits to a synagogue, church, and mosque for a service of worship will be required.

450.610 Twice-Told Tales: Classic Texts and Their Contemporary Retellings (3 credits)
This course offers a comparative study of classic texts and their modern or contemporary retellings—in literature and on stage and screen—with a focus on how these ancient stories, which have endured through the ages and helped define our sense of what it means to be human, have been refashioned to reflect modern realities. Examining “second stories” provides the pleasure of seeing the familiar from a fresh and surprising perspective (e.g., the wanderings of Odysseus seen through the eyes of his stay-at-home wife, Penelope) and also allows us to study the cultural content of the tales through a bifocal lens. How does the political protest of Sophocles’ Antigone change its thrust when it is retold by a 20th-century French existentialist writing during the Nazi occupation of France? Our twice-told pairings are Homer’s Odyssey and Margaret Atwood’s Penelopeiad; Sophocles’ Antigone and Anouilh’s Antigone; Shakespeare’s The Tempest and Frederick Buechner’s The Storm; and Virginia Woolf’s Mrs. Dalloway and Michael Cunningham’s The Hours. Note: This course satisfies the interdisciplinary core requirement.

450.611 The Social History of Medicine (3 credits)
This course will explore the demographics of audiences, the reasons for attending the theatre, who presented theatre, where theatres were located, what theatre space looked like and why they looked that way in order to track the dynamics of western political and social history. Major works of dramatic literature will serve as the entry point into various periods and as reflections of the historical forces at work. The major periods to be studied are: Classical Greek and Rome, Medieval, Renaissance (Italy, England and Spain), 18th and early 19th centuries, the modern era and the postmodern present. (Available online)

450.613 British Victorian Women (3 credits)
This course embraces the broad sweep of primarily British Victorian women’s experiences. It analyzes the emergence of the Victorian stereotype of middle and upper class women and compares that stereotype to the reality of individual case studies. It also explores the variety of expectations and demands on working class women - focusing on geographical, industrial and rural factors and the resulting lives of women working and living across the British Isles. In addition, there is an emphasis
on Victorian women as agents of change in the fields of literature, medicine, teaching and social work both at home and abroad, as well as in local and national politics.

450.616 Beneath the Veneer: Film Culture of the 1950s (3 credits)
Peaktonville (1998) provides a look back at the cultural memory we have regarding the 1950s. We will then examine three films which focus on different aspects of the blacklist: High Noon (screenplay written by the blacklisted Carl Foreman), On the Waterfront (directed by Elia Kazan), and Salt of the Earth (written, directed, and produced by members of the original “Hollywood Ten”). A study of two musicals, By the Light of the Silver Moon and Gentlemen Prefer Blondes will examine the competing cultural icons of Doris Day and Marilyn Monroe represented within the context of the fifties musical. Other themes explored include the rise of youth culture and concerns over juvenile delinquency (Rebel Without a Cause, The Wild Ones, Blackboard Jungle); war, both cold and hot, with a comparison of The Bridges of Toko Ri (Korean War) to Forbidden Planet’s use of science fiction to comment on the cold war; a focus on film auteur Alfred Hitchcock (Strangers on a Train, Vertigo, and North by Northwest); and a closer look at changes in the western genre (a revisit of High Noon, Johnny Guitar, and The Searchers).

450.617 Crime, Justice, and the Constitution (3 credits)
Examines how the Supreme Court establishes and enforces the constitutional rules that govern law enforcement in the United States, including the fourth Amendment’s provisions on searches and arrests, the Fifth and Sixth Amendment protections for individuals charged with a crime, and the Eighth Amendment’s requirement for bail and its ban on cruel and unusual punishments. We will also examine what it means to have a fair trial; the process of plea bargaining, which resolves most criminal cases; and the continuing controversy over criminal sentencing. And we will continually be exploring the meaning and the reality of “Justice”.

450.619 Revolutions of the Book: The Transformation of Knowledge in Europe From Antiquity to the Renaissance and Enlightenment (3 credits)
This course will explore how intersection of transformations in the technologies and arts of communication with transformations in ideas—a topic of particular relevance today, much as it was long ago. The entire course will be taught directly from original rare book and manuscript materials in the collections of Johns Hopkins University. We will begin with the history of writing, from the cuneiform tablets and papyri in the ancient world, to illuminated manuscripts of the Middle Ages, on to scribal traditions of the Renaissance. We will also explore myths of writing as well, in particular ancient pagan and early Christian mythologies that sought to explain how letters, words, and languages were invented and discovered through the medium of the newly restored fresco cycle in the Vatican Library’s Salone Sistino.

450.621 The Self in Question: Readings in Literature & Psychology (3 credits)
What is the nature of the self? For Plato, the self is a sleeping giant; for Buddha, it is an illusion; for Freud, it is instinctual hunger; for Schopenhauer, irrational will; for B.F. Skinner, it is a machine; for R. Buckminster Fuller, it is a verb; for Sartre, it is a useless passion. Thinkers throughout the ages have probed the riddle of our human identity, and today, the dimensions of this age-old quest have been expanded to include the formative roles of gender, class, race, and culture. From selves in the making to selves under siege, from the lonely, existential self to the transpersonal, communal self, in this class, we explore questions of selfhood from the perspectives of literature and psychology—two key disciplines devoted to understanding the perplexities of human nature. This course satisfies the interdisciplinary core requirement. (Available online)

450.623 The Theater of Revolt: Makers of Modern Drama (3 credits)
In this course, we study the playwrights whose intellectual brilliance and moral passions created a revolution in traditional theater, unleashing energies that continue to drive theater a century later. We will read major plays of Ibsen, Chekhov, Pirandello, Shaw, Brecht, and O’Neill in the context of their social/historical settings to understand how shifting philosophical, cultural, and scientific views required new ways of staging human stories, prompting innovations in both subject matter and technical form. Because drama is primarily a performance art, we will spend time comparing versions of the play on the page with the play on the stage. Our alternate-weekly, extended-class format will afford us the opportunity to analyze scenes from distinguished theater performances that have been captured on film.

450.624 Follow the North Star: Histories of Slaves Escaping From Maryland (3 credits)
The course examines the many ways in which slaves sought or were able to escape from slavery by running away, or by assistance from nature. Included will be an examination of the ads for runaway slaves that appeared in newspapers, the stories of the ship Pearl and the brig Enterprise, the fate of slaves who fled to the British during the War of 1812, and the path to freedom followed by slaves who enlisted in the Union Army prior to Maryland’s abolition of slavery in 1864. The course is designed to broaden one’s understanding of the choices and paths enslaved Maryland residents were able to follow to freedom, from the Declaration of Independence to the case of Elizabeth Turner decided by Chief Justice Salmon P. Chase after the Civil War.

450.629 Halls of Wonder: Art, Science, & Material Culture, 1400–1750 (3 credits)
This course will address the cultural fascination in Europe with sources and objects of wonder and popular imagination. At its core, this exploration will focus on material culture across the academic disciplines (disciplines that were not recognized as separate areas of knowledge at the time) from art, science and technology, literature, religion, and beyond. Through our focus, in particular, on collecting material objects, we will also be exploring in great detail the origin of museums, first as
private Renaissance and Baroque wunderkammern (German, “halls of wonder”), and then ultimately as the first national museums of the Enlightenment period. Major themes will include socio-economic change and the emergence of new commercial and professional classes; the rise and consolidation of centralized states; the invention of printing by moveable type; literacy and evidence of historical reading practices; patronage of the arts; collectors and the collecting of books and objects d’art; revolutions in the graphic arts; arts and press censorship; the advent and progress of Renaissance humanist interest in the ancient Greco-Roman world; the Protestant and Catholic Reformations; the Scientific Revolution; the production and circulation of literary texts; and popular culture (riot, ritual, and rebellion) in the Renaissance.

450.630 Orientalism versus Occidentalism: A Brief History of Two Illusions (3 credits)
This course examines the evolution of regional attitudes that shape national discourses that create global discourse that influence the ways peoples and therefore nations at both ends of the Eurasian continent perceive and deal or do not deal with each other. Primary focus will be upon the sectarian religious, ethnic, social-economic conflicts that frame popular images, upon competitive power groups, international and domestic, that manage and model leadership polities, and upon the domestic and international press that play a significant role in shaping public perceptions. Students will view documentaries and films, read, weigh, consider and discuss a wide range of literary and media sources, including a film based upon Kipling’s The Man Who Would Be King and other films, essays by world leaders, from the 19th-century father of modern India, Raja Rammohan Ray and Henry Louis Vivian Derozio, to the 20th- and 21st-century writers, such as Kishore Mahbubani (Can Asians Think), Steward Gordon (When Asia Was the World), Edward Said (Orientalism), and Ian Buruma and Avishai Margalit (Occidentalism, The West in the Eyes of Its Enemies). (Available online)

450.631 Western Theatre History: The Dynamic Interplay of Social, Economic, and Cultural Forces (3 credits)
Theater offers unique insight into the development of western civilization by depicting people in their relationships to themselves, to each other, and to society. Theater history provides a distinctive lens through which to explore the social, economic, cultural, geographical, and other forces shaping those relationships over the past 2500 years. Beginning with the inception of theater in religious ritual up to the present postmodern era, Western Theatre History: The Dynamic Interplay of Social, Economic, and Cultural Forces will explore the demographics of audiences, the reasons for attending the theater, who presented theater, where theaters were located, and what theater space looked like and why they looked that way in order to track the dynamics of western political and social history. Major works of dramatic literature will serve as the entry point into various periods and as reflections of the historical forces at work. The major periods to be studied are Classical Greek and Rome, Medieval, Renaissance (Italy, England, and Spain), 18th and early 19th centuries, the modern era, and the postmodern present.

450.634 Italian Renaissance Art and Thought (3 credits)
In what sorts of intellectual contexts was Italian Renaissance art produced and received? What, in other words, were the connections among Renaissance art, philosophy, theology, mathematics, rhetoric, and history? This seminar will investigate a number of answers to such questions through a consideration of primary evidence and recent scholarship. Among other things, we will consider Aristotle’s theory of magnificence as it was applied to Renaissance architecture, the development of perspectival systems, the notion of a Renaissance or golden age, and Vasari’s efforts to conceptualize art of the Renaissance in metaphorical terms. Several substantial writing assignments will allow students to develop critical positions of their own, and throughout the term there will be an emphasis upon close reading of both texts and artworks. (Available online)

450.642 Yesterday’s Tomorrows: Utopian and Dystopian Futures in Science Fiction Literature (1 credit)
Beginning with Thomas More’s seminal work Utopia (1516), this course will engage in an interdisciplinary discussion of the construction of the utopian/dystopian-cacotopian dynamic in science fiction, or more broadly speculative fiction, and the accompanying philosophical issues and concerns raised in these stories. Although the focus of the course will be on the literature, we will examine the construction of these stories, and authors, within a cultural context to question how “utopia” and “dystopia” have been defined historically and articulated through literature, art, philosophy, film, photography, music and theatre. These authors react to and against major historical paradigm shifts caused by, for example, the Industrial Revolution, Modernity, War, the Cyber Revolution, and century ends, along with the overarching “End of Days” stories. Among the authors under consideration are H.G. Wells (The Time Traveler), Jules Verne (20,000 Leagues Under the Sea, The Mysterious Island), Samuel Butler (Erewhon), Charlotte Perkins Gilman (Herland), Edward Bellamy (Looking Backwards), Yevgeny Zamyatin (We), Isaac Asimov (I, Robot), Ursula Le Guin (The Dispossessed, The Left Hand of Darkness), Walter Miller (A Canticle for Leibowitz), George Orwell (1984), Philip K. Dick (Do Androids Dream of Electric Sheep, The Man in the High Castle, Minority Report), Margaret Attwood (The Handmaid’s Tale, Oryx and Crake), William Gibson (Neuromancer), Cormac McCarthy (The Road), Octavia Butler (Parable of the Sower, Kindred), Suzanne Collins (The Hunger Games trilogy), among many others. Through these stories the writers both project possible futures and offer incisive commentary on contemporary realities. (Available online)
**450.645** **Documentary Photography** *(3 credits)*

Documentary photographs inform, entertain, and enlighten us on subjects as diverse as Civil War battlefields, Alabama sharecroppers, and outer space. We will explore different genres of documentary photography, including the fine art document, photojournalism, social documentary photography, the photo essay, and photography of propaganda. We will look at the relationship of image and text in the works of Walker Evans and James Agee. “Let Us Now Praise Famous Men” and “Minimata: Words and Photographs” by Aileen and Eugene Smith. Students will work on a semester-long photo documentary project on a subject of their choice.

**450.646** **Religion of Politics, Politics of Religion: Conflict and Convergence in Sacred Authority and Temporal Hierarchies** *(3 credits)*

This course examines patterns of authority that evolve from interpreting the great texts to developing contemporary global cultural hierarchies. Special focus will be directed to two dominant competing 20th- to 21st-century authority systems, one represented by Mahatma Gandhi’s satyagraha nonviolent program for social change, the other by Seyyid Qutb’s (ideologue of the Ikhwan, Muslim Brotherhood) program for violent change. These two competing ecumenical ideologies and their secular versions, not geography, religious orthodoxies, or ethnic rivalries, represent the great divide in global relations and within societies today, since both provide opposing models for radical social change within the same developing world, often religious communities. Students will evaluate this and other contrasting themes through reading, discussion, and case studies from contemporary India, America, South Africa, Pakistan, Afghanistan, and Egypt. (Available online)

**450.650** **Cultural Eras: The 1960s** *(3 credits)*

The sixties. A collage of events, people, sights, sounds, and ideas immediately come to mind. These powerful visual representations in many ways define the history of the 1960s. In this course, we will consider the images, memories, history, and legacy of the sixties through an interdisciplinary exploration using literature, art, history, politics, music, and film. Cultural identity located within defining events provide the focus. Black, white, Vietnamese, astronaut, protestor, gay, journalist, soldier, woman, man, young, old. How do people see themselves within the context of larger cultural events and changes that many have labeled revolutionary? We will examine the major themes through a focus on some of the major social dramas of the period and the cultural rhetoric employed to articulate meaning including: landing on the moon, the assassination of Malcolm X, the Tet Offensive and My Lai, Woodstock, and the 1969 Stonewall Riots.

**450.651** **Western Political Philosophy** *(3 credits)*

This is intended as a broad survey of Western political thought, particularly as it developed in the European historical context from the classical era to the 20th century. The thinkers we will discuss can be thought of as engaged in what Robert Hutchins called a “great conversation” across the centuries on the central questions of political philosophy. These questions include: What are the purposes of government? What is the best form of government? How are justice and liberty best realized in a political system? What are rights - and where do they come from? What is sovereignty and in whom does it reside? What principles make political authority legitimate? Is disobedience to political authority ever justified? In many ways these questions are perennial ones, as relevant in our own time as in the distant past. Moreover the divergent systems of thought developed to answer these questions continue to shape much of contemporary political life - e.g. democracy, constitutionalism, liberalism, socialism, and conservatism. Among the political philosophers who will be examined are Plato, Aristotle, Augustine, Thomas Aquinas, Machiavelli, John Locke, Edmund Burke, Thomas Hobbes, Jean Jacques Rousseau, Friedrich Nietzsche, Karl Marx, Hannah Arendt, and Leo Strauss. (Available online)

**450.661** **History of Russia** *(3 credits)*

This course will focus on American and Japanese perspectives on the war but will also include other national perspectives, such as German, Chinese, French, and British. Students will view or read clips and excerpts from both fictional and documentary texts and films. Students may be asked to do independent projects on better-known works such as From Here to Eternity, The Caine Mutiny, The Diary of Anne Frank, Band of Brothers, Saving Private Ryan, Schindler’s List, or Flags of Our Fathers. (Available online)

**450.666** **World War II in Visual and Literary Art** *(3 credits)*

This course will focus on American and Japanese perspectives on the war but will also include other national perspectives, such as German, Chinese, French, and British. Students will view or read clips and excerpts from both fictional and documentary texts and films. Students may be asked to do independent projects on better-known works such as From Here to Eternity, The Caine Mutiny, The Diary of Anne Frank, Band of Brothers, Saving Private Ryan, Schindler’s List, or Flags of Our Fathers. (Available online)

**450.667** **The Bildungsroman as Literary Form – Chronicling Personal Growth in Countries and Cultures** *(3 credits)*

This course will first address the issue of history, which more than history dominated the thinking of the Eurasian Steppe, a centrifugal plain that caused the people to adopt centrifugal institutions; it will include study of the region of Siberia, the land of the Shaman east of the sun; the constant stream of foreign invasions throughout Russian history and their indelible marks on the character and culture of the people; the periodization of important leaders (Peter the Great, Ivan the Terrible, Catherine the Great, etc.) of Russian history; the enormous contribution of its 19th-century literature (Pushkin, Dostoevsky, Tolstoy, Chekov, etc.); the spiritual influence of the Russian Orthodox Church; the causes and effects of the Russian Revolution in 1917—and arguably, the most important world event in the 20th century; Stalin, Khruhachev, and the age of the Cold War; and the post-Communist search for identity (Gorbachev, Yeltsen, Putin, and Dimitry Medvedev).
This course examines the bildungsroman in several of its manifestations: the rise of the form in Eighteenth Century Germany, its adoption among French and English writers, its adaptation in Joyce’s Ireland, its popularity among American and African American writers, and its unique presentation in Asian and African literatures. Students will read several major bildungsromans and discuss the constructs of the form as well as the ways it differs among countries and cultures, races and ethnicities, and between genders. Some attention will be paid to the social and societal contexts associated with the form, as well as the ways in which it has been shaped by prevailing philosophies. Students will be encouraged to participate in The Bildungsroman Project, a Digital Humanities project designed to catalog and explore the form (http://bildungsromanproject.com/). (Available online)

**450.668 Afghanistan and Pakistan: Struggling Societies-Founding Democracies (3 credits)**

Afghanistan and Pakistan are at crossroad today—two contemporary societies struggling to define basic human values, two polities uncertain about their constitutional roots. The stakes are not only high for the peoples of these nation states but also for the global community, which has, true to convention, intervened. While the Universal Islamic Declaration of Human Rights is reflected in broad principle in the current constitutions of Afghanistan and Pakistan, violations of the most basic human rights are endemic. This tragedy is at the root of the problem of governance in both states. Students will examine the continuing social, cultural, and consequent constitutional crises in these two Silk Road hub-Great Game battleground territories through study of the historical religious, literary-artistic, geographic, environmental, natural resources, ethnographic, economic, social institutional, regional-international relational, and current constitutional contexts. Special attention will be given to the 2008 Pakistan and 2009 Afghanistan national and regional assembly election outcomes.

**450.669 The Family in Cross-Cultural Perspective (3 credits)**

This course examines the family from various cross-cultural perspectives. Throughout the semester we will examine the family as a social institution through the lenses of race, gender, age, social class, and sexual orientation. First we will explore how the notion of family has changed over time in the United States. Next we will explore the social processes that take place within the context of the family such as dating, courtship, marriage, and parenting. We will also look at other issues that affect families such as immigration policy, work inside and outside the home, poverty, and domestic violence. (Available online)

**450.673 Monstrosity & Metamorphosis: Imagining Animals in Early Art & Literature (3 credits)**

From man’s earliest artistic expressions on the walls of caves, animals have figured centrally in the human imagination. One can argue, in fact, that much of early art and literature does not differentiate fully between the human and the animal, that human self-awareness evolved, in part, through interactions with animals, and through the imaginative fusion of human and animal forms. This seminar will study the representation of animals, and human/animal hybrids, in cave painting, in Sumerian art, in Egyptian mythology, in classical mythology (Crete and the Minotaur, tales from The Odyssey, tales from Ovid’s Metamorphoses), in the Anglo-Saxon epic Beowulf, in a selection from Chaucer’s The Canterbury Tales, and in the monstrous creatures that decorate the margins of medieval manuscripts in the Christian West. The seminar will use a blog for the posting of texts and images, and will require a research paper. This course satisfies the interdisciplinary Core course requirement. (Available online)

**450.675 Literary Analysis of the Hebrew Bible (3 credits)**

This course focuses on narrative criticism of the Hebrew Bible, comparing it to similar methodologies (poetics, rhetorical criticism, etc.) and contrasting it with other forms of exegesis (historical criticism, deconstruction, etc.). Students will study key literary terms and discuss the elements that work together to form a story. The class will consider the narrator’s voice in relation to the text and the reader, examining narrative omniscience, key type scenes, and themes in the Hebrew Bible and ancient Near Eastern (ANE) literature. This course attempts to discern narrative criticism’s place in the history of Biblical interpretation. Long overshadowed by historical criticism and increasingly seeking to find its place in the midst of a number of reader oriented approaches, narrative criticism can be a valuable partner to both. This class examines narrative criticism’s value as a tool for exegesis by studying its roots and the methodologies incorporated by narrative critics of the Hebrew Bible. (Available online)

**450.678 Religions of the Emerging World (3 credits)**

The emerging world of the 21st century is globally interconnected: AI peoples are now neighbors. In this world, competing religious claims to unique truth pose a serious threat. Yet abandoning such claims can reduce religions to quaint cultural relics. How can religious believers maintain the vitality of their spiritual heritage while fully appreciating the faith/wisdom traditions of others? This course explores the insights of one man who has sought that balance of religious consciousness—philosopher Huston Smith—as he reflects on Hinduism, Buddhism, Confucianism, Taoism, Judaism, Christianity, and Islam. Rather than competing, he found, the world’s religious traditions can greatly enrich one another. (Available online)

**450.680 From the Holy Land to Graceland (3 credits)**

A familiar but puzzling phenomenon of American popular culture is the secular canonization of Elvis Presley. This seminar will explore the belief, ritual, and art associated with all those people, places, and things that have been revered as holy, from the earliest centuries of Christianity. And from this historical probing will be extracted a religious/anthropological model by which to deconstruct Elvis and Elvis-like examples of secular sanctification in contemporary life. Students will come to understand the significance of pilgrimage, relics, votives, sacred souvenirs, miraculous healing, and supernatural apparitions, as well as devotional images (icons), sacred time, and the literary genre of the saint’s life. After drawing this all together in the lives and sacred places of the early saints of the Church, and

Johns Hopkins University  |  Krieger School of Arts & Sciences | Advanced Academic Programs
then seeing many of its essential elements replicated in Elvis and at Graceland, students will be challenged to extend their newfound understanding and analytical skills to other “holy” people and places of our times, from Princess Diana to Ground Zero.

450.682 The American Presidency (3 credits)
This course is an introduction to the study of the presidency. Part one of the course examines how the office of the presidency became the central focus of the American political system and how the presidency developed various resources beyond the formal constitutional powers of the office such as party leadership, control of the executive, and relations with the public. Part two explores how presidents engage the broader political system and its relations with Congress, the press, the broader public, and the bureaucracy. Part three questions the sources of successful presidential leadership and examines whether presidential leadership hinges on personal skill, particular electoral or political circumstances, or an incumbent’s position within a larger partisan context of American politics. The class concludes with a consideration of presidential greatness and asks whether such a goal is attainable (or desirable) given the complex environment of contemporary American politics.

450.683 The History of the Book from the Ancient World to the Digital Humanities (3 credits)
“What is the future of the book?” This course will tackle that question in two distinct ways. First, we will delve into the distant historical past together and explore the circumstances governing the transmission of knowledge itself, from its origins in Bronze Age cuneiform, hieroglyphic and Semitic-language manuscripts, up to the Greco-Roman period, in the form of inscribed tablets, papyrus rolls, and epigraphic fragments. The next portion of the course will address the medieval “manuscript revolution,” marking the epochal technological transition to the codex book-form still in use today. Here we will address the progress of paleography—the forensic development of Western handwriting over time—and the proliferation of book illustration and illumination alongside the parallel development of traditional sacred and novel secular textual genres, partly made possible through these same innovations in book production. In the interest of presenting an especially focused study over the final half of the course, we will then move from the late Middle Ages to the “Printing Revolution,” from the middle of the 15th c. up to the close of the 17th c. We will hone in on the first era of “information overload” (before our present-day digital revolution) and its broader cultural impact on the cultures of book history and the reception of knowledge over time. (Available Online)

450.684 Nature and the American Imagination (3 credits)
This course offers an interdisciplinary study of the American landscape and the role it has played in shaping American identity. We anchor our study by looking at the way the idea of the land has been constructed throughout our history as a kindred spirit by Native Americans, as a “howling wilderness” by the early colonists, as a school for spirit by the New England transcendentalists, as a precious inheritance in need of preservation by 19th-century conservationists like John Muir and Teddy Roosevelt, and in keeping with Manifest Destiny, as a rich resource that was ours for the taking.

450.687 The American Revolution (3 credits)
This course will explore the roots of the American Revolution, comparing the perspectives of England with the colonies on the causes, comparing the positions of Loyalists and Patriots within the colonies, exploring the role of diplomacy during the revolutionary years, reviewing the war years, studying the legacy of the revolutionary experience on the social, religious, economic, and political fabric of the new nation and the resulting Constitution for the United States.

450.689 Introduction to Digital Humanities in the Liberal Arts (3 credits)
This introductory course in the MLA program’s digital humanities concentration is designed to familiarize students with digital encoding tools, web platforms, assorted search engines and other methodologies directly relevant to a wide range of research agendas in the liberal arts. In the course of the semester, students will receive a comprehensive introduction to selected tools and methodologies, such as the Text Encoding Initiative (TEI) and text mining software (e.g. Voyant and Collatex). Assigned text encoding projects will guide students in identifying appropriate textual markup strategies, resolving issues generated through digital research, and finally in selecting appropriate tools for edition making. The semester will conclude with group critiques of these assigned projects from the standpoint of both content and user experience. (Available online)

450.695 American Political Theory and Practice (3 credits)
Our purpose in this course is not to provide an account of the mechanics of American government, but to examine the principles that underlie those mechanics, and the way in which those principles change over time. In other words, we are going to examine the political philosophy that serves as a basis for the American regime (or regimes, if one is so inclined). This means that in addition to questions of justice and right we will examine how the thinkers of the Founding era understood the human being, and the sort of governmental structures that are built on this understanding. We will also consider the revolution in American politics that occurs in the 20th century. The progressive movement of the 20th century builds on a different view of human nature and metaphysics (originating in, but ultimately transcending, Hegelian Idealism), and therefore finds itself in tension with the principles of the Founding. This tension is one of the animating forces of American political partisanship today, so an understanding of the development of American political theory will help us to better understand political disagreements in our own day. (Available online)

450.697 (IC) Rise and Fall of Empires: From Rome to Brexit (3 credits)
This course will examine what correlation can be traced between the rise and fall of empires, ranging from the ancient Roman to the modern British, and their relative effects upon other societies. It aims to acquaint students with the events, traditions, ideas, and values that have shaped the modern world. Students will gain a perspective on the position of these empires among the nations of the world, and on the controversies and agreements concerning the desired attributes of government,
culture, and ideals. It will focus on central themes and issues in the development of political, economic, and religious institutions, and will raise questions about human values, economic growth, institutional change, cultural development, and political democracy. (Available online)

450.698  African American Poetry and Poetics  (3 credits)
This course will explore the category, history, and development of African American poetry from Phillis Wheatley to the present. We will focus on poetry and poetics specifically but will consider the general movement of literature produced by African American writers over the course of three centuries. We will read works by the key contributors to this particular American literary tradition with the goal of understanding the aesthetic, cultural, and critical legacy of African American poetry to the American literary and musical sensibility of the twenty-first century. From eighteenth-century odes to the blues, hip hop, and rap tradition, we will examine the role that race, cultural identity, legal status, and the impersonal structures (or shackles) of poetic forms have played in shaping and reshaping African American verse. We will use several Digital Humanities tools (e.g., Voyant Tools and NGram Viewer) to map the evolution of African American poetry from the 18th century to the present. (Available online)

450.700  “The Souls of Black Folk”: Evolving Conceptions of Leadership in African American Literature and Culture  (3 credits)
Equal parts historical study, sociological investigation, and cultural analysis, W. E. B. Du Bois’ classic work, The Souls of Black Folk, exemplifies the type of interdisciplinary and multidimensional approach employed by political and social theorists in their efforts to make sense of the fundamental conditions, contours, and characteristics of political life in modern societies. Paying particular attention to Du Bois’ account of race, the role political leadership, and the relationship between leaders and the masses, we will put Du Bois’ seminal work in conversation with a number of other prominent Afro-American voices, including Frederick Douglass, Booker T. Washington, Ralph Ellison, Martin Luther King Jr., James Baldwin, Cornel West, Barack Obama, Ta-Nehisi Coates, and Keeanga-Yamahtta Taylor. By attending to Du Bois’ political engagements as well as literary representations of political theorists that have been influenced by him in one way or another, students will have the opportunity to explore the premises and implications of racial politics as well as some of the creative ways in which African Americans have sought to overcome racial domination. What are the appropriate roles and responsibilities of political leaders? What is the nature of their relationship to the community? What are the foundations of legitimate leadership and authority? What form should black politics take in order to overcome white supremacy? How should we understand the relationship between class, gender, race, and sexuality? (Available online)

450.707  Therapy of the Soul: Philosophy of Ancient Rome  (3 credits)
This course will cover some of the most important philosophical texts in the Roman Empire, texts at the nexus of Ancient Greek and Roman, and a religious studies scholar. On the Nature of Things, one of the earliest atheist writings, is a treatise on the human body and mind in which Lucretius lays out a ‘therapy of the soul’ that is an impressive precursor and fascinating comparison to Freudian psychoanalysis. An even more impressive political actor, Cicero, along with areas like economics, philosophy, and science, is also on the reading list; we will look at his work on moral duties and political corruption, and consider how we should understand the relationship between class, gender, race, and sexuality? (Available online)

450.710  The Mind of Leonardo da Vinci  (3 credits)
Leonardo da Vinci (1452–1519) was one of the most fascinating individuals in history. He is the creator of what are arguably the world’s two most famous paintings: the Last Supper and the Mona Lisa. He was also a brilliant scientist and engineer; he made dozens of original anatomical discoveries (for example, he injected hot wax into an ox brain to demonstrate the shape of the ventricles), and he invented hundreds of devices (from ball bearings to a steam cannon). He was well-known as a musician, court entertainer, and even as a practical joker. Who was Leonardo? What do we know of his personal life, including his thoughts on religion, sexuality, or politics? What personal traits shaped his genius? This course explores his thousands of pages of manuscripts; his paintings and other artistic projects; his scientific projects (including anatomy, physiology, botany, and geology); and his civil and military engineering projects. (Available online)

450.712  Cosmos & Consciousness: Perspectives From Modern Physics & Religion  (3 credits)
What does the culture of mass energy, space-time, the Big Bang, and black holes have to say to the culture of myth, ritual, contemplation, and prayer? And vice versa? In this course, students are introduced to the profoundly strange realities unveiled by modern physics, and they explore the impact of quantum theory and relativity on our understanding of questions which have traditionally been the province of the world’s great spiritual traditions: What is the origin of the cosmos, and where, if anywhere, is it headed? Does the universe have meaning? What is the relation between time and eternity, between mind and matter? Who are we and how did we get here? In exploring these questions, students examine the problems and possibilities of finding common ground where modern science and the world’s time-honored spiritual traditions can meet. This course is team-taught by a physicist and a religious studies scholar.
450.726 Lost Books of the Bible (3 credits)
After centuries of agreement about which texts constituted the Hebrew Bible and the New Testament, modern archaeological discoveries have rekindled the profound ancient controversies about which books should be considered sacred and authoritative. The Dead Sea Scrolls, for example, predate the time when the limits of the Hebrew Bible were set, and the Gnostic writings found at Nag Hammadi include forgotten gospels that once rivaled those preserved in the New Testament. In this seminar, students compare the processes of inclusion and exclusion that produced the Jewish and Christian Bibles—giving special attention to the light shed by recent manuscript discoveries.

450.727 Race, Gender, Sexual Orientation and the Constitution (3 credits)
This course will explore the evolution of three major transformations in American law and culture: racial equality, gender equality, and sexual orientation equality. From the perspective of the U.S. Constitution, we will examine the path from discrimination to legal and constitutional acceptance, and how the U.S. Supreme Court and the Congress ultimately, if only partially, has fulfilled the promise of “equal protection” set forth in the 14th Amendment after the Civil War. We will also explore, more generally, how, and how much, the Supreme Court can promote social and legal change.

450.731 The History of the Papacy: Pope Francis in Context (3 credits)
This course will cover the history of the papacy from Late Antiquity until the present day. It will pay particular attention to the growth of the papacy as an institution, its ideological expression, and the historical roots of today’s Pope. The acclaimed historian, Thomas F.X. Noble, has noted that the papacy is the “world’s oldest continuously functioning institution.” Its longevity alone has prompted curiosity and interest, inspired scholarly works and attracted popular attention; to many, it has been the model of tradition for two millennia. But upon closer inspection, another story, one of transformation, also emerges. The approach of most papal histories, beginning with the Liber Pontificalis in the sixth century up to and including many twentieth-century accounts, is to weave a seamless narrative. These histories attempt to reinforce the notion that the papacy was (and still is) moving inexorably toward some preordained end. Most historians today disagree with this approach, and prefer to acknowledge far more contingency: the papacy as an institution has witnessed periods of monumental transformation over its 2000-year history. This course will highlight these developments, place them within their proper historical context, and demonstrate that perhaps no institution has witnessed more change and continuity than the papacy. (Available online)

450.733 Why Tonality Works: Symphonic Music and its Practitioners in Western Culture (3 credits)
Early in the 20th century, composers of the “Second Viennese School,” believed that tonality and Romanticism in Western music had gone far enough; as an alternative, they developed forms of atonal music written to avoid any formal relation to a central key. In this course, students will learn why this alternative theory of composition largely failed, and why tonality, in effect, “won out.” Through in-class demonstrations and discussion, as well as through listening experiences both in and out of class, students will explore some of the reasons why we, as human beings, naturally seek harmonic structure. Important to our discussions throughout the semester will be the harmonic series and the tempered scale. Assigned readings will supplement our continuing discussions of composers who succeeded, others who failed, and why. Assignments will include required viewings of Leonard Bernstein’s six-part Norton Lecture Series, “The Unanswered Question,” recorded in 1973 at Harvard University. The goal of this course is not only to make students more aware of the components of music as an art form, and better at-listening to forms of music that have persisted for over two centuries, but also to give students a greater appreciation for the persistence and influence of “tonality” in Western culture.

450.736 Medieval England: From Beowulf to the Battle of Bosworth (3 credits)
This course traces this history of England from the Anglo-Saxon invasions of the fifth and sixth centuries to the political unrest and economic crises of the fourteenth and fifteenth centuries. This course will focus on the trends and developments that help explain the distinctive liberalism and individualism of English culture, e.g. the breakdown of feudalism, life in the medieval town and on the manor, the origins and evolution of the common law, and the rise of Parliament. (Available online)

450.739 Race and Jazz (3 credits)
The music known as jazz has been celebrated and performed by peoples throughout the world. This course will examine the music itself as well as the role that race has played in the creation of jazz, the perception of its history, and the perceived authenticity of present-day jazz. We will examine the music from a historical perspective through the study of the music and lives of its creators and practitioners beginning with precursors in ragtime and minstrelsy and continuing into the modern era. Students will learn to make aesthetic judgments, identify various jazz styles, and discuss their relevance to their time and to the present. Classes are planned to include guest artists from the Baltimore jazz scene, examples in various media, and live performances by the instructor. (Available online)

450.742 The Archaeology of Reading: Cultural Communication and the Project of Digital Humanities in the 21st Century (3 credits)
When we go on to the Internet today, a set of expectations emerge the minute you open a web browser: users have time, curiosity, skills, and abilities that motivate and allow them successfully to meet their information needs by “reading” the digital environment. This course will investigate these cultural expectations critically, and the larger enterprise of Digital Humanities work through a focused study of the history of reading, from its origins to the latter-day information revolutions of print and digital. We will investigate how digital humanists engage with the need to “read” historical sources capably, efficiently, and usefully, but scholars, researchers, teachers, and users who come from less specialized
Liberal Arts
Available online
course satisfies the interdisciplinary Core course requirement.

Rivers in the literature and mythology of world cultures. This includes intersections with gender and immigration status.
The course will examine the racial diversity of America and the enduring implications of racial and ethnic pluralism. Throughout the course, students will work to expand their critical thinking and reflection skills, make meaningful connections between ideas and everyday experiences, and better understand how the personal experience of race and ethnicity interacts with larger social and historical forces. We will also discuss the ways people work to mitigate and overcome racial and ethnic disparities.

(Available online)

450.752 Spies and Code-Breaking in WWII (3 credits)
Even though it is common knowledge that the Allied generals and admirals won the Second World War on the battlefields and the high seas, it remains almost unknown and opaque to the general public as to how much information the espionage agents, the deciphering of the Axis codes, the resistance fighters, etc. were able to provide in contributing to the ultimate Allied victory over Nazi Germany and Militarist Japan. Texts for the course include: Spyglass: An Autobiography of a French Female Spy, Cast No Shadow: The Story of an American Female Spy, Agent Zigzag: The True Story of Nazi Espionage, Escape from Davao: The Forgotten Story of the Most Daring Prison Break of the Pacific War, and Codebreakers: The Inside Story of Bletchley Park, among others.

(Available online)

450.756 Navigating the Underworld: Homer’s Odyssey, Dante’s Inferno, and Milton’s Paradise Lost. (3 credits)
Long before Socrates and Plato mapped the course of underground rivers as pictured in the Phaedo, poets and philosophers had been fascinated by the metaphorical implications the earth’s mysterious subterranean landscapes. Flowing through this netherworld under various names were rivers that remain familiar today—Acheron, Cocytus, Plegethon, Lethe, and Styx. Our goal in this course will be to follow in detail the course of these rivers through the vastly different landscapes created by three epic poets: the grey world of Shades in the watery depths of Homer’s Odyssey; the elaborately structured geography of punishment in Dante’s Inferno; and, finally, the strangely contiguous landscapes of Hell and Eden in Milton’s Paradise Lost. Along the way, we will touch briefly on descriptions of the underworld in other Western classics; as a class, we will also investigate parallel stories of subterranean rivers in the literature and mythology of world cultures. This course satisfies the interdisciplinary Core course requirement.

(Available online)

450.762 America’s Cultural Diversity: the History of Race and Ethnicity in the United States (3 credits)
This course examines the historical, cultural, and structural dimensions of race and ethnicity in the United States. We will examine key theories about the ways race and ethnicity are constructed and influence intergroup dynamics; engage in debates regarding definitions of race and ethnicity and forms of prejudice and discrimination; and review and analyze empirical evidence related to racial and ethnic disparities in economic status, educational attainment, health, employment, and the criminal justice system. The course will examine the racial and ethnic experiences of a range of individuals and communities, including intersections with gender and immigration status.

We will begin by reviewing a series of key readings in racial and ethnic studies that establish central concepts, theories, and historical contexts. Using a variety of sources, this course will examine the racial diversity of America and the enduring implications of racial and ethnic pluralism. Throughout the course, students will work to expand their critical thinking and reflection skills, make meaningful connections between ideas and everyday experiences, and better understand how the personal experience of race and ethnicity interacts with larger social and historical forces. We will also discuss the ways people work to mitigate and overcome racial and ethnic disparities.

(Available online)

450.790 Six Degrees of Miles Davis (3 credits)
Miles Davis is one of the most important and influential figures in modern music. His innovations as a bandleader, composer, and musician have made an enormous impact on our concept of jazz music as well as our perception of a jazz musician. Following his personal life leads to Picasso, Norman Mailer, Jimi Hendrix, Prince, Cecil Tyson, and many more. This course will examine his contributions to jazz in particular and his impact on society in general through his autobiography, biographies, and documentaries with special emphasis on his recorded works. We will also use the popular ‘six degrees of separation’ theory as a starting point in discussing the nature of innovation.

(Available online)

450.791 A Cultural History of New York City: World’s Fair to World Trade Center (3 credits)
This interdisciplinary course begins with a look at what architect Rem Koolhaas has called “Delirious New York”: the competitive mania of the skyscraper wars, and the rambunctious and over-the-top worlds of Coney Island, Times Square, and Broadway theater in the early 20th century. We then turn to the decisive turning point of the 1930s when, in the face of the Great Depression, New York City witnessed some of its greatest building projects: the Empire State Building, Rockefeller Center, and the monumental projects overseen by NYC’s controversial “master builder”, Robert Moses. The New York World’s Fair of 1939 serves as a fitting symbol for what the Fair itself proclaimed as “The World of Tomorrow”, the world of middle class consumerism, the automobile, the highway and the suburb. A major focus of our study is the unfolding and increasingly controversial career of Robert Moses in attempting to implement this ‘World of Tomorrow’, and the gathering forces of opposition galvanized by the book The Death and Life of Great American Cities written by the Greenwich Village activist Jane Jacobs.

(Available online)
and immigration; the culture of Irish New York, Yiddish New
York, and Italian New York; at Greenwich Village when it really
was bohemian; Black Harlem when it really was in vogue. We’ll
focus on the artists, writers, musicians, and architects who
have given shape and expression to the city, spending time with
such figures as Edith Wharton, Henry James, F. Scott Fitzgerald,
Langston Hughes, and E. L. Doctorow. Two overnight field
trips to New York City will be programmed into the course.
The actual weekends will be posted soon for the overnight field
trips. This course satisfies the interdisciplinary Core course
requirement.

MLA CAPSTONE

The Capstone is designed to encourage the integration of
course work in the program and comes at the end of a student’s
MLA career. Students conclude the MLA degree by completing
one of three Captstone options: a portfolio, a graduate thesis
or internship. Students will consult with an adviser and the
program director to determine the option best suited to their
needs and goals. The MLA Capstone does not require a period of
on campus residency.

450.082 MLA Portfolio
The MLA Portfolio is a one-credit option within the MLA
Capstone. Students who select the Portfolio option will take
10 courses in the program (one IC course and 9 electives), and
register for one-credit portfolio in their final semester. The
portfolio will be completed within the same semester as the
10th course, and for students not selecting a graduate project
or thesis, the portfolio is a degree requirement. The associate
chair serves as the portfolio adviser. The portfolio consists of a
sampling of the best papers and projects written over the course
of the student’s graduate career, and consists of reflections on
knowledge gained, on intellectual points of convergence, and on
future agendas now made possible.

450.830 MLA Graduate Thesis (3 credits)
The graduate thesis a second option in the MLA Capstone.
Students who choose this option take one IC course, 8 electives,
and register for the graduate thesis as their tenth elective.
Most students enrolled in the Master of Liberal Arts program
with a focus on a particular subject area conclude their degree
requirements by writing an independent graduate thesis under
the direction of a faculty sponsor. Before registering for the
graduate thesis, a student must submit a proposal and receive
approval from the faculty sponsor and the MLA program
director.

450.850 Internship (3 credits)
A third option in the MLA Capstone is the Internship; students
who choose this option take one IC course, 8 electives, and
for their tenth course they will register for a particular
internship, which will culminate in a detailed research report.
Please contact the program director for more information on
internship options.
To prepare current and future museum professionals to be the visionary leaders of museums in contemporary society, Johns Hopkins University offers an innovative Master of Arts in Museum Studies. The format of the program itself—an almost fully online program—looks to the future. As an online program, we are able to offer the expertise of highly regarded professors and museum professionals from around the world, innovative virtual field trips, and global resources from a wide array of museums brought together in new and exciting ways. An international student body provides diverse perspectives and experiences in a dynamic online learning environment.

Museums of the 21st century are in the midst of a tremendous period of growth and change. New demands and challenges are emerging in every aspect of the museum landscape. Innovations in information and communication technologies are being integrated into the core strategies of the museum. Museums are increasing in number, expanding in size, and attracting more diverse audiences every day. The museums of the 21st century need leaders with the knowledge and skills to face these challenges and who possess a vision for the future.

The aim of this program is to provide a perspective on the theory and practice of museums in a changing technological, social, and political environment for current and future museum professionals. It emphasizes the role of technology as a pervasive aspect in today’s museum; examines new models of education, exhibition, and business strategies; and explores the role of the museum in a global society and as an agent of social change.

We welcome students interested in all types of museums, including history, technology, science, art, special topic or themed museums, historic sites, national parks, and zoos, and those interested in collections and exhibitions for corporations, government agencies, and private organizations.

DEGREE REQUIREMENTS

All students earn a Master of Arts (MA) in Museum Studies. Nine online classes and one on-site seminar are required to complete the degree. These 10 courses are made up of two required courses, three core courses, and five electives, which must be completed within five years of beginning the graduate program.

Online Classes

All online classes are offered as asynchronous learning experiences, allowing maximum flexibility in a student’s schedule. Students can log on to an easy-to-use course management system at any time, from anywhere, 24 hours a day and 7 days a week. Courses are structured around weekly course content, and students log on multiple times a week at their convenience to access course materials, participate in discussion, submit assignments, or take exams. Course content is delivered mainly via text, multimedia presentations, and threaded discussions. As an online program, we use the Internet to its full potential, and learning is enhanced through the most up-to-date Web-based tools for design, collaboration, conferencing, and community building. Classes are kept small (15 to 17 students) to encourage active engagement and community among students and faculty. Students have direct access to faculty in their courses and can arrange one-on-one student/faculty member online meetings in real time.

To address student concerns or questions about an online learning environment, an orientation course, offered by the university, introduces the student to the online learning tools, and is required before taking the first online class.
Onsite Seminar
A two-week intensive period of on-ground museum study in a location organized by the MA in Museum Studies program is a required component of the program. The seminar includes practicum opportunities in a variety of museum settings, conversations with local museum professionals, observation of and interaction with museum visitors, and class sessions to integrate the daily experiences. Using the rich diversity of museums, this course provides students with the chance to use what they have learned in their prior courses, develop networks with fellow students and museum experts, and explore the latest in museum practice, including exhibition design and development, public programming, collections management, conservation, and the uses of technology in the museum. Seminars have taken place in locations as diverse as Washington, DC, New York, Philadelphia, Atlanta, Chicago, San Diego, London, Berlin, and Barcelona. Students work in teams on directed activities during the two-week period. Note: Students must have completed a minimum of two courses in the program, although four or more courses are encouraged, to register for this course. One of these courses must be 460.601 or 460.602 and some seminars may have other specific requirements. Students are responsible for travel to and from the location, accommodations, and meals, as well as any specified field trip fees.

Waiver option: Students who are unable to travel to a seminar location due to accommodation needs, financial hardship, or family challenges may apply to the program director for an exemption to the two-week seminar.

If a waiver is granted, the student must enroll in the internship option (460.750) to fulfill the on-site component of the degree requirement.

COMMUNITY

Students
Students in the MA in Museum Studies program include current and aspiring museum professionals from around the world. We have students from a variety of academic and professional backgrounds, including those with degrees in areas such as art history, anthropology, history, economics, business administration, historic preservation, biology, archeology, music, philosophy, and film and media arts.

Faculty
The MA in Museum Studies faculty is made up of highly regarded experts in the museum field and academia from diverse geographic locations. The faculty is primarily full-time museum practitioners who are active members of the museum community. They are passionate about training the next generation of museum professionals and enthusiastic about the online course format.

Advisers
All MA in Museum Studies students are assigned an adviser who will help determine which courses are best for their career goals.

Alumni
Alumni from the program hold positions such as museum director, curator of collections, exhibition coordinator, registrar, director of education and public programs, visitor services manager, and social media coordinator. The program maintains close ties with our alumni, and they serve as ambassadors to new students.

Network
As an online program, we offer students valuable opportunities to meet museum professionals from around the world. We build a community within the program through social media tools and a virtual museum café, where students meet others in the program, find internship and job announcements, and learn about relevant conferences and events.

ADMISSION REQUIREMENTS

> A bachelor's degree from an accredited college or university
> A grade-point average of at least 3.0 on a 4.0 scale
For students who have been out of school for some time, museum work experience—employee, intern, or volunteer—may also be considered.
> Strong writing skills

Application Documents
> AAP application and fee
> A current résumé or CV
> Two letters of recommendation that verify professional and/or academic accomplishments
> A statement of purpose (approximately 750 words). This statement should describe how your academic and professional experiences have led to your decision to pursue a career in the museum field and how this museum studies degree will help you succeed in your goals in the museum profession. If you have worked for a museum in any capacity, please incorporate your experience into your statement. Your statement will be reviewed for content, organization, and writing style.
> Official undergraduate and graduate transcripts from all institutions attended
> International students must submit TOEFL scores and a “course-by-course” credential evaluation of their undergraduate and graduate (if applicable) transcripts performed by an outside evaluation service.
> All students who earned their postsecondary degree(s) in a country other than the United States must submit a “course-by-course” credential evaluation performed by an outside evaluation service.
> International students, see http://advanced.jhu.edu/prospective-students/international-applicants/ for more information.
### Advanced Standing

Advanced Standing allows consideration for those who have graduate-level coursework from an accredited college or university to be exempt from taking up to two courses towards degree completion. To be considered for advanced standing, you must meet the following criteria:

- Completed graduate-level courses from a Museum Studies degree or certificate program of an accredited university; OR
- Graduated from the Johns Hopkins University Museums and Society undergraduate program; AND
- Earned an A or A+ in the course being considered for an advanced standing waiver within the past three years

The following materials are required and will need to be uploaded to your online application for each course:

- Syllabi for the course(s) being submitted for advanced standing, including name of University and program attended
- Course number(s) of JHU elective course(s) considered for exemption

### CURRICULUM

The MA in Museum Studies offers a structured curriculum of required and core courses augmented with electives. This curriculum provides opportunities for students to gain the knowledge and skills necessary for current professional museum practice with an eye to the future and an integration of past philosophies. The program encompasses both theory and practice, focusing on providing real-world skills and training that enable students to move into the museum field or advance into jobs with more responsibility.

Students must take a total of 10 courses

- Exploring Museum Professions (460.601) OR Museums in the Digital Age (460.602)
- Three core courses
- On-site two-week seminar (460.610)
- Five elective courses

An internship at a student’s local museum, approved by the internship coordinator, may be substituted for one elective course. Students may take courses offered in the MA in Cultural Heritage Management program or up to two courses in other JHU programs as electives, subject to the approval of the director of each program.

**Note:** Students may not earn a C in a core course or required course. If you earn a C in a core or required course, you must either repeat the course or take another core or required course to count toward your degree. Degree candidates who receive a second C or below in either a repeated core course or any course taken in the program will be dismissed from the program.

### REQUIRED COURSES

Students are required to take either 460.601 or 460.602; and 460.610

**460.601 Exploring Museum Professions (3 credits)**

Managing a 21st-century museum relies upon the coordinated efforts of a wide range of specially skilled staff members from directors, curators, and educators to collection managers, conservators, and exhibition designers to event planners, press officers, fundraisers, and administrators to media, IT, membership, security, and facilities management teams. These professionals working behind the scenes or out front with the public define the quality of the institution and each visitor’s experience. Through readings and interviews with leaders in the field, this course examines the core functions of a museum and explores how the roles and responsibilities of museum professionals assure an organization’s daily operation, growth, and sustainability. Current issues facing museums, including diversity in the workforce, financial challenges, and the effects of technology, will also be addressed. In addition, students will engage in activities to help strategize their own museum career. Note: This course may be taken as an elective, if you have taken 460.602 to meet the requirement.

**460.602 Museums in the Digital Age (3 credits)**

With the emergence of new media and the ever-expanding use of the Internet, the traditional role and scope of the museum is changing. The museum has a new position in global communication, dissemination of information and cultural understanding. The introduction of technology into the museum is challenging traditional exhibition concepts, introducing new interactions with museum audiences, and affecting the museum’s core operations. This course introduces students to the museum field and explores the impact of media and technology on the museum, including an overview of the historical role of the museum in society and an examination of the current uses and effects of digitization, the Internet, and wireless technologies in these institutions, as well as basic concepts underlying the planning of a technology project for a museum. Note: This course may be taken as an elective, if you have taken 460.601 to meet the requirement.

**460.610 Two-Week On-site Seminar (3 credits)**

A two-week intensive period of on-ground museum study in a location organized by the MA in Museum Studies program is a required component of the program. The seminar includes practicum opportunities in a variety of museum settings, conversations with local museum professionals, observation of and interaction with museum visitors, and class sessions to integrate the daily experiences. Using the rich diversity of museums, this course provides students with the chance to use what they have learned in their prior courses, develop networks with fellow students and museum experts, and explore the latest in museum practice, including exhibition design and development, public programming, collections management, conservation, and the uses of technology in the museum. Seminars have taken place in locations as diverse as Washington, DC, New York, Philadelphia, Atlanta, Chicago,
San Diego, London, Berlin, and Barcelona. Students work in teams on directed activities during the two-week period. Note: Students must have completed a minimum of two courses in the program, although four or more courses are encouraged, to register for this course. One of these courses must be 460.601 or 460.602 and some seminars may have other specific requirements. Students are responsible for travel to and from the location, accommodations, and meals, as well as any specified field trip fees.

Waiver option: Students who are unable to travel to a seminar location due to accommodation needs, financial hardship, or family challenges may apply to the program director for an exemption to the two-week seminar.

If a waiver is granted, the student must enroll in the internship option (460.750) to fulfill the on-site component of the degree requirement.

CORE COURSES

Choose three out of five.

460.604 Introduction to Museum Education (3 credits)
This course introduces students to the educational role of the museum. What benefits and services does museum education provide in a pluralistic society? What do educators do within the museum organization? We begin by tracing the history of education in museums. We review theories about how people learn, what constitutes good teaching practice in the museum, and the unique role that objects play in an informal learning environment. We look at the different kinds of audiences for education programs, how to develop museum experiences including effective education programs and services, how evaluation works in gathering feedback and assessing outcomes in a museum setting, and the role of educators in inter- and intramuseum collaborative projects, such as the development of exhibition interpretation, marketing for educational programs, audience building, and interpretive planning. This course also considers the role and integration of digital technologies in the provision of educational services, products, and programs. As a culminating project, students research and develop a conference proposal based on an education-related topic of their choice.

460.606 Exhibition Strategies (3 credits)
This course introduces the diverse strategies and approaches used in exhibition planning, development, and implementation. It asks students to think critically about exhibitions and the interface between objects, concept, and experience. The course focuses on visitor-centered interpretive design and is applicable to a wide range of institutions. Students spend much of the semester working together in small teams, collaboratively producing a comprehensive exhibition project as they walk through the practical steps in exhibition development and design. Note: Because of the high level of online group work, this course is not recommended for first-semester students.

460.608 The Business of Museums (3 credits)
Museums are stewards of cultural heritage and intellectual property, vortices of knowledge, and arbiters of taste. They are community icons, places of respite, and public education adjuncts. Museums don't necessarily deal in products for profit, yet they compete in an entertainment ecology. They must cultivate members, donors, government funds, and corporate contributions, and rely on programs, gifts, grants, sponsorships, retail operations, and planned giving to survive. They must advocate for themselves in the legislative arena while constrained by their nonprofit status. Students will become conversant in the fundamentals of museum business, including mission, nonprofit status, transparency, governance, programming, management, finance, fundraising, facilities, legal and ethics issues, the impact of technologies, and ever-changing audiences. They will achieve this through readings, thought-provoking essays, engaging discussions, museum news analysis, recorded public talks, and live online discussions with leading museum professionals.

460.611 History & Philosophy of Museums (3 credits)
From cabinets of curiosities to historical monuments and sites of memory, this course surveys museum history from a global perspective to examine how the museum's function has changed over time. Students create a comprehensive timeline of museum history and philosophy—thinking through and visualizing the way certain concepts and events are related in time and across space. Through case studies and course readings in museum history, theory and methods, students will contextualize the philosophical trends that have impacted organizational structures, outreach, collection strategies, and the museum's role and relationship to its public.

460.666 Collection Management (3 credits)
Museums exist to preserve and share their collections with the world. Collection managers, or registrars, are essential to any collecting institution, whether collections are art, history, science, or live specimens. This course focuses on management principles that can be applied broadly to any type of collection. The course covers all aspects of collections care from the acquisition of objects, evaluation, care, and storage, through loans and exhibitions. Safe collections care and handling, using the most current methods, are emphasized so objects may be preserved for future generations. Any student who intends to work at a collecting institution will benefit from mastering the practical knowledge and skills underpinning many phases of museum work, which will be taught in this class.

ELECTIVES

Choose five of the following.

460.609 Museums in a Global Perspective (3 credits)
In this intensive course, students participate in collaborative role play to debate urgent issues confronting museums in the 21st century. Through readings, research, and extensive teamwork, students explore, analyze, develop, and discuss a range of policies and procedures that link museums to
international communities and trends. Students examine
and experience (through simulation) the significant effects
and challenges of a globalizing world on museum mission,
preservation of cultural heritage, and exhibition practice.
Students gain experience in debating global issues that will have
an impact on the future of museums as well as developing and
writing effective program proposals. The collaborative aspect of
this course requires the flexibility to schedule working sessions
every other week with an assigned team. Note: Students must
have completed two courses in the program to register for this
course.

460.612 Multimedia History, Theory, and Practice
(3 credits)
This course is an overview of the artists, scientists, philosophers,
mathematicians, and engineers who have pioneered the
scientific and artistic concepts central to our understanding of
multimedia. It emphasizes a critical understanding of the cross-
disciplinary nature of art, science, and technology, crucial to
the effective incorporation of new media aesthetics, production
strategies, trends, and sociocultural experiences into the
museum environment. Seminal 20th-century interdisciplinary
artistic movements and genres will be explored, i.e., kinetic
sculpture, installation art, electronic theater, etc., to consider
their interplay with the evolution of personal computing,
including cybernetics, augmented intelligence, hypertext,
graphical user interface, etc. Students will critique museum
installations, online projects, and educational exhibits, applying
concepts learned in the course, to better understand how digital
multimedia has come to define our contemporary museum experience.

460.615 Museums and Community Engagement (3 credits)
This course explores how museums and cultural organizations
of all sizes can strengthen their relationships with the
communities they serve. No longer are museums measured
and judged solely by their internal resources—collections,
endowments, facilities, and staff—but rather by the external
benefits and value they create for individuals and communities.
Growing numbers of museums are learning to make their
organizations more meaningful and relevant by involving their
communities in ongoing planning and decision-making. They
are reframing museum activities to focus on what matters
to their communities. By getting involved in community
challenges and developing new partnerships, they are
identifying underserved audiences and creating memorable
visitor experiences. As museums begin this journey towards
community engagement, they are initiating and facilitating
social change and moving toward social entrepreneurship.
This course includes the theory and skills of community
engagement, drawing on both research and practice for
examples.

460.616 Museums, Law, and Policy (3 credits)
Legal issues and concepts are a fundamental part of the day-
to-day management of museums and the policies that shape
the nature of museums. This course introduces students to the
ways in which museums are affected by the law and key legal
concepts. Discussions and assignments will address practical
concerns as well as policy and conceptual matters, incorporated
cases, mock negotiations, and group discussions. Students
will be able to identify issues from hypotheticals and relevant
legal concerns and resources. The course will help students
understand legal matters in museum practice in an applied
manner. Legal and policy discussions will include current issues
in copyright, freedom of speech and censorship matters, and
collections issues, including cultural heritage developments.

460.618 Museum Controversies: Ethical Issues in
Museums (3 credits)
Museum directors, curators, and other staffers have faced
an array of political and ethical dilemmas in an increasingly
contentious environment. This course explores the historical,
political, and cultural backgrounds to controversies surrounding
exhibitions such as the Smithsonians display of the Enola Gay,
the Brooklyn Museum of Art’s “Sensation,” the British Museum’s
Elgin Marbles, and the showing of illegally acquired antiquities
at various art museums. Nationalism, religious beliefs,
ocenity, and “edutainment” are among the issues discussed.

460.620 Accessibility in the Museum (3 credits)
Making museums and their information and collections
accessible to people with disabilities concerns more than ramps
and restrooms. People with disabilities can encounter barriers
to every aspect of the museum experience, from finding out
about exhibitions and educational offerings before a visit
through advertising or the museum’s website; to getting to, into,
and around the museum galleries and other public spaces; to
hearing tours and lectures, reading labels and signs, and using
interactive tools; to participating in educational programs. This
course will introduce students to the key concepts and issues
associated with making museums accessible to and inclusive of
people with disabilities.

460.621 Evaluation Theory & Techniques for Museums
(3 credits)
This course covers evaluation theory, methodologies, and
practical implementation of evaluation in museums and similar
environments. The class explores the stages of evaluation,
what can be achieved at each stage, and how those stages fit
into educational technology development. Students practice
developing clear evaluation questions choosing appropriate
methods, and assessing the benefits and trade-offs of different
evaluation strategies. Emphasis is given to the opportunities
and challenges of evaluating all types of museum experiences
(programs, exhibitions, architecture, wayfinding systems,
various interpretive technology, etc.) from multiple points of
view, including museum visitors and museum staff.

460.628 Architecture of Museums (3 credits)
This course serves as an introduction to museum architecture,
including the history of museum buildings, as well as current
case studies of renovations, expansions, and new facilities. We
will discuss the relevant topics in creating a physical museum
space, such as developing a museum program, planning the
visitor experience, developing wayfinding systems, building a
green museum, and incorporating technology in the initial plan.
We will analyze museum buildings from multiple perspectives,
including visitors, staff, and collections. Students will learn how
to evaluate an existing museum building and will be guided
through a mini post-occupancy evaluation of a museum in their
community.
460.630  Exhibition Design, Construction, and Documentation (3 credits)
Understanding the exhibition design process, from concept to implementation, is valuable not just for exhibition developers but also for registrars, curators, and museum educators. Looking beyond artifacts, storyline, and aesthetics, this course examines the rarely explored, but essential, aspects of exhibition design, from drawings and specifications to contracting and installation. Topics will include drawing packages and project documentation, schedules, client and developer responsibilities, project budget, architectural coordination, fabrication techniques, and legal and practical contracting considerations. As with general construction, the exhibition designers and fabricators follow industry standards, and whether a museum is a public or private organization, specific rules must be followed for solicitation and contracting. Prerequisite: 460.606 Exhibition Strategies.

460.633  Core Aspects of Conservation: A 21st-Century Approach (3 credits)
The conservation, preservation, and restoration of cultural heritage is an increasingly complex practice within the museum context, and one that benefits greatly from widely shared knowledge and collaborative networks. Today, a variety of highly specialized conservators perform treatments on individual items of high value, while at the same time there are a growing amount of conservation-related issues that collections managers, registrars, and others are responsible for in the process of caring for collections. This class will give students the opportunity to work in and around conservation issues and tasks while assimilating and contributing to the existing body of knowledge in collections care (preventive conservation). A variety of media used to create and conserve artworks will be discussed. Assignments will be coordinated with or related to current Web-based conservation projects, including Wikipedia, ConservationReel, and AIC’s Lexicon Project. Prerequisite: 460.666 Collection Management.

460.634  Museums, Libraries, and Archives: Issues of Convergence for Collecting Institutions (3 credits)
“Convergence” has been a buzzword for archives, museums, and libraries for most of the past decade. This course will look at areas of convergence among the three communities, focusing on issues that relate specifically to collecting institutions. Classwork will involve the history of collecting and the development of the three communities (archives, libraries, and museums) in the United States in the late 19th century/early 20th century, before delving more deeply into ideas and ideals, missions, professional training, conservation, ethics, and services that are shared among these communities. In the final weeks, we will focus on how technology can help shape ongoing dialogues.

460.635  Curatorship: Principles and Practices (3 credits)
Whether the museum is large or small, public or private, has several curatorial departments or a single director/curator, it must have a way to fulfill its curatorial obligations. Everyone in the museum should understand the institution’s curatorial responsibilities, and every museum should have a curatorial strategy suited to its collection and/or its exhibitions. In this course, students will study principles and practices relating to core curatorial functions and learn about the relationship of curatorship to the museum’s mission, ethical, and other challenges facing museums, and how technology is changing the ways museums fulfill their curatorial responsibilities. Students will draft a position description for today’s curator, write an acquisition proposal, present an exhibition proposal, and visit museums to critique specific curatorial practices.

460.636  Living Collections (3 credits)
Zoos, aquaria, botanical gardens, and nature preserves, like many other museums, are collection-based institutions. This course explores the unique character of these institutions in their core functional areas, including the special considerations and challenges of caring for, interpreting, and exhibiting living collections. Developed by three museum professionals with specialties in terrestrial, aquatic, and botanic institutions, course topics are explored through the lenses unique to plants, animals, and marine life. In addition to understanding the core functional areas of these museums, students will analyze the complex social role of cultural institutions that are devoted to the living world.

460.637  Curating Online Exhibitions and Experiences (3 credits)
Today, every museum must have an effective online presence. Increasingly, museum professionals from multiple disciplines—curatorial, collections management, new media, publications, external affairs, etc.—need to collaborate to create online exhibitions and experiences. It is essential that museum professionals have a solid grounding in the theory of online curation, as well as the practical skills to plan, design, and implement online exhibitions and experiences that capture the imagination of online museum visitors. Students will discuss questions such as: What are the unique challenges of curating online? How are the aesthetics of online spaces similar and/or different from traditional bricks and mortar museum galleries and exhibit spaces? What strategies and methodologies can the curator and other museum professionals apply to successfully educate, inform, and engage online exhibition visitors? What are the trends in curating online museum exhibitions, and where does the future lie in this exciting new area of the museum field? Course readings, assignments, and discussions will culminate in a research paper on current trends in online curation in museums.

460.638  Preservation of Analog and Digital Photographs (3 credits)
This course will explore the main principles in caring for analog and digital photographic collections. It has been designed as a broad approach to the subject, but with enough depth to give the student an approach to the care for photographic collections with both historical and natively born digital photographs. This course will provide this insight from looking at the materials that photographs are composed of, understanding the materials and environment that they are housed in, and the technologies and workflows needed to care for analog and natively born digital photographs for long-term preservation. Students will be required to build and present a case study and a final project discussing a topic related to the course.
Material Culture and the Modern Museum (3 credits)
From the Mona Lisa to Archie Bunker's easy chair, museums play a critical role in the collection, preservation, and interpretation of objects. This course looks closely at the development of material culture studies and its connection to museums in the 21st century. Students will explore collecting as meaningful action, the classification of objects (from academic categorizations to tags and folksonomies) and their access (from collections to archives, to physical and virtual display). Student-developed object biographies will be used throughout the semester to explore the life history of objects, their changing meanings, and their relationship to self, society, and the museum. Note: Students are strongly encouraged to have completed two courses in the program before registering for this course.

Educational Programming for Museum Audiences (3 credits)
Educational programming for today's museums requires more skills than ever before, from defining mission-driven educational goals to conducting summative evaluation, from understanding learning theory and characteristics of a myriad of museum audiences to designing and implementing technology solutions. Students in this course will learn the steps needed to design sound educational programming in museums, including developmentally appropriate learning theory and strategies for audiences such as children, families, adults, teachers, and students. Prerequisite: 460.604 Introduction to Museum Education.

Digital Media in the Museum (3 credits)
Digital media is a crucial part of a museum's visitor engagement strategy, and it plays an integral role in such areas as informational programming, marketing, wayfinding, and interpretation. Students in this course will examine the impact of a wide range of technologies, including mobile guides, multitouch tables, augmented reality games, and immersive theater environments on both museum professionals and visitors. Through readings, interviews with multimedia professionals, hands-on experience, and papers, students will learn the practical applications of digital technology while developing the critical skills necessary to evaluate both the use of technology and the best way to integrate it into the museum environment. This course provides students with the basic skills to plan, manage, and assess the production of successful in-museum digital media projects. Students will have the opportunity to produce their own project plan for a real or imagined production. Prerequisite: 460.602 Museums in the Digital Age.

Museums and Mobile: Adapting to Change (3 credits)
We live in a mobile-first world. The mobile revolution has profoundly altered our behaviors, transforming our very expectations of how we interact with the world around us: We now expect to get what we want on any device, anytime, anywhere, at the touch of a finger. And we expect the same when interacting with cultural institutions. The future of museum technology lies heavily in the use of mobile platforms, but how should museums adapt to the future? Through presentations, interviews, guest speakers, hands-on experience, group discussions, and collaborative assignments, this course will explore the many questions and issues facing cultural institutions as they try to adapt to this mobile mind shift, as well as how museums can leverage mobile as a platform for social conversation, deeper brand engagement and, of course, opportunities for education. Students will learn how to leverage mobile to engage visitors, balance the need for curatorial direction with user participation, and redefine the museum experience for mobile visitors, both on-site and off-site. Prerequisite: 460.602 Museums in the Digital Age.

The Practice of Museum Publishing (3 credits)
As content originators, museum curators, educators, conservators, public relations officers, development staff, and others will hold a stake in the publications process at some point in their careers. This course presents an overview of the range of print and electronic publications typical—and not so typical—of museums and the processes required to make them happen. Students will gain an understanding of schedules and budgets, the editorial process, design concepts, copyright issues and printing, and how new technologies have affected both the way museums think about publications and how they get produced.

Expanding Roles of Museum Marketing and Communications (3 credits)
This course explores the core responsibilities and the expanding roles of museum marketing and communications in an era of increasing competition for people's time, attention, and resources. Topics range from market research and branding to crisis communications and social media. Creative and strategic thinking and collaboration will be emphasized, and models from throughout the world will be presented and discussed.

Fundamentals of Museum Fundraising (3 credits)
Through a combination of current and historical readings, case studies, discussions, and written assignments based on "real-life" scenarios, this course will cover general fundraising strategies and ethics, e-philanthropy, prospect research, grant writing, annual and capital campaigns, corporate giving and cause marketing, special events, and stewardship.

Culture and Management of Technology in Museums (3 credits)
Technology plays an increasingly critical role in how 21st-century museums should operate their business, manage their information, and engage with their audiences. To be a successful museum professional today, in any discipline, requires some understanding of the impact and opportunities that can be derived from the use of technology to support our initiatives, from supporting core museum functions like managing collections information and digital assets, to understanding the opportunities that the Internet, mobile technologies, and social media can provide to engage with our audiences. Understanding the principles that underlie various technologies and specific applications, and how the workplace and society influence our use of technology are crucial to understanding how museums can use technology to deliver on their missions. By providing a grounding in technology trends, principles, concepts, applications, and philosophies, this course will provide non-
technical students with the necessary knowledge and tools to assess, deploy, and manage the use of technology in a museum environment. Note: This course may be taken as a required course in place of 460.602 Museums in the Digital Age.

460.666 Developing Museum Web Projects (3 credits)
How can museums best use the Web to further their missions? What are the best practices for planning and sustaining high-quality online projects? In this course, students will survey the application of online technologies for various purposes, including collections, education, exhibition, fundraising, collaboration, and marketing projects. The bulk of the course work will focus on researching and creating the components of a Web project plan (for a project of the student’s own choice and design). Students will gain hands-on experience with audience research and usability testing, articulating technology solutions to match desired goals, developing information architecture, building a basic online prototype, crafting a marketing and evaluation plan, and pitching a project idea for funding. A range of online technologies will be considered, including websites, blogs, email newsletters, mobile applications, and social media.

460.663 Social Media Strategies for Museums (3 credits)
From #AskACurator to Snapchat selfies, social media has permeated the work of museum staff and the people who visit them. In this course, we will explore social media trends and their relevance for museums, including marketing, fundraising, education, and curatorial functions. Students will explore case studies, talk with leading museum social media practitioners, and develop social media strategies to meet specific museum objectives.

460.665 Introduction to Archives (3 credits)
This course provides an introduction to the theory and practice of archives, including an overview relating to the elements of an archival program and the role and work of archivists. Special attention will be paid to the work of archivists in a museum context. The theoretical component of the course will be supplemented with a variety of hands-on exercises, case studies, and informed anecdotes designed to illustrate the relationship between theory and practice. Although American archival tradition will be the focus, international perspectives on archival theory and practice will play an important role in the course of study. Topics include: acquisition; appraisal; arrangement and description; preservation; reference; outreach; archival access systems; legal and ethical issues; and born-digital curation, including digital preservation.

460.667 Collection Management Systems (3 credits)
Collection management systems, the workhorses of museum information technology, provide staff members and the public alike with access to collection information for a myriad of purposes. In this course, we will look at how these systems have evolved from their traditional role as registration tools to rich repositories of collection information, with the potential to interface with other types of systems, both inside and beyond the museum walls. This course introduces widely used museum collection management systems in a series of developer-led presentations, providing students with the opportunity to evaluate how collection management transactions are performed using various software. Students will learn the basic features of collection information policies and how to apply museum standards to analyze these policies. Data migration planning—from paper to electronic, and electronic to electronic—will be discussed, as well as emerging technologies used in conjunction with traditional collection management systems. This is a must-have course for students with the goal of becoming a registrar, collection manager, or digital curator.

460.668 Cataloging Museum Collections: History, Standards, and Applications (1 credit)
Cultural heritage institutions—including museums, libraries, and archives—have as core responsibilities the safeguarding of the objects in their care and the education of the public about these objects. To support both of these responsibilities, one of the foundational activities of cultural heritage professionals is the cataloging of the objects in their collections. This course will provide both an overview and practicum of cataloging definitions, philosophies, standards, and practices. Record-keeping methods, numbering systems, and data formats will be emphasized, and professionally accepted standards for cataloging various cultural objects will be reviewed. Discussion of the broad application of cataloging data sets, including cross-collection aggregation and search, delivery to the public, and Web 2.0 and 3.0 delivery methods will be covered.

460.670 Digital Preservation (5 credits)
This course introduces students to the current state of digital preservation, preservation challenges, and basic concepts for designing effective digital preservation plans and programs. Topics include the relevance of digital preservation for museums; archival principles that inform preservation practices; standards and policies; considerations in preservation strategies; issues relating to formats, repositories, and processes; and emerging preservation solutions and services. Note: Students who are not enrolled in the Digital Curation Certificate program are encouraged to take 460.666 Collection Management before enrolling in this course.

460.671 Foundations of Digital Curation (3 credits)
This course lays a foundation for managing digital information throughout its life cycle by introducing students to the emerging field of digital curation and by examining the practical issues and tools involved in managing digital collections and repositories over time. Topics include metadata schemas for describing digital assets in different disciplines; sharing digital content beyond the institution to reach wider audiences; requirements for trustworthy repository services; management of research data; policy issues; and user services. Note: Students who are not enrolled in the Digital Curation Certificate program are encouraged to take 460.666 Collection Management before enrolling in this course.

460.672 Managing Digital Information in Museums (3 credits)
This course addresses technical and practical issues involved in the long-term management and preservation of digital assets, with an emphasis on the unique problems facing museums. Subjects will include the best practices for digital format conversion, the management of digital surrogates and
derivatives, practical planning and design of workflow for digital curation, and a survey of the technologies (software, equipment, and metadata schemas) required at ingest, storage, access, and dissemination points in the Open Archival Information System model. These topics will be presented within the context of analyzing the digital asset management practices (in the broadest sense) of individual institutions and developing strategies for the curation of these assets. Prerequisite: Either 460.670 Digital Preservation OR 460.671 Foundations of Digital Curation; both are recommended.

460.673 Digital Curation Certificate Internship (3 credits)
The internship, including at least 120 hours of field experience, affords students the opportunity to gain hands-on experience working with experts who are leading digital curation activities in museums and related cultural heritage organizations in the U.S. and abroad. The internship is a partnership between the university and the host institution, and is customized to meet each student's needs and career goals. The program will assist students in arranging appropriate internships. Student interns will produce evidence of their accomplishments through work products, project reports, or other documentation in an online course component and will participate in online discussion forums with other students enrolled in digital curation internships during the same semester. The internship is usually taken after completing at least two of the following core courses: Digital Preservation (460.670), Foundations of Digital Curation 460.671, or Managing Digital Information in Museums 460.672. Note: Students should discuss internship plans with the Digital Curation Certificate Program Coordinator at least one semester before enrolling in the course.

460.674 Digital Curation Research Paper (3 credits)
The supervised research course enables students to investigate a significant problem or issue in digital curation and to develop and demonstrate critical thinking and communication skills. Ideally, the research paper will build on the student's internship experience. The research paper is expected to result in a publishable or presentable paper that makes a contribution to the literature and field of digital curation. As there is currently a significant need for research in digital curation, and relatively little published literature—especially relating to museums—student research in this program can make a major contribution, and graduates will be prepared for careers as leaders in the field. Course work, assignments, and meetings with a faculty member will take place in an online course environment. The research paper is normally completed as the final requirement in the Digital Curation Certificate program.

460.675 Leadership of Museums (3 credits)
A museum career offers many opportunities for leadership. Whether you want to be a museum director or not, throughout your career you will lead individual projects, teams, departments, or organizations. This course is designed to introduce students to the nature and practice of leadership in the 21st-century museum. Regardless of an institution's age, size, location, discipline, or its focus, leadership determines its tenor and tone. Leadership frames a museum's intangible values while underpinning its tangible assets. It comes in many guises, proactive, reactive or benign, driving institutions forward or binding them to the past. Leadership can be a lightning rod for change or preserve an organization in amber. Good, bad or indifferent, it drives everything, yet in theory and practice it receives little direct attention. Underpinning this course is the philosophy that we each make leadership choices affecting boards, staffs and colleagues, as well as our own careers. This course focuses on personal leadership development, beginning with an assessment of students' leadership strengths and weaknesses while building awareness of challenges, best practices, and practical workplace applications. Through reading, discussion, and projects students will deepen their understanding of their personal leadership capacities, grasp the importance of self-awareness to leadership growth, and utilize their skills across the rapidly evolving world of the 21st-century museum. Prerequisite: Students must have completed ONE of the following courses to register for this course: Business of Museums 460.608; History and Philosophy 460.611; OR Museums and Community Engagement 460.615.

460.682 Museum Procurement and Contracting (3 credits)
Through case studies and case law, sample materials from a variety of museum projects and a smattering of underpinning statutes and regulations, students will learn the hows and whys of museum outsourcing practice. While conducting market research, drafting a scope of work, evaluating creatives and pricing approaches, and confronting ethical constraints, students will derive a practical road map for leveraging the marketplace to address museum needs. Students will learn best practices and acquire a deeper understanding of the contractual, legal, technical, and creative issues that museums typically face when working with vendors. Most importantly, students will acquire the tools necessary to help them navigate and set the expectations of their museum clients to assure successful collaboration between internal teams and external contractors.

460.683 Project Management in Museums (3 credits)
Project management is the oversight and process of planning, organizing, and coordinating multiple tasks, resources, and stakeholders. In museum settings, it often requires a choreographed juggle of scheduling, budget tracking, content and education considerations, facility and operations issues, and human resources, along with an ability to be flexible and calmly tackle unexpected challenges. This course will present both theoretical and practical concepts for initiating, planning, executing, monitoring, and completing projects in a museum. Using real-world scenarios and different types of projects, the course will, provide students with tools and strategies necessary for project scheduling, task supervision, and stakeholder management. Project management is a learned skill, useful not only to those who will ultimately oversee a project but to everyone who may eventually be part of a project team.

460.684 Museums, Finance, and the Economy (3 credits)
This course examines how changes in the economy can affect museum income, expenditures, fundraising, endowments and attendance. It explores how various museum practices can mitigate the effects of a weak economy and capitalize on a strong economy. Through case studies of large and small museums, students examine information sources that managers use to identify changes in the local, regional, and...
national economy, which might affect their institutions. Students gain familiarity with economic and museum financial information by adopting two museums and tracking how changes in their finances and attendance relate to shifts in the economy. This course is critical for all students interested in the “behind the scenes” of museum management, including those with little or no background in finance or economics.

460.685 Private Collections and Museums: The New Frontier (3 credits)
An increasingly significant amount of our cultural and historical heritage is in private collections and outside the protective sphere of public institutions. Numbering in the tens of thousands in just the U.S., private collections span a great variety of objects reflecting the wide range of enthusiasts who collect them. This course will explore private collectors and trends in their collecting plus the similarities and differences between public and private collections and museums. It will help prepare students for the unique challenges they may face, illustrated by real world examples and interviews with collectors, curators, collections managers, and service providers plus hands-on experience. It will include developing problem solving strategies and project management skills they can use to adapt and implement institutional ethics and best practices, especially as private collections evolve into public museums.

460.686 Culturally Specific Museums (3 credits)
Museums have the potential to provide safe spaces for comprehensive cultural inquiry. Culturally specific museums provide strategic platforms for showcasing diverse sets of art, history and culture with the intention of reaching a broad set of visitors. This course examines the significance of culturally specific museums, both individually and in relation to mainstream museums, to better understand how public culture engages issues of art, history, aesthetics, religion, ethnicity, and politics. Through the combination of contemporary reading material, survey of six national culturally specific museums, synchronous and a-synchronous discussion forums and guest speakers, students will discuss some of the ways in which culturally specific museums help make up the fabric of culture represented in museums in the United States of America.

460.690 Science, Society, and the Museum (3 credits)
Museums have been shaping the public discourse on science for centuries. They serve as a bridge between science and society, a way for general citizens to connect with, engage, and increasingly contribute to scientific understanding. Science, Society, and the Museum presents the history of this intimate relationship, detailing the connection and affect that science and society have on one another, and the museum as the documentarian of that relationship. From Darwin and Sputnik to global change and extinction, the course emphasizes the responsibility of museums—past and present—to embrace their role in communicating science and increasing the scientific literacy of an engaged population.

460.691 Innovation and the Modern Museum (3 credits)
The past decade has seen a huge rethinking of what museums do, their purposes, even what they are. This course explores how museums today are searching for new ways to incorporate creativity and innovation in their missions, practices, and displays. Like other educational and cultural institutions, they are seeking to nurture their own cultures of innovation and to play a greater role in “creative place-making” in towns and cities everywhere. This effort is not limited to the “Maker Faires” and the like at science and technology centers/museums. It is also applied, for example, in art and design museums displays about artistic creativity, including digital art and videogame graphics; in exhibits about technological, social, and cultural invention in museums of history and anthropology; in novel approaches at children’s museums. Impossible to ignore is the spirit of innovation expressed in modern museum architecture. The course also looks to the future of museum innovation. It explores how cutting-edge digital technologies, including 3-D imaging and replication, and how ‘virtual museums’ will transform the interpretation and presentation of artifact collections. Students will be encouraged to draw upon their own powers of creativity and innovation. As a term project, they will develop their own “Innovation Plans.”

460.750 Museum Internship (3 credits)
An internship at a student’s local museum, approved by the internship coordinator, may be substituted for one elective course. To fulfill the internship requirement, a student must complete a minimum of 80 hours of work on-site and a project, (either a research paper or a practical product) on an approved topic related to his/her experience, due at the end of the semester. Students also participate in online discussion and course work during the semester. Before registering for the internship option, the student should contact the internship coordinator for approval. At least four to six weeks before the beginning of the semester in which the internship will take place, the student must submit 1) a description of the internship weekly duties including activities and/or responsibilities, 2) learning objectives and goals, 3) why this experience should be part of the museum studies degree, and 4) a signed letter of commitment from the internship supervisor. Students must have completed a minimum of two courses in the program before registering for this internship.

460.755 Museum Projects (3 credits)
This course expands opportunities for practical experiences beyond the on-site seminar and internship elective. Offered as an online experience, this course will involve students in an actual museum or museum-related project. Students will work in collaborative teams facilitated by a JHU faculty member and engage with museum professionals outside of the program. The goal of the course will be to establish a prototype or complete a real-life project of value to the museum field while interacting with current museum professionals. Museum Projects will be offered on an occasional basis and will vary in topic. Different prerequisites will be set up each time the course is scheduled depending upon the specific project. In addition to weekly research, writing, and asynchronous discussions in the course management system, students should expect to participate in five to seven real-time online meetings throughout the semester, dates of which will be determined by the Museum Projects team in tandem with the project requirements and deadlines. Students must submit a Museum Projects application form two weeks before registration begins to be approved.
for enrollment in the Museum Projects course. On this form, students will describe their interest in the specific Museum Projects course offered and other applicable topics as requested, as well as confirm their ability to attend five to seven real-time sessions. A selection committee will review the applications and determine enrollment eligibility before the semester’s registration begins. Enrollment limits may vary depending upon the project.

MA IN MUSEUM STUDIES/ CERTIFICATE IN NONPROFIT MANAGEMENT

Students pursuing an MA in Museum Studies who are interested in furthering their management education may enroll in the combined degree program offered with the Certificate in Nonprofit Management. Museum studies students may earn the Certificate in Nonprofit Management by taking an additional four of the six online courses necessary to complete the certificate, provided they have taken 460.608 The Business of Museums as a core course and have had at least one of the museum studies electives listed below. This enables students to earn both the MA degree and a graduate certificate for a total of 14 courses, 10 in museum studies and four in nonprofit management. Those interested should apply to the combined MA in Museum Studies/Certificate Nonprofit Management through Advanced Academic Programs. Current students can submit a Change of Program request. Please see page 13 for more information on that process.

MA in Museum Studies students pursuing the Nonprofit Management Certificate must meet the following course requirements:

Courses from the MA in Museum Studies

Ten courses from the MA in Museum Studies program are required. Of those 10 courses, the following criteria apply:

Required
460.608 Business of Museums (3 credits)

Additionally, one of the following electives:
460.621 Evaluation Theory and Techniques for Museums (3 credits)
460.655 Expanding Roles of Museum Marketing and Communications (3 credits)
460.657 Fundamentals of Museum Fundraising (3 credits)
460.660 Culture and Management of Technology in Museums (3 credits)
460.675 Leadership of Museums (3 credits)
460.682 Museum Procurement and Contracting (3 credits)
460.683 Project Management in Museums (3 credits)
460.684 Museums, Finance, and the Economy (3 credits)

Courses from the Nonprofit Management Certificate

Choose four of the following.
470.623 Nonprofit Program Development and Evaluation (3 credits)
470.625 Resource Development and Marketing in Nonprofits (3 credits)
470.666 Institutional Fundraising: Raising Maximum Dollars from Government Agencies, Corporations & Foundations (3 credits)
470.682 Mission Meets Profit: An Exploration and Building of a Social Enterprise (3 credits)
470.689 NGOs in Development and Global Policy-Making (formerly Overview of Global Public and Nonprofit Relationship) (3 credits)
470.728 Influence and Impact of Nonprofits (3 credits)
470.774 Nonprofit Governance and Executive Leadership (3 credits)
470.789 INGOs in Development and Global Policy-Making (3 credits)
470.798 Financial Management and Analysis in Nonprofits (3 credits)

Note: Students are encouraged to enroll in courses 470.728 and 470.798 at the start of the Certificate when possible. Descriptions of the Nonprofit Management Certificate courses can be found on page 152.

MA IN MUSEUM STUDIES/ CERTIFICATE IN DIGITAL CURATION

Students who are interested in pursuing an MA in Museum Studies and are also interested in the preservation and management of cultural heritage digital assets may enroll in this combined program. Museum Studies students may earn the Certificate in Digital Curation by taking two of the required six courses as electives in the MA program plus the additional four courses required to complete the certificate. This enables students to earn both the MA degree and the certificate for a total of 14 courses, 10 in museum studies and four in digital curation. Students may also enroll directly in the Certificate in Digital Curation alone. If they later choose to pursue the MA in Museum Studies, they may count two courses from the digital curation certificate program toward the MA.

Applicants to the combined program should follow the admissions requirements for the MA in Museum Studies and submit a statement of purpose that describes in detail your academic and professional experiences that have led to your decision to pursue a master’s degree in museum studies with a focus on digital curation.

To learn more about the Certificate in Digital Curation, see page 213.
Digital curation is an emerging field that encompasses the planning and management of digital assets over their full lifetime, from conceptualization through active use and presentation to long-term preservation in a repository for future reuse.

Museums worldwide are now routinely digitizing all collection objects as they are acquired and loaned, not only for access but as documentation in the event of loss, damage, or theft. They are also digitizing significant portions or even all of their holdings in order to create the robust websites that the public now expects. In addition, museums are acquiring born-digital content, such as digital media art, historical data in digital formats, and scientific research data. The creation and acquisition of valuable digital assets continues at a rapid pace, and cultural heritage institutions now have a critical need for professionals in the field to manage and preserve all types of digital assets to ensure their long-term availability for researchers, educators, and the public, and to participate in the development and promotion of standards and best practices for digital curation in cultural heritage.

The Johns Hopkins University Certificate in Digital Curation, offered through the graduate program in museum studies, advances the education and training of museum and other cultural heritage professionals worldwide in this emerging field. The certificate program offers a specialized curriculum that prepares current and aspiring cultural heritage professionals to work with digital collections, exhibitions, and research data to ensure the effective stewardship of our global cultural heritage in all types of museums, from art museums to zoos, and related cultural heritage organizations. Students in this program will also contribute to the critically needed professional literature in the field.

The program prepares students to:

- Identify and describe the principles of digital preservation and digital curation.
- Create and assess digital preservation plans and strategies.
- Demonstrate understanding of archival principles of appraisal and the management of digital content in trustworthy repositories.
- Demonstrate awareness of legal issues that impact museums’ abilities to preserve digital content and make it accessible.
- Identify and describe workflows for the creation and management of digital content in museum environments.
- Demonstrate understanding of research methods and critical thinking skills through the supervised research paper.

PROGRAM COMMITTEE

Phyllis Hecht  
Program Director

Joyce Ray  
Program Coordinator

ADMISSION REQUIREMENTS

Prerequisites:

Applications to the Certificate in Digital Curation will be accepted from:

- Individuals with a bachelor’s degree and at least five years of experience working in a museum, library, or archive, or related cultural heritage organization
- Individuals with a master’s degree in museum studies or other relevant field
- Students currently enrolled in the JHU museum studies master’s program. (A separate Change of Program application to the certificate program is required; no more than two courses, from a list of designated courses, may be applied to both the master’s degree and the certificate.)
- A grade-point average of at least 3.0 GPA on a 4.0 scale (work experience will also be considered)
- Individuals who have a bachelor’s degree and meet the GPA requirement but lack the necessary work experience may apply to the dual MA in Museum Studies/Certificate in Digital Curation program. Prospective students are encouraged to discuss their academic and career goals with the digital curation program coordinator prior to applying.

Application Requirements:

- AAP application
- Application fee
- A current résumé
- A statement of purpose (approx. 750 words) that describes in detail your academic and professional experiences that have led to your decision to pursue a certificate in digital curation
CURRICULUM

Students must take a total of six courses to complete the certificate requirements: five core courses and one elective. Two of the three core courses marked with asterisks should be taken before enrolling in the internship or research paper requirements. The elective may be taken at any time.

Up to two courses completed in the JHU museum studies master's degree program may be applied toward the certificate upon admission to the certificate program. This includes two courses marked with asterisks below, or one of these courses plus an elective.

Also, up to two courses from the Digital Curation Certificate program marked with asterisks may be applied to the JHU museum studies master's degree program as electives.

CORE COURSES

460.670 Digital Preservation* (3 credits)
This course introduces students to the current state of digital preservation, preservation challenges, and basic concepts for designing effective digital preservation plans and programs. Topics include the relevance of digital preservation for museums; archival principles that inform preservation practices; standards and policies; considerations in preservation strategies; issues relating to formats, repositories, and processes; and emerging preservation solutions and services. Note: Students who are not enrolled in the Digital Curation Certificate program are encouraged to take 460.666 Collection Management before enrolling in this course.

460.671 Foundations of Digital Curation* (3 credits)
This course lays a foundation for managing digital information throughout its life cycle by introducing students to the emerging field of digital curation and by examining the practical issues and tools involved in managing digital collections and repositories over time. Topics include metadata schemas for describing digital assets in different disciplines; sharing digital content beyond the institution to reach wider audiences; requirements for trustworthy repository services; management of research data; policy issues; and user services. Note: Students who are not enrolled in the Digital Curation Certificate program are encouraged to take 460.666 Collection Management before enrolling in this course.

460.672 Managing Digital Information in Museums (3 credits)
This course addresses technical and practical issues involved in the long-term management and preservation of digital assets, with an emphasis on the unique problems facing museums. Subjects will include the best practices for digital format conversion, the management of digital surrogates and derivatives, practical planning and design of workflow for digital curation, and a survey of the technologies (software, equipment, and metadata schemas) required at ingest, storage, access, and dissemination points in the Open Archival Information System model. These topics will be presented within the context of analyzing the digital asset management practices (in the broadest sense) of individual institutions and developing strategies for the curation of these assets. Prerequisite: Either 460.670 Digital Preservation OR 460.671 Foundations of Digital Curation; both are recommended.

460.673 Digital Curation Certificate Internship (3 credits)
The internship, including at least 120 hours of field experience, affords students the opportunity to gain hands-on experience working with experts who are leading digital curation activities in museums and related cultural heritage organizations in the U.S. and abroad. The internship is a partnership between the university and the host institution, and is customized to meet each student's needs and career goals. The program will assist students in arranging appropriate internships. Student interns will produce evidence of their accomplishments through work products, project reports, or other documentation in an online course component and will participate in online discussion forums with other students enrolled in digital curation internships during the same semester. The internship is usually taken after completing at least two of the following core courses: Digital Preservation (460.670), Foundations of Digital Curation (460.671), or Managing Digital Information in Museums (460.672). Note: Students should discuss internship plans with the Digital Curation Certificate Program Coordinator at least one semester before enrolling in the course.

460.674 Digital Curation Research Paper (3 credits)
The supervised research course enables students to investigate a significant problem or issue in digital curation and to develop and demonstrate critical thinking and communication skills. Ideally, the research paper will build on the student's internship experience. The research paper is expected to result in a publishable or presentable paper that makes a contribution to the literature and field of digital curation. As there is currently a significant need for research in digital curation, and relatively little published literature—especially relating to museums—student research in this program can make a major contribution, and graduates will be prepared for careers as leaders in the field. Course work, assignments, and meetings...
with a faculty member will take place in an online course environment. The research paper is normally completed as the final requirement in the Digital Curation Certificate program.

**ELECTIVE COURSES**

Students may choose any of the MA in Museum Studies courses to meet the digital curation elective requirement, but they are encouraged to discuss their choice and its relevance to their career goals with the digital curation program coordinator prior to enrollment.

See page 205 for course descriptions for the MA in Museum Studies.
The MS in Research Administration is designed to accommodate both career practitioners and those who seek a career in research administration. The program requires that students complete a core curriculum of four courses, and a minimum of two specialized tracks. As part of the core curriculum, students must either write a thesis or engage in an approved capstone project. In all, the total number of courses taken must be 12 courses or higher, regardless if it a three credit or four credit course. Courses within tracks are grouped in areas of interest to benefit students who work or want to work in various areas of research administration, or who may have varying levels of experience or special needs. Two tracks must be completed (four courses in each) in order for students to meet degree requirements.

Non-degree-seeking students may enroll in track courses with special student status. Such students are required to obtain the approval of the MS in Research Administration program director before enrolling as a non-degree-seeking student. Non-degree-seeking students are restricted to taking a maximum of four courses overall. If non-degree-seeking students want to take more than four courses overall, they must formally apply to the degree program and be accepted, if they decide to seek a degree.

**COURSE REQUIREMENTS**

- Four core courses
- Each track has one required course
- Six elective courses

**Core Courses (Required of all students)**

- 475.601 Introduction to Research Administration* (3 credits)
- 475.602 Organization and Leadership for Research Administration* (3 credits)
- 475.604 Introduction to Legal, Ethical, Regulatory, and Compliance Issues* (3 credits)
- 475.800 Capstone Project in Research Administration
  OR
- 470.801 Research and Thesis
- 475.855 Thesis and Capstone Continuation (non-credit)

**CURRICULUM TRACK 1**

Program Administration and Facilitation

(One required course and choose any 3 courses)

- 475.603 Assistive Technologies for Research Administration (3 credits)
  (Offered as an elective in all three curriculum tracks but may only be taken once)

**CURRICULUM TRACK 2**

Financial Management of Sponsored Programs

(One required course and choose three courses.)

- 475.603 Assistive Technologies for Research Administration (3 credits)
  (Offered as an elective in all three curriculum tracks but may only be taken once)
- 475.609 Financial Management of Sponsored Programs (required) (3 credits)
- 475.610 Financial Accounting and Compliance Auditing (3 credits)
- 475.611 Reporting and Statistical Analysis for Sponsored Programs (3 credits)
- 475.617 The Federal Acquisition Regulations and Defense Contracting (3 credits)

**Interdisciplinary Courses**

- 470.709 Quantitative Methods (3 credits)
- 470.728.81 The Influence and Impact of Nonprofits (3 credits)
- 470.709 Quantitative Methods (3 credits)
- 470.798 Financial Management and Analysis in Nonprofits (3 credits)
  OR
- 470.627 Financial Management and Analysis in the Public Sector (3 credits)
Students in the MS in Research Administration program will receive a firm foundation, through the core curriculum, for understanding how the research enterprise is organized worldwide and within the United States, how university and college research offices are organized and led, how the federal and nonprofit sectors facilitate research and how they are organized, funded, and led. Through the core curriculum, students will be introduced to the basics of the management for sponsored programs, including finances and information technology, as well as legal, ethical, regulatory, and compliance issues. In addition to the core, students may elect two additional tracks. The program's tracks allow students to choose from several groupings in: Program Administration and Facilitation; Financial Management of Sponsored Programs; and Compliance, Legal, and Regulatory Issues. As part of the core curriculum, students will be required to elect either a thesis or capstone project, which will be initiated within the core curriculum sequence and completed while the students take elective courses or, through continuous enrollment, within five years. The curriculum has been developed to prepare students with skills identified by several national and international associations.

The program prepares emerging leaders in research administration to face complex management challenges of today. Students will gain an appreciation for these issues through their core courses and their electives. Twelve courses, including a capstone project, are necessary to complete the degree.

**Sequence of Study**

Students should make every effort to take the core courses, other than the capstone, in their first two semesters. The final required course of the program is the Capstone Project in Research Administration or the Research and Thesis in Research Administration, which students can only take in their final semester.

**Capstone**

The Capstone Project Course is one of two courses that a student may select after having successfully completed 10 courses in the MS in Research Administration Program. This course is the culmination of the Master's in Research Administration where students will integrate and build on their previous coursework in the program to apply it to practical settings. During the semester students will identify and analyze an issue or problem and propose a solution during this semester long course. Those electing the Capstone may explore issues related to a current research administration project in a "real world" setting. This original work can be for the organization or agency for which the student works or for a hypothetical organization, but it should result in the student conducting original research and applying strategies, testing solutions, and using tools to meet the particular needs of chosen work environment. To complete the course students must write a 25-35 page capstone project paper. If the project is not completed by the end of the semester, students will need to enroll in AS.475.855.

**Thesis**

The Research and Thesis Course is also one of two courses that a student may select after having successfully completed 10 courses in the MS in Research administration Program. This course is the culmination of the Master's in Research Administration where students embark on a designing and conducting research in the field of research administration. The purpose of this core course is for students to refine their thesis topic, develop their research design and conduct and complete the research. Students will conduct research and write their thesis during this class in earnest. The course format is long course. Those electing the Capstone may explore issues related to a current research administration project in a "real world" setting. This original work can be for the organization or agency for which the student works or for a hypothetical organization, but it should result in the student conducting original research and applying strategies, testing solutions, and using tools to meet the particular needs of chosen work environment. To complete the course students must write a 25-35 page capstone project paper. If the project is not completed by the end of the semester, students will need to enroll in AS.475.855.

**CORE COURSES**

**Core Courses**

475.601 Introduction to Research Administration (required) (3 credits)

Provides an overview of research administration including how it has evolved in the United States, the role it plays nationally and at the state level, and how conducting research in the U.S. differs from elsewhere. The course also examines the research continuum and the research enterprise as it exists in higher education, nonprofit organizations, and the federal government.
The course allows students the opportunity to become familiar with issues, problems and strategic outcomes as they affect research administration.

**475.602 Organization and Leadership for Research Administration (required) (3 credits)**

The course provides an overview of the organization, structure, and language of the research enterprise; how the enterprise functions in the discovery to commercialization pipeline; who the players and stakeholders are and how they interact; the organizational models used by institutions; the role and effect of national policy in shaping research; the impact of the information age and technology; the qualities and requirements for students to become successful leaders; and, how university, federal, and non-profit research administration organizations are managed and led. The course allows students the opportunity to become familiar with the issues faced by leadership in the ever-changing and fluid world of the research enterprise.

**475.604 Introduction to Legal, Ethical, Regulatory, and Compliance Issues (required) (3 credits)**

During this course students examine the legal, ethical, and regulatory framework underlying most research activities in the U.S. Students discuss the trajectory of legal, ethical, regulatory and compliance issues affecting research administration, including the role of Congress, the role of the Executive Branch of government, and the role of federal and state agencies in the issuance and auditing of compliance regulations. Students will also discuss practical considerations for human subjects and animal research, financial conflict of interest, misconduct in science, export controls, safety and security and risk assessment.

**475.800 Capstone Project in Research Administration (required) (3 credits)**

The Capstone Seminar is the culmination of the Master’s in Research Administration where students will integrate and build on their previous coursework in the program to apply it to practical settings. Students must have completed ten of the twelve courses required for the M.S. degree in order to enroll in this course. During the semester students will identify and analyze an issue or problem and propose a solution during this semester long course. Those electing the Capstone may explore issues related to a current research administration project in a “real world” setting. This original work can be for the organization or agency for which the student works or for a hypothetical organization, but it should result in the student conducting original research and applying strategies, testing solutions, and using tools to meet the particular needs of chosen work environment. To complete the course students must write a 25-35 page capstone project paper. If the project is not completed by the end of the semester, students will need to enroll in AS.475.855.

**475.855 Thesis and Capstone Continuation (noncredit course)**

This is a non-credit course required for those who have completed all of their course work including the Research and Thesis class or the Capstone Project in Research Administration class, but who are still working on their Research Thesis or Capstone Project. There is a fee associated with this course.

**CURRICULUM TRACK 1**

Program Administration and Facilitation

(One required course and choose any three courses.)

**475.603 Assistive Technologies for Research Administration (3 credits) (Offered as an elective in all three curriculum tracks but may only be taken once.)**

This course explores the role of software applications and systems utilized by research administrators and by those seeking and receiving funding. Students examine and compare software applications such as COEUS, SunGard Public Sector, Grants.Gov, GrantsOnline, PeopleSoft, ERA Software, Compliance Software, SAP, and others.

**475.605 Program Development and Evaluation (3 credits)**

From the perspective of funders, this course explores ways in which initiatives become sponsored programs, the role of strategic planning, how proposals are designed and disseminated, how responses are solicited and evaluated. The important role that communication plays is emphasized, and communication strategies and work products are examined. The course also allows students to become familiar with key roles and relationships, such as those played by the program officer, the proposal development specialist, and the principle investigator.

**475.606 Project Management of Sponsored Programs (Track required) (3 credits)**

The course explores how research projects and sponsored programs are best catalyzed and later managed utilizing project management theory, best practices, case studies, and research. The course examines the emergence of pre-award research development within the realm of research administration and its impact on post-award project management. Issues related to team building, group dynamics, and building collaborative win-win relationships with multiple principle investigators and team leaders will be emphasized in the course.
**475.607 Grantsmanship, Grant Writing, and Evaluation of Grant Proposals (3 credits)**

This course describes the process of applying for, writing, and evaluating grants and sponsored program opportunities offered through non-profit, foundation, think-tank, government, and university settings. Emphasis is placed on how to evaluate opportunities, how to use online resources, how to ensure that prerequisites are met, and how to respond to RFPs with fully-vetted, well-written proposals. Students will be required to write and edit portions of proposals as well as evaluate current opportunities.

**475.608 Procurement and Award Processes (3 credits)**

This course provides a detailed examination of request for proposal (RFP) as well as RFAs, RFQs, and other proposal submission requests. It examines the procurement processes of the government through grants, contracts, and cooperative agreements. The course also focuses on award processes from the perspective of those planning and offering them. Students compare and contrast these processes in different environments, including federal and foundation grant-making and private sector funding for specific projects. In the final segment of the course, these same processes—solicitation of proposals, and negotiation and acceptance of awards—will be examined from the perspective of the research administrator at the grantee institution.

**Curriculum Tracks**

**Curriculum Track 1**

**475.603 Assistive Technologies for Research Administration (3 credits) (Offered as an elective in all three curriculum tracks but may only be taken once.)**

This course explores the role of software applications and systems utilized by research administrators and by those seeking and receiving funding. Students examine and compare software applications such as COEUS, SunGard Public Sector, Grants.Gov, GrantsOnline, Conversis, PeopleSoft, ERA Software, Compliance Software, SAP, and others.

**475.609 Financial Management of Sponsored Programs (Track required) (3 credits)**

Provides an introduction to topics related to financial operations of sponsored programs, including how to establish a financial reporting system, budgeting, effort reporting, preparing for and engaging in an audit, procuring resources, and sub-contracting. Students also learn how to translate the financial terms of a proposal into a project budget and how to engage in specialized oversight and reporting, such as required for projects undertaken within the GSA Schedule.

**475.610 Financial Accounting and Compliance Auditing (3 credits)**

Focuses on the specifics of financial and non-financial auditing as related to sponsored programs and grants. Clinical accounting is presented as well as the role of clinical research in a university and non-profit research environment. The audit process is also examined in detail and the roles of the financial research administrator, auditors, PI, and project participants are discussed. Special attention is paid to compliance pitfalls, record keeping, information technology, and accepted accounting standards and practices.

**475.611 Reporting and Statistical Analysis for Sponsored Programs (3 credits)**

Provides hands-on opportunities for students to understand reporting requirements and work with the types of reports required for research projects and sponsored programs. The course examines reporting as a CRM (customer relationship management) and PM (project management) strategy, as well as special requirements affecting research administration. Specific types of reporting requirements are analyzed, including federal government agency-based requirements, Star Metrics, Data Act, and GSA Schedule.
475.617 The Federal Acquisition Regulations and Defense Contracting (3 credits)
This course covers the Federal Acquisition Regulations or FAR, with an emphasis on contracting with the Defense Department. The purpose of the FAR and its application to different types of contracts is explored. Using a hypothetical program, the development of a large federal contract program is examined from the earliest phases through the delivery of the required product. The different phases and decision points in the program are explored from the positions of multiple participants. Both federal contracts and subcontracts and related contract clauses are examined. By the end of the course, students will have a recognition of how the FAR is applied to federally funded programs.

Interdisciplinary Courses
470.709 Quantitative Methods (3 credits)
(Formerly Introduction to Quantitative Research Methods). Students will learn how to construct and evaluate multivariate regression models, which are useful for answering causal questions about issues related to political behavior, policy and governance. Topics include multivariate regression, interaction terms, measures of fit, internal and external validity and logistic and probit regression. The focus of the course is on using statistical methods in an applied manner. The course will also introduce students to Stata, a widely-used statistical software program. Recommended prerequisite: Political Analysis and Statistics.

470.798 Financial Management and Analysis in Nonprofits (3 credits)
The basic tools for financial management and analysis are covered in this course with a focus on those aspects that will: 1) provide needed skills to students planning careers in public and nonprofit organizations and 2) provide those working for government with tools to evaluate nonprofit and private sector organizations with which they interact. Topics include legal and audit requirements for financial reporting, disclosure laws, and state and federal registration requirements. The course will also address interpreting financial statements and assessing and managing for financial health. These basic management tools are necessary not only for basic financial management but also for creating the financial component of a Request For Proposal (RFP) from a US funding source and for those striving for organizational sustainability through “social enterprise” or earned income ventures in general.

OR
470.645.51 The Budgetary Process (3 credits)
The federal budget process is an enormously complex mixture of administrative routines and mechanisms designed to bias decisions, avoid blame, or reduce conflict. This course explores the structures of federal budgeting in terms of its varied goals and in the context of the wider governing process. The course will review the budgetary process in both the executive and congressional branching, as well as the interaction of those two systems. In order to gain understanding of the difficult policy choices and political pressures policymakers face, students will be asked to do a simulation of a budget process within the executive branch. The roles of entitlements, scoring issues, and tax policy will be examined in the context of the debate over budget policy. The course will start with a short primer on finance theory.

OR
470.627.81 Financial Management and Analysis in the Public Sector (3 credits)
The primary emphasis of this class will be to teach students how to make more informed business decisions through the use of financial management accounting information. Management accounting is concerned with the information provided managers to plan, manage control and assess an entities activities and performance. Managerial accounting concepts are universal, and can be applied to service, government and non-profit organizations. This class assumes no formal exposure to management accounting [or financial accounting for that matter] and as such will focus on how to organize and use information to run/measure/operate a public entity or program.

CURRICULUM TRACK 3
Compliance, Legal, and Regulatory Issues
(One required course and choose any three courses)

475.603 Assistive Technologies for Research Administration (3 credits) (Offered as an elective in all three curriculum tracks but may only be taken once.)
This course explores the role of software applications and systems utilized by research administrators and by those seeking and receiving funding. Students examine and compare software applications such as COEUS, SunGard Public Sector, Grants.Gov, GrantsOnline, Conversis, PeopleSoft, ERA Software, Compliance Software, SAP, and others.

475.612 Intellectual Property, Technology Development, and Technology Transfer (3 credits)
This course examines the role of research administrators in safeguarding Intellectual Property (IP), identifying patentable material, creating and operating a technology transfer office, facilitating various aspects of technology transfer, and developing and implementing such specialized agreements as non-disclosure agreements, material transfer agreements, licensing agreements and other related intellectual property agreements. Students examine case studies, case law, institutional and agency policies.

475.613 Advanced Topics in Compliance, Legal, and Regulatory Issues (Track required) (3 credits)
This course examines in-depth advanced issues of compliance, legal and regulatory affairs. Students will examine and discuss critical issues and real world applications in research compliance and research ethics. Topics to be examined include an in-depth examination of research, human tissue centers, use of special populations in research, informed consent, use of primates in research, and misconduct in science. This course will also look at the issues affecting high containment research and facilities, infectious diseases research, and the regulatory agencies that govern these special areas.
475.614 Managing Compliance, Legal, and Regulatory Issues in Research Hospitals and Health Care (3 credits)
This course looks at what is needed to develop, maintain, and manage compliance, legal and regulatory issues in a research hospital or health care setting. The elements of patient care, clinical trials, and other research administration issues affecting healthcare are discussed. Areas such as the Physicians Self-Referral (Stark) Law, Anti-kickback laws, HIPPA and HITECH regulations as well as the Privacy Rule, and the Security Rule are examined. Elements of a good compliance program are also discussed.

475.615 Research Contracts and Industrial Agreements: Domestic and International (3 credits)
This course examines how to prepare and execute research contracts and industrial agreements. It examines issues affecting both domestic and international contracting, including issues such as U.S. regulations that affect the contracting process, good terms and conditions in research contracts, maintain your nonprofit status, safe harbor laws, unrelated business income, and profit v nonprofit legal issues. The course also examines issues related to the human dynamics and cultural aspects of international and industrial contacting.

475.616 Domestic and International Special Issues in Research, Legal, and Regulatory Affairs (3 credits)
This course discusses special issues both domestic and international that affect research administration. Special issues such as seeking, obtaining, and monitoring an export control license, issues affecting research with pharmaceutical companies, issues affecting small business contracting, and requirements for international conflict of interest, research integrity, and use of research results will be discussed.

Interdisciplinary Courses

410.649.81 Introduction to Regulatory Affairs (4 credits)
(Prerequisites in biotechnology apply. Contact the director of the MS in Research Administration.)
Regulatory affairs comprise the rules and regulations govern product development and post-approval marketing. In the U.S. the FDA establishes and oversees the applicable regulations under several statutes, many regulations, and partnership with legislators, patients, and customers. Biotechnology products may be classified as drugs, biologics, or medical devices. Each type is regulated by a different center within the FDA. This course provides an overview of RA and its effect on product development. Topics include RA history, regulatory agencies, how to access regulatory information, drug submissions, biologics submissions, medical device submissions, GLP, GCP, GMP, and FDA inspections.

410.687.81 Ethical, Legal, & Regulatory Aspects of the Biotechnology Enterprise (4 credits) (Prerequisites in biotechnology apply. Contact the director of the MS in Research Administration.)
This course provides an overview of the important ethical, legal, and regulatory issues that are critical to the biotechnology industry. The course shares current trends and essential elements of ethics, legal issues, and regulations in a way that allows for an appreciation of how each influences the others. Students will examine core ethical values that guide the practice of science in the biotechnology industry. The course will provide an overview of legal issues, such as protecting inventions and intellectual property and licensing, and the range of regulatory oversight mechanisms with which the biotech industry must comply. This course will review the implications of strategic ethical, legal, and regulatory choices that add value to the biotechnology firm, customers, and society.
475.800 CAPSTONE PROJECT IN RESEARCH ADMINISTRATION

**Required (3 credits)**

Students enrolled in the Master of Science Program in Research Administration (MRA) program and who have successfully completed 10 or more courses in research the program are required to complete a Capstone Project in Research Administration, under the supervision of the 475.800 Capstone Project course instructor. The topic and methodology chosen for the Capstone Project must be related to the student’s course work and interests. Ideally, the Capstone Project will be a culminating project, integrating material studied in the program. The Capstone Project is designed to provide a real world problem identification and research administration solution-driven experience for students; explore issues related to a current research administration project in a real world setting, integrate skills and knowledge gained from previous courses and experiences; conduct original research and apply strategies, testing solutions, and use tools to meet the particular needs of the chosen work environment; analyze and propose solutions to the identified issue; and write a paper about the project and the project results

**CAPSTONE PROJECT SCHEDULE**

<table>
<thead>
<tr>
<th>Step and Task to Be Completed</th>
<th>Fall Semester Due Dates</th>
<th>Spring Semester Due Dates</th>
<th>Summer Semester Due Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Initial meeting with your adviser</td>
<td>No later than Aug. 15</td>
<td>No later than Dec. 15</td>
<td>No later than April 15</td>
</tr>
<tr>
<td>2) Identify topic and communicate with Capstone Project instructor</td>
<td>Aug. 31</td>
<td>Jan. 15</td>
<td>May 1</td>
</tr>
<tr>
<td>3) Choose a mentor (Optional)</td>
<td>Sept. 15</td>
<td>Jan. 15</td>
<td>May 15</td>
</tr>
<tr>
<td>4) Draft proposal of Proposed Topic</td>
<td>Sept. 25</td>
<td>Jan. 25</td>
<td>May 15</td>
</tr>
<tr>
<td>5) Final proposal of Proposed Topic</td>
<td>Oct. 10</td>
<td>Feb. 10</td>
<td>June 10</td>
</tr>
<tr>
<td>6) Draft Project Paper</td>
<td>Nov. 15</td>
<td>March 31</td>
<td>July 15</td>
</tr>
<tr>
<td>7) Final Project Paper</td>
<td>At least two weeks before the end of the semester. The instructor will post the date.</td>
<td>At least two weeks before the end of the semester. The instructor will post the date.</td>
<td>At least two weeks before the end of the semester. The instructor will post the date.</td>
</tr>
</tbody>
</table>

1) **Consult with your adviser** to discuss the Capstone Project as part of your program of study in research administration. Your adviser will identify who the course instructor for the capstone will be.

2) **Identify Project and Communicate with Capstone Project Instructor.** The purpose of the discussion is to outline preliminary ideas with an aim to focusing the topic into a project that can be completed in the one semester time frame and to review the course timeline. Initial contact should be made by email.

3) **For a Capstone Project, You May Choose a Mentor (not required).** If you choose to have a mentor they may be a JHU faculty member, an appropriate person from the student’s place of work, or any expert with appropriate credentials in Research Administration. The mentor is the person who may guide you in the hands-on elements of the project, assist you in networking, and/or open doors for you in order to facilitate your project. Mentors who have not previously worked with Johns Hopkins must be approved by the course instructor. The course instructor will not communicate with the mentor unless requested to do so by the student. As a student you will communicate directly with the mentor regarding what assistance you need from them, how you want them to work with you, deadlines for the Capstone Project, the grading policy, etc. JHU MS in Research Administration Program does not offer a stipend to mentors.

4) **Submit a Draft Proposal.** The proposal is a description of the research, its objectives, the research methods to be used, and the anticipated results. The draft proposal can be preliminary, but must be submitted by the above date. Students should work closely with their mentor to complete the proposal. The length of the proposal should be about 2-3 pages.

5) **Submit final Proposal for the Capstone Project.** The proposal should be four to seven pages and must include the following:

   > Statement of purpose with a clear definition of the goals of the project and the rationale for these goals
   > Background information
   > Suggested data sources to be used
   > Detailed explanation and justification of the methodology;
   > Description of the anticipated results and outcomes
   > Anticipated final visualization of the output
   > Bibliography
Your instructor must approve of the final proposal before you can move to step 6.

6) Draft Project Paper. This is to be submitted to the course instructor by the above dates. Note that the mentor may require additional deliverables during the project. The project paper must be 25-35 pages, double spaced.

In addition to using a standard scientific format, students must include, at a minimum, the following sections in the Draft Project Paper:

> Introduction;
> Statement of the Problem;
> Data;
> Techniques and Methods;
> Results and Discussion;
> Conclusions;
> Cited References.

7) Complete Final Project Papers and Deliverables.
The following are the deliverables for the final project:

> Final report, as described on Step 6
> Executive Summary or Summary Abstract to be included in the beginning of the Final Paper
> Outcome or project results
> Recommendations (if applicable)

The instructor may confer with other faculty on a Project Paper. During the course the instructor will post a due date for the final Project Paper. Papers received after the posted deadline will be reviewed at the instructor’s discretion. This may result in papers being reviewed in the following semester. Student’s whose final paper submission does not meet the posted date for submission and/or a paper that needs more work and is not approved by the instructor, will need to enroll in AS.475.855 Capstone Project or Thesis Continuation.

Submission of Final Copies of Capstone Project Paper
Once you are enrolled in the course you will receive a syllabus that will detail all aspects for the submission of the final copies for completing of the Capstone Course.

Continuation of the Capstone
For a variety of reasons, many work-related, some students find that they cannot finish their capstone report after having taken the Capstone Project course. These students must enroll in the AS.475.855 Thesis and Capstone Continuation (noncredit), in every subsequent semester, including the summer, until they finish. The continuation fee is currently $500 per semester and is subject to fee change every semester. Continuation students are not required to attend class, but will consult with and submit their completed capstone project report or thesis to the instructor.
475.801 RESEARCH AND THESIS IN RESEARCH ADMINISTRATION

Required (3 credits)

Students who have successfully completed 10 or more courses in the program are required to complete a Capstone Project in Research Administration or a Research and Thesis Paper. If a student elects to take the Research and Thesis in Research Administration they will do so under the supervision of the 475.801 Research and Thesis course instructor. The purpose of this core course is for students to refine their thesis topic, develop their own research design and conduct and complete the research. Students are required to conduct a thorough review of the literature related to the thesis topic and research administration; develop a research design; develop and submit a protocol to the Institutional Review Board for the Protection of Human Subjects if needed; conduct original research; analyze the research results; and, write a 25-35 page scholarly thesis that can be published in a research administration journal.

CAPSTONE PROJECT SCHEDULE

<table>
<thead>
<tr>
<th>Step and Task to Be Completed</th>
<th>Fall Semester Due Dates</th>
<th>Spring Semester Due Dates</th>
<th>Summer Semester Due Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Initial meeting with your adviser</td>
<td>No later than Aug. 25</td>
<td>No later than Dec. 15</td>
<td>No later than May 1</td>
</tr>
<tr>
<td>2) Identify topic and communicate with Research Thesis instructor</td>
<td>Sept. 15</td>
<td>Jan. 15</td>
<td>May 15</td>
</tr>
<tr>
<td>3) Submit Draft Proposal</td>
<td>Oct. 1</td>
<td>Feb. 1</td>
<td>June 1</td>
</tr>
<tr>
<td>4) Obtain approval of IRB or IACUC, if needed</td>
<td>Oct. 15</td>
<td>Feb. 15</td>
<td>June 15</td>
</tr>
<tr>
<td>5) Submit Final proposal</td>
<td>Oct. 15</td>
<td>Feb. 15</td>
<td>June 15</td>
</tr>
<tr>
<td>6) Submit Draft Research Thesis Paper</td>
<td>Nov. 1</td>
<td>March 15</td>
<td>July 15</td>
</tr>
<tr>
<td>7) Submit Final Research Thesis Paper</td>
<td>At least two weeks before the end of the semester. The instructor will post the date.</td>
<td>At least two weeks before the end of the semester. The instructor will post the date.</td>
<td>At least two weeks before the end of the semester. The instructor will post the date.</td>
</tr>
</tbody>
</table>

1) Consult with your adviser to discuss the Research Thesis as part of your program of study in RA. Your advisor will identify the instructor for the Research Thesis Course.

2) Communicate with the Research Thesis Course Instructor. The purpose of the discussion is to outline preliminary ideas with an aim to focusing the topic into a research thesis that is doable in the one semester time frame. You will also need to review the course timeline. Initial contact with your instructor should be made by email.

3) Submit a Draft Proposal. The proposal is a detailed description of the research, its objectives, the research methods to be used, and the anticipated results. The draft proposal can be preliminary, but must be submitted by the above date. The length of the proposal should be about 2 pages.


5) Submit Final Proposal for the Research Thesis. The proposal includes a statement of purpose with a clear definition of the research objectives, background information, suggested data sources to be used, a preliminary explanation and justification of the methodology and techniques to be used, a description of the anticipated results and outcomes, and a brief bibliography. The final proposal for the research thesis is usually 4-7 pages.

Your Instructor must approve of the final proposal before you can move to Step 6.
6) Submit Draft of Research Thesis. This is to be to the course instructor by the above dates. An adequate project length for the final research thesis is 25-35 pages, double spaced, 12 point font. Students must label, as appropriate to their paper, the sections of the research thesis according to standard scientific format. The final draft must include, at a minimum, the following areas:

- Introduction;
- Review of the Literature;
- Problem Statement;
- Research Methodology;
- Results and Discussion; and,
- Conclusions.

7) Submit Final Research Thesis Paper. The following are required subject headings for the final Research Thesis Paper:

a. Title Page
b. Abstract
c. Table of Charts (if applicable)
d. Table of Contents
e. Introduction
f. Review of the Literature
g. Problem Statement
h. Methodology
   - If using human subjects a description of approval from the IRB and methodology used and approved by IRB
   - If using animals in research a description of approval from the IACUC and methodology used and approved by the IACUC
i. Project Results and Discussion
j. Conclusion(s)
k. Cited References
l. Appendices (if applicable)

The instructor may confer with other faculty on the Thesis Paper. The date for submission of the final thesis is posted in the Research and Thesis Schedule Papers received after the posted deadline will be reviewed at the instructor’s discretion. This may result in papers being reviewed in the following semester. Student’s whose final paper submission does not meet the posted date for submission and/or a paper that needs more work and is not approved by the instructor, will need to enroll in AS.475.855 Capstone Project or Thesis Continuation.

Submission of Final Copies of Research and Thesis
Once you are enrolled in the course you will receive a syllabus that will detail all aspects for the submission of the final copies for completing of the Research and Thesis Course.
**475.801 RESEARCH THESIS**

*Required (Core course for the MS in Research Administration.)*

RESEARCH THESIS GUIDELINES (course 475.801)

Students enrolled in the Master of Science in Research Administration program are required to complete a Capstone Project or a Research Thesis in Research Administration, under the direct guidance of a qualified mentor and under the supervision of the 475.800 Capstone Project or 475.801 Research Thesis course instructor. The topic and methodology chosen for the Capstone Project or Research Thesis must be related to the student’s course work and interests. Ideally, the Capstone Project or Research Thesis will be a culminating project, integrating material studied in the program.

**Goals of the Research Thesis Paper:**

> Conduct a thorough review of the literature related to research administration.
> Develop a research design.
> Develop and submit a protocol to the Institutional Review Board for the Protection of Human Subjects if needed;
> Conduct the research.
> Write a thesis paper that can be published in a research administration journal.

Prior to conducting the Research Thesis paper, a student must have completed at least 10 courses toward the degree and should be in good academic standing in the program. A student taking the course the Research Thesis course needs to plan well in advance of conducting the research and registering for the class. See the time frame and description of steps outlined below.

**RESEARCH THESIS PAPER SCHEDULE**

<table>
<thead>
<tr>
<th>Task to Be Completed</th>
<th>Fall Semester Due Dates</th>
<th>Spring Semester Due Dates</th>
<th>Summer Semester Due Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Initial meeting with your adviser</td>
<td>No later than Aug. 15</td>
<td>No later than Dec. 15</td>
<td>No later than April 15</td>
</tr>
<tr>
<td>2) Identify topic and communicate with thesis instructor</td>
<td>Aug. 31</td>
<td>Jan. 1</td>
<td>May 1</td>
</tr>
<tr>
<td>3) Draft proposal</td>
<td>Sept. 15</td>
<td>Jan. 15</td>
<td>May 15</td>
</tr>
<tr>
<td>4) Final proposal</td>
<td>Oct. 1</td>
<td>Feb. 1</td>
<td>June 1</td>
</tr>
<tr>
<td>5) Draft thesis</td>
<td>Nov. 15</td>
<td>April 15</td>
<td>July 15</td>
</tr>
<tr>
<td>6) Final thesis</td>
<td>One week before the end of the semester</td>
<td>One week before the end of the semester</td>
<td>One week before the end of the semester</td>
</tr>
</tbody>
</table>
5) Draft the thesis.
This is to be submitted to the course instructor by the above dates. A Research Thesis will be 25 to 35 pages, double spaced. A thesis must conform to APA guidelines and must include the chapters as discussed in "Guidelines for Writing a Thesis or Dissertation," which will be given to you by your instructor.

The following are the deliverables for the final research thesis:

- Final written research paper as described in 5) Draft of Thesis above.

Your instructor should approve the final Research Thesis at least a week before the end of the semester. Your instructor will notify you that your Research Thesis has been approved or advise you if you need to do more work. If your Research Thesis has been approved, your instructor will submit your final grade to the registrar.

Submission of Final Copies of the Research Thesis
Once a Research Thesis has been approved, copies need to be prepared for the Research Administration Office and the Advanced Academic Programs Library. Please pay particular attention as to what is needed for both the RA Office and the library.

3) Copies for the Office of Research Administration:
One copy of the finished and approved Research Thesis must be printed on acid-free paper, which is available at printing and copying firms such as the Copy Center or Staples. In addition, an extra copy of the title page and abstract must be included.

4) Copies for Library:
In addition to the acid-free copy, two more copies of the Research Thesis need to be submitted as well on regular paper for our library. These two copies should be tape bound with a clear plastic cover.

Please mail all copies of the finished and approved Research Thesis to:
Dr. Marianne R. Woods, Ph.D., J.D.
Academic Program Director
Master of Science Degree in Research Administration
Krieger School of Arts and Sciences, Advanced Academic Programs, Suite 805
Johns Hopkins University
1717 Massachusetts Ave. NW
Washington, DC 20036

Continuation of the Capstone
For a variety of reasons, some students find that they cannot finish their capstone report after having taken the Research Thesis course. These students must enroll in the AS.475.855 --Thesis and Capstone Continuation (noncredit). Students must enroll in this course each subsequent semester, including summer, until they finish their Capstone Project Report. The continuation fee is currently $500 per semester.
Certificate in Science, Technology, and International Security

national-security.jhu.edu

The Post-Baccalaureate Certificate in Science, Technology, and International Security (STIS) draws on academics and seasoned practitioners in cyber operations, environmental sciences, biological sciences, big data, energy policy, security studies, intelligence, and government in order to provide students with the tools to analyze the security threats and opportunities inherent in scientific and technological developments.

Cyberattacks, weapons proliferation, drones, climate change, and energy security, are just a few of the science and technology-related security issues that affect the security of the United States and the world today. The Post-Baccalaureate Certificate in Science, Technology, and International Security brings together courses from many different disciplines into a highly customizable program. Our goal is to help students excel and advance in their careers by helping them gain an understanding of how science and technology issues play in the security realms of defense, diplomacy, and intelligence.

This program is useful for students who are interested in science and technology in a national security or international security context but who come from a social science or humanities background. This program is also useful for students with an established background in a science or technology field who wish to make themselves more marketable in the national security or international security field. Such students may be able to take advanced electives.

Student in the STIS program will be able to draw on courses from several programs around Johns Hopkins. These include courses offered by the Science, Technology and International Security program itself. They also include courses offered by our partner programs:

- Biotechnology
- Energy Policy and Climate
- Environmental Sciences and Policy
- Geographic Information Systems
- Global Security Studies
- Government
- Government Analytics
- Intelligence

Students in this program can study on the ground, online, or in any combination that suits their needs.

PROGRAM COMMITTEE

Steven David  
Professor of Political Science

Benjamin Ginsberg  
David Bernstein Professor of Political Science; Chair of the Center for Advanced Governmental Studies

Bertrand Garcia-Moreno  
Professor of Biology, Program Chair; Advanced Biotechnology Studies

Mark Stout  
Program Advising

ADMISSION REQUIREMENTS

Application Documents
Submit to Advanced Academic Programs Admissions Office (aapadmissions@jhu.edu or fax 202-452-1970):

- AAP application and fee
- Official undergraduate transcript indicating a minimum grade-point average of 3.0 on a 4.0 scale
- A current résumé
- Two letters of recommendation
- A statement of purpose outlining why you wish to study at JHU and how studying at JHU will help you realize your ambitions

COURSE REQUIREMENTS

Students take three core courses, one from each of the following areas.

- Security Studies
- Science and Technology
- Science and Technology Policy

In addition, students select two electives, for a total of five courses.
Science, Technology and International Security courses have a 406 prefix. Students may also take courses offered by our partner programs. Global Security Studies, Government, Government Analytics, and Intelligence have a 470 prefix. Biotechnology courses have a 470 prefix. Energy Policy and Climate courses have a 425 prefix. Environmental Sciences and Policy courses have a 420 prefix. Geographic Information Systems courses have a 430 prefix.

Please refer to the Advanced Academic Programs course schedule (advanced.jhu.edu) for exact dates, times, locations, fees, and instructors. Courses are open only to students who meet admission requirements.

CORE COURSES

The Certificate in Science, Technology, and International Security has three core requirements. Students must take one class from each of the following three areas. Courses on these lists not taken as core courses may be taken as electives.

Security Studies
470.603 Introduction to Global Security Studies (3 credits)
470.692 Military Strategy and National Policy (3 credits)

Science and Technology
406.661 Technology and Terrorism (3 credits)
406.678 The Science of Biodefense (3 credits)
406.680 Science, Technology and National Security (3 credits)
406.681 Technology of Weapons of Mass Destruction (3 credits)
406.683 Weapons of War: The Technology and Uses of Weapons (3 credits)
410.692 Biological & Chemical Threat Response & Forensics (4 credits)
410.693 Science, Medicine, & Policy in Biodefense (4 credits)
420.608 Oceanic and Atmospheric Processes (3 credits)
425.601 Principles and Applications of Energy Technology (3 credits)
425.602 Science of Climate Change (3 credits)
430.601 Geographic Information Systems (4 credits)
430.602 Remote Sensing: Earth Observing Systems and Applications (4 credits)
470.709 Quantitative Methods (3 credits)
470.719 Technical Collection of Intelligence (3 credits)
470.743 Data Mining and Predictive Analytics (3 credits)

Other courses as they are developed.

Science and Technology Policy
406.676 The Politics of Cybersecurity (3 credits)
406.680 Science, Technology, and National Security (if not used to satisfy the above requirement) (3 credits)
425.603 Climate Change Policy Analysis (3 credits)
470.601 Climate Change and National Security (3 credits)
470.657 Energy, Security, and Defense (3 credits)
470.696 Ethics and Privacy in Intelligence Operations (3 credits)
470.731 Privacy in a Data-driven Society (3 credits)

470.740 Cyber Policy, Strategy, Conflict and Deterrence (3 credits)
470.752 Intelligence Analysis (3 credits)
470.773 Energy and Environmental Security (3 credits)

Other courses as they are developed.

ELECTIVE COURSES

STIS students must also complete two electives. Eligible electives include any of the above courses if not used to satisfy core requirements. They also include all courses offered under the Science, Technology and International Security rubric. These courses have the course number prefix of 406.

In addition, students may take any course from the STIS’ partner programs. Note that some courses have pre-requisites or assume certain knowledge. When in doubt, contact the director of the program offering the course.

CERTIFICATE IN NATIONAL SECURITY STUDY PAIRINGS (OPTIONAL)

MS in Biotechnology/
Certificate in Science, Technology, and International Security

The Certificate in Science, Technology and International Security may also be taken with the MS in Biotechnology. Applicants interested in pursuing both degrees simultaneously should apply to the combined program. Current students enrolled in either the MS in Biotechnology or the STIS Certificate may apply for a change of program into the combined program prior to the completion of the initial degree or certificate.

Admission in either the certificate or the MS in Biotechnology neither confers nor implies admission to the other program. The decisions on admission to each program are made by their respective admission committees alone.

Enrolled students must complete all of thirteen courses. This entails completing the requirements of the MS in Biotechnology with a concentration in biodefense. This must include 410.692 Biological & Chemical Threat Response & Forensics and 410.693 Science, Medicine, & Policy in Biodefense. Students will take three additional courses:

1. 470.610 Introduction to Global Security Studies or 470.692 Military Strategy and National Policy
2. Science and Technology Policy Core Course
3. Elective from the Science, Technology, and International Security program (406 prefix course) or from the Global Security Studies, or Intelligence programs (470 prefix courses).
MS in Energy Policy and Climate/Certificate in Science, Technology and International Security

The Certificate in Science, Technology and International Security may also be taken in combination with the MS in Energy Policy and Climate. Those with an interest in both programs should apply to the combined program.

Students choosing this option must meet the following course of study:

1. 425.601 Principles and Applications of Energy Technology (3 credits)
2. 425.602 Science of Climate Change and its Impact (3 credits)
3. 425.603 Climate Change Policy Analysis (3 credits)
4. 425.604 Energy and Climate Finance (3 credits)
5. 425.800 Capstone Project in Energy Policy and Climate (3 credits)
6. 470.610 Introduction to Global Security Studies (3 credits) OR 470.692 Military Strategy and National Policy (3 credits)
7. 470.773 Energy and Environmental Security (3 credits) OR 470.601 Climate Change and National Security (3 credits) OR 470.657 Energy, Security and Defense (3 credits)
8. An additional elective from Science, Technology, and International Security program (406 prefix) or the Global Security Studies or Intelligence programs (470 prefix).
9. Five elective courses from Energy Policy and Climate or other environmental program (Environmental Sciences and Policy or Geographic Information Systems.)

COURSE DESCRIPTIONS

Core Courses

406.661 Technology and Terrorism
This course explores the phenomenon of terrorism and its nexus with technology. Beginning with an emphasis on terrorist group factors most likely to influence terrorists’ perceptions and attitudes towards extant and emerging technologies, the course subsequently investigates cases of terrorist use, and noteworthy non-use, of various technologies. Students also receive a broad understanding of the evolution of technology with an emphasis on current and imminent technologies of acute security concern, including weapons of mass destruction, cyber, robotics, and nanotechnologies. The course then addresses counterterrorism technologies and potential terrorist response actions for overcoming such security efforts. Students operationalize all of these elements in the final phases of the course when engaging in Red Team exercises designed to demonstrate which types of terrorists are most likely to pursue certain types of technologies, the role of tacit versus explicit knowledge, likelihood of successful adoption, targeting options, and potential counterterrorism measures. Please note that students do not need to possess a technical background or prior knowledge of terrorism to succeed in this course.

406.667 Social Science, National Security, and Intelligence (3 credits)
This online course examines the role of social science in intelligence and in national security policy formulation and decision-making. It describes the nature of the various social sciences and the ways in which they can potentially contribute to national security. It helps students understand how social science has actually contributed to key national security issues and the ambivalent relationship between social scientists and the national security communities, particularly the military and intelligence agencies. The course will also help students become savvy consumers of social science.

406.676 The Politics of Cybersecurity (3 credits)
In recent years, the United States has become dependent on cyber virtual networks as the engine for our society. However, this digital infrastructure remains extremely vulnerable to cyber attacks. Protecting the networks we rely on presents unique challenges, as networks are without borders and bear the stress of attack millions of times each day. This course will explore the challenges and political factors impacting the judicial, legislative, executive branch agencies of Department of Defense, Homeland Security, National Security Agency, and private industry as they all work to secure and create a national cyber security apparatus. The intelligence community is facing an enormous challenge in working to prevent the transfer of the United States’ intellectual property and identifying the cyber attackers. We will discuss the political implications of establishing laws addressing how information is to be shared between governments and industry and the authorities needed for the DoD and intelligence community to operate domestically. We will discuss the impact of the creation of the Department of Homeland Security and examine the evolving relationship of Congressional oversight and legislative mandates. Issues such as jurisdiction of congressional committees, the budget, and the authorization and appropriations processes will be covered. Major policy and counter-terrorism issues of special concern to Congress will also be addressed in this course. Guest speakers will be invited from DHS, Capitol Hill and the media, allowing us to examine the issues from a variety or perspectives.

406.680 Science, Technology, and National Security (3 credits)
This survey course will explore the role of science and technology in the national security of our Nation. The Federal role in funding science and technology along with a description of the Federal Laboratories will be discussed. A high level view of the physics and chemistry behind various national security issues will be presented. These issues will include situations involving chemical, biological and explosive compounds and the science behind the tasks of sensing and protection involving these threats. The science and engineering of topics such as remote sensing, unmanned vehicles, energy, and climate change as it relates to National Security will also be addressed. The course will be conducted in a part lecture/part discussion format.
406.681  Technology of Weapons of Mass Destruction  
(3 credits)  
Students gain the foundational knowledge behind WMD (both weapons of mass destruction and weapons of mass disruption) and about how these weapons threaten U.S. homeland security. Weapons of mass destruction traditionally include nuclear, biological, and chemical weapons, while weapons of mass disruption include radiological weapons, such as “dirty bombs.” In addition, the course covers the technology behind three WMD delivery vehicles: ballistic missiles, cruise missiles, and unmanned aerial vehicles. In assessing each WMD threat, the course first examines the science and technology for each type of weapon and then applies this theory to real-world threats emanating from state and non-state actors. Students apply this knowledge by engaging in red team exercises to identify options for preventing and reducing vulnerabilities from WMD. Please note that students do not have to have prior technical knowledge about WMD issues to succeed in this course.

406.683  Weapons of War: The Technology and Uses of Weapons  (3 credits)  
Modern warfare utilizes advanced weapons systems. This course will examine various weapon systems ranging from artillery, cruise missiles, aircraft, aircraft launched weapons, ships, submarines and unmanned systems. We will also examine strategic and tactical nuclear weapons. In the examination we will look at capabilities, concepts of operation, and issues surrounding their procurement and use. The course will also involve students working through a crisis scenario utilizing various weapon systems. No pre-existing technical knowledge is assumed nor is any required.
Master of Arts in Writing

Fiction and Nonfiction Concentrations offered onsite at the Washington, DC Center and at the Homewood campus in Baltimore.

writing.jhu.edu

Even as technology and globalization alter our lives, creative writing remains essential to human expression. Through intensive writing and challenging reading, students in the Master of Arts in Writing program develop as writers in their choice of two concentrations: Fiction and Nonfiction. Students interested in writing about science, medicine, or technology should consider our Master of Arts in Science Writing program, which is online/low-residency and also offers a graduate certificate. See page 251. In the MA in Writing program, experienced faculty members, all practicing writers or editors, provide expert direction and constructive criticism to help students craft successful short stories, essays, articles, or books. Applicants to this part-time program may seek the entire master’s degree or only a course or two of special interest.

Students in the MA in Writing program learn primarily through the practice of writing; literature is studied to clarify approaches to craft. Depending on student goals, the program offers a broad foundation in fine arts/creative writing, in journalism/professional writing, or in both fields. Some students cultivate skills to prepare for a career; others are seasoned writers who want to change focus; still others favor artistic exploration over professional ambition. Within the realm of literary writing, students have the flexibility to develop individual styles and pursue specialized subjects. The program’s goal is to create a nurturing yet demanding environment where creative writers of diverse promise and purpose are challenged to work toward publication at the highest artistic and professional levels. We expect our graduates to become contributing citizens in the Community of Letters.

Prospective students may apply to the MA in Writing program year-round; accepted students may begin study in the fall, spring, or summer terms. Admission to the program is based on a competitive review of writing samples and other materials. The program strongly urges applicants to submit all application materials two to three months before the desired term; later applications are considered as time and course openings allow. Financial aid is provided for qualified students through student loans; many students receive employer assistance for tuition. Students complete the program part time at their own pace—usually in two to four years. The program is not designed for full-time study, although exceptions are considered for military veterans and international students. Most students take only one or two courses per term, but some acceleration is allowed. Students also may take a term off, as needed. The nine required courses include two core courses, three workshops, three electives, and a final thesis course.

The full degree program in Fiction and Nonfiction is available in on-site classes at Dupont Circle in Washington, D.C., and at the main Homewood campus in Baltimore. Students may take courses at either or both campuses. Our Washington/Baltimore courses are taught on weekday evenings or Saturdays; fully online courses are not available in Fiction and Nonfiction. However, the program requires supplemental online work for many courses. To increase student choice of courses, we sometimes use innovative live video links to combine students from both campuses into a single course. On-site courses are also sometimes combined by alternating classes between D.C. and Baltimore each week, and/or they meet on Saturdays to ease commuting.

PROGRAM COMMITTEE

Brad Leithauser
Chair, MA in Writing Program; Professor, The Writing Seminars

Elise Levine
Director, MA in Writing Program

Jean McGarry
Professor and Co-Chair, The Writing Seminars

Mary Jo Salter
Andrew W. Mellon Professor in the Humanities and Co-Chair, The Writing Seminars

Tristan Davies
Senior Lecturer and Director of Undergraduate Studies, The Writing Seminars

Karen Houppert
Assistant Director and Faculty Advisor, MA in Writing Program

Melissa Hendricks
Coordinator, MA and Graduate Certificate in Science Writing Programs
The MA in Writing program’s previous Science-Medical Writing concentration has been replaced by a separate master’s degree and graduate certificate that can be completed mostly online; only a brief on-site residency is required. See page 251. At printing time for this catalog, the MA in Writing Program was considering the addition of concentrations beyond Fiction and Nonfiction.

Some applicants to the MA in Writing Program may be granted provisional status, with permission to take one or two courses to determine if full acceptance is merited. Provisional acceptance is granted to applicants the admissions committee believes will develop enough for degree candidacy. Applicants not interested in a degree may seek permission to take individual courses as a special student; such applicants must follow the usual application process and obtain adviser approval for any course desired.

The MA in Writing Program sponsors readings, seminars, and conferences. The program’s popular summer experience, the Hopkins Conference on Craft, offers students full-course credit in an intensive, concentrated format at an off-site location. Conferences have been held in Washington; Baltimore; Florence, Italy; Bar Harbor, Maine; and Shenandoah National Park. The 2017 conference is set for Bar Harbor, Maine. MA in Writing program alumni may attend the conference at a discounted tuition rate, with applications also accepted from outside writers and editors. For details, see http://writing.jhu.edu/craftconference or email craftconference@jhu.edu.

APPLICATION AND ADMISSION REQUIREMENTS

Credentials and Experience

Applicants to the MA in Writing program should possess some familiarity with writing in their chosen concentration, although they need not be published or professional writers. Fiction students should have read in their area of interest and explored their writing voice. Nonfiction writers should have read in their field. For Nonfiction writers, some exposure to journalistic fundamentals is helpful. Applicants without such familiarity might need to take introductory courses elsewhere, or, depending on their development as writers, they might receive permission to take a core course in the program as a provisional student. (See Admission Status below.)

Graduate writing students are expected to be proficient in grammar, punctuation, spelling, and usage. Applications lacking this proficiency will be rejected. The program does not require a graduate entrance examination. The MA in Writing program is not designed for students who need help with issues relating to English for Speakers of Other Languages.

Application Documents

Application materials are submitted online. See writing.jhu.edu “Apply Now” for more information. On the application form, applicants must indicate the concentration in which they wish to specialize. Admission is based on a competitive evaluation of the Advanced Academic Programs standard application materials (including an application and application fee) and the following MA in Writing program materials, which each applicant must submit: (Applicants should closely examine all the information below; improper or incomplete applications are major reasons for delay or rejection.)

> A statement of purpose, explaining the applicant’s aspirations as a writer and describing the applicant’s recent reading (required; see below)
> Recent writing samples in the chosen concentration, demonstrating the applicant’s current development as a writer in that field (required; see below)
> Official undergraduate and graduate transcripts (required)
> Résumé or CV (required)
> Up to three recommendation letters directly relating to the applicant’s experience or promise as a writer (optional)

Statement of Purpose

The statement of purpose should describe the applicant’s education, experience, and interest in the chosen writing area, and share the applicant’s aspirations as a graduate student and as a writer. Statements of purpose are reviewed for content, creativity, and interest in literary or journalistic creative writing. The statement also must describe the applicant’s recent reading. The statement should not exceed three typewritten pages. The statement of purpose should specify whether the applicant seeks degree status or permission to take only a specific course or two, with the desired courses cited.

Writing Samples

The most important part of an application is the writing sample, which should be the applicant’s best attempt at creative or journalistic writing in the concentration of interest. The samples should total 20 to 40 typewritten, double-spaced pages, or about 5,000 to 10,000 words, in the concentration of interest. Samples do NOT have to be a single, lengthy piece of writing. In fact, a combination of several shorter pieces is recommended as long as the combined length of all pieces equals the requirements. For more suggestions on writing samples in each concentration, see below. Applicants may submit copies of the published equivalent (print or digital) of the above lengths, although submitted samples do not have to be published. The samples usually should be no more than five years old. Writing that is not in the chosen concentration can supplement but will not be counted in meeting the length requirements above. Academic papers, internal business reports, speeches, or government documents generally are not recommended as writing samples; the samples should be creative writing, blogging, or journalism in the chosen concentration. Applicants may submit uncompleted work as part of their sample as long as incomplete work is labeled. Applicants should not submit the only copy of their work; samples cannot be returned.
The program’s admissions committees offer the following additional suggestions for writing samples for each concentration:

**Fiction:** Up to four short stories or novel chapters in prose fiction, or any combination of the two forms, demonstrating literary content or themes. Any style, vision, or approach is permitted—traditional, experimental, hybrid, etc.

**Nonfiction:** Up to five separate works of prose nonfiction about any subject, but demonstrating goals beyond a typical news report. Any nonfiction form or combination of forms, including feature article, commentary/blogs, memoir, travel, essay, profile, biography, book chapters and creative nonfiction, is permitted. Academic assignments, term papers, government reports, or scholarly criticism generally are not acceptable nonfiction writing samples.

**Dual-Concentration Applicants**

Applicants may seek formal degree candidacy in both Fiction and Nonfiction by submitting full writing samples in each proposed area. Such applicants should explain their multiple interest and reading in a single statement of purpose. The program makes individual admission decisions for each concentration in a dual-concentration application. Dual-concentration students must complete two to four more courses than the nine required for a single-concentration degree.

**The Writing Seminars**

Applicants are reminded that Johns Hopkins University has two graduate creative writing programs. Students interested in the MA in Writing program should follow the application process above. Students interested in the full-time MFA program, The Writing Seminars, should follow that program’s separate application procedures. Applying to one program does not count as an application to the other. The MA in Writing program accepts applications year-round; the seminars accept applications until a January deadline for a cohort class the following fall. The part-time MA program offers courses year-round in Washington and Baltimore; the full-time MFA program offers courses only in the fall and spring in Baltimore. For more information about the seminars, call 410-516-6286 in Baltimore or visit writingseminars.jhu.edu.

**Admission Status**

Applicants to the MA in Writing program are either rejected or accepted as a degree candidate, provisional student, or special student. (See “Student Status” in the front section of this catalog.) The MA in Writing program differs from other AAP graduate programs in how it handles provisional and special students: (1) Provisional students who want degree candidacy in the program must complete the provisional course or courses with a grade of A- or higher to request degree candidacy. Other AAP programs require a grade of B or higher in the provisional course(s). Provisional students should consult the program website at writing.jhu.edu for more information. (2) Special students in the program must get adviser permission for every course they take. (3) Unlike other AAP graduate programs, the program does not allow applicants to enroll in a program course without some type of review of writing samples and a statement of purpose, even if those applicants request special student or provisional status. The requirements and standards of the desired course will determine the admissions review for a request to register for that course as a special student; some courses require greater writing experience than others. Courses completed as a provisional or special student will count toward the MA degree if the student later earns degree status.

**COURSE REQUIREMENTS**

To earn a Master of Arts in Writing in Fiction or Nonfiction, students must complete the following nine on-site courses:

- Two core courses: Contemporary American Writers and the appropriate Techniques course
- Three writing workshops in the chosen concentration (core courses usually must be completed before enrolling in a workshop)
- Three electives, approved by an adviser (at least one elective must focus on reading or other work in the student’s concentration)
- The thesis course (all eight earlier courses must be completed before starting the thesis course)

For the MA in Writing program thesis, students submit highly revised versions of writing selected from their work in earlier courses. Core courses, workshops, and electives are described below.

**COURSES**

Writing courses are open only to program students who have submitted appropriate writing samples and received a formal admissions decision from the MA in Writing program. Please refer to each semester's course schedule (writing.jhu.edu or in the SIS registration system) for exact dates, times, locations, fees, and instructors for that term's courses. Only a selection of courses from the curriculum is offered each term, although core and required courses are offered more often than electives and specialized workshops. Some electives are offered only every year or two. Students may enroll in one or two courses per term; more than that requires special permission. Those who take two courses per term usually pair two core courses, or a workshop and an elective, until reaching thesis. Students may enroll in only one workshop course per term. Students usually have five years to complete their degree and should consult the policies and guidelines in the front of this catalog concerning continuation of enrollment, time limitation, and leave of absence.

Note to students from outside the MA in Writing program: The program encourages enrollment from students in other Johns Hopkins University graduate programs. However, non-program applicants should be aware that all writing workshops and some other courses require the completion or waiver of certain prerequisite core courses, or they require an evaluation of
the student's writing skills to determine whether he or she qualifies for the desired course. Non-MA in Writing Program students may be asked to submit writing samples and/or a full description of their writing experience before being allowed to register for certain courses.

**CORE COURSES**

Core courses provide foundation skills and theory in each concentration. Fiction and Nonfiction students should complete both of their concentration's core courses before enrolling in a workshop, although they may take an elective at any time. The core courses for Fiction students are 490.652 Contemporary American Writers and 490.654 Fiction Techniques. The Nonfiction core courses are 490.656 Nonfiction Techniques and 490.652 Contemporary American Writers. To improve foundation skills, Nonfiction students should consider 490.703 Principles of Journalism as an additional core course or elective. (In some cases, Fiction and Nonfiction students may seek permission to enroll in a workshop after completing the appropriate Techniques course; adviser approval is required.)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>490.652</td>
<td>Contemporary American Writers</td>
<td>3</td>
</tr>
<tr>
<td>490.654</td>
<td>Fiction Techniques</td>
<td>3</td>
</tr>
<tr>
<td>490.656</td>
<td>Nonfiction Techniques</td>
<td>3</td>
</tr>
<tr>
<td>490.703</td>
<td>Principles of Journalism (optional core course)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Waiver of a Core Course**

Some accomplished writers may seek a waiver of the Techniques course requirement in their concentration. Such students must submit a written request to the program director or assistant director explaining how they have previously acquired the appropriate foundation skills. For example, applicants with numerous publication credits, extensive professional experience, or an undergraduate degree in their concentration may decide to request a Techniques waiver. If a waiver is granted, the student must replace the waived course with an additional workshop or elective. Waivers are rarely granted in Fiction; waiver requests are more common from practicing journalists who apply in Nonfiction. Waiver requests should be submitted at least a month before the term starts, if possible.

**WORKSHOPS**

Workshops are the most important courses in the MA in Writing program curriculum. They allow students to create and revise their own writing in an intensive group critique process. All courses that count as a workshop for degree requirements include the word "workshop" in their title unless special permission is given; courses without the word "workshop" in their title cannot count as a workshop toward degree requirements. Some workshops are general workshops, in which students may submit writing of any form or style within the specified concentration: Fiction Workshop or Nonfiction Workshop. Other workshops are specialized, meaning students must submit writing in a certain form or style within the concentration: Writing the Novel Workshop, Writing the Memoir & Personal Essay Workshop, Experimental Fiction Workshop, Profile & Biography Workshop, Travel Writing Workshop, etc. Any workshop counts toward the requirement of three workshops for a degree. To meet the requirement of three workshops, students may take the same workshop multiple times, or they may take any combination of general or specialized workshops.

Unless a core course waiver has been granted or special permission is received, students in Fiction and Nonfiction should complete the appropriate core courses before enrolling in any writing workshop. Students are encouraged but not required to take each of their three writing workshops from a different instructor.

**Special Note:** Students should not take more than one workshop per semester, and no student may take a writing workshop or other intensive writing course outside the chosen concentration without the permission of the program director or assistant director. Additional writing samples or the completion of core courses may be required before such permission is granted; the non-concentration workshop will count as an elective.

Please note the university uses three course numbers for general workshops in a given concentration. These numbers distinguish between the offerings in the three terms of an academic year; they do not indicate that workshops are sequential or that students need to take workshops with a different number to meet degree requirements. Because the numbering scheme is repeated every year, it is conceivable that a student's three completed general workshops will have the same course number.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>490.660-1-2</td>
<td>Fiction Workshop</td>
<td>3</td>
</tr>
<tr>
<td>490.670-1-2</td>
<td>Nonfiction Workshop</td>
<td>3</td>
</tr>
<tr>
<td>490.679</td>
<td>Experimental Fiction Workshop</td>
<td>3</td>
</tr>
<tr>
<td>490.682</td>
<td>Writing the Novel Workshop</td>
<td>3</td>
</tr>
<tr>
<td>490.690</td>
<td>Travel Writing Workshop</td>
<td>3</td>
</tr>
<tr>
<td>490.692</td>
<td>Profile &amp; Biography Workshop</td>
<td>3</td>
</tr>
<tr>
<td>490.693</td>
<td>Writing Memoir &amp; Personal Essay Workshop</td>
<td>3</td>
</tr>
<tr>
<td>490.695</td>
<td>Viewpoint Journalism Workshop</td>
<td>3</td>
</tr>
<tr>
<td>490.698</td>
<td>Writing the Review Workshop</td>
<td>3</td>
</tr>
<tr>
<td>490.701</td>
<td>Advanced Workshop</td>
<td>3</td>
</tr>
<tr>
<td>490.746</td>
<td>Workshop in Review &amp; Opinion</td>
<td>3</td>
</tr>
</tbody>
</table>

The MA in Writing Program sometimes offers special courses that offer either workshop or reading elective credit to students enrolled in a single, combined course. See Course Descriptions. The program is also developing workshops that enroll both concentrations in the same course.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>490.667</td>
<td>Combined Workshop &amp; Readings in Fiction</td>
<td>3</td>
</tr>
<tr>
<td>490.668</td>
<td>Combined Workshop &amp; Readings in Nonfiction</td>
<td>3</td>
</tr>
<tr>
<td>490.669</td>
<td>Combined Workshop in Fiction &amp; Nonfiction</td>
<td>3</td>
</tr>
</tbody>
</table>
ELECTIVE COURSES

The MA in Writing program offers three types of electives: reading electives, craft electives and cross-concentration electives. Reading electives are literature courses that involve craft-based analysis and discussion of intensive reading assignments, with few writing requirements. Craft electives focus on special issues of technique, such as voice, revision or structure, and may involve extensive reading plus some writing exercises and assignments. Cross-concentration electives are courses that are open to students of both concentrations and require comparative reading, exercises, and analysis.

Students usually can take electives at any time, even if they have not completed the required core courses. However, students are strongly urged to complete both core courses as soon as possible so they have the option of taking a workshop and/or elective in subsequent terms.

MA in Writing program students usually must complete three electives to earn their degrees, although additional workshops may count as electives. At least one of those electives should be specifically within the student's concentration. Students should consult the course descriptions below for information on electives designed for their chosen concentration. With an adviser's approval, students may take electives outside their chosen concentration. Depending on their background, students may be asked to submit appropriate writing samples for the new concentration before they are allowed to register.

Students should carefully plan their studies to include their top choices for elective courses. Electives are offered on a rotating basis; some are scheduled only every two or three years. While students generally register on a first-come, first-served basis, students within a concentration may, at the program's discretion, be granted enrollment priority when registering for required or elective courses within that concentration. New electives may be offered at any time.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>490.676</td>
<td>Sentence Power: From Craft to Art</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.677</td>
<td>Shakespeare: From Art to Audience</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.678</td>
<td>Novel Form, Style, and Structure</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.680</td>
<td>20th Century World Literature</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.681</td>
<td>The Craft of Poetry: An Introduction for Fiction &amp; Nonfiction Writers</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.683</td>
<td>Voice in Modern Fiction</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.684</td>
<td>The Heritage of Fiction I or II</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.686</td>
<td>Identity in Contemporary Writing</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.687</td>
<td>The Short Story: Past &amp; Present</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.688</td>
<td>The Evolution of Fiction Forms</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.689</td>
<td>Masters of Nonfiction</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.699</td>
<td>Magazine Style and Substance</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.700</td>
<td>Readings in Creative Nonfiction</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.702</td>
<td>Readings in Global Fact &amp; Fiction</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.703</td>
<td>Principles of Journalism (also optional core)</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.704</td>
<td>Readings in Essay &amp; Memoir</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.705</td>
<td>Crafting Nonfiction Voice</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.711</td>
<td>Masterworks: Examining the Boundaries</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.712</td>
<td>Teaching Writing: Theory, Practice, &amp; Craft</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.713</td>
<td>Fiction for Young Readers</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.714</td>
<td>Essence of Place: Description, Detail, &amp; Setting</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.715</td>
<td>Hybrid Forms: Innovative Writing Across Genres</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.717</td>
<td>The Novel in the 21st Century</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.718</td>
<td>Studies in Digital, Intermedia, and Multimedia Forms</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.719</td>
<td>Technology Tools, Multimedia, and Digital Publication</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.721</td>
<td>Drama &amp; Playwriting</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.731</td>
<td>Film &amp; Screenwriting</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.742</td>
<td>Readings in Poetry</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.745</td>
<td>Voice in Modern Fiction &amp; Nonfiction</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.747</td>
<td>Advanced Revision Techniques in Fiction</td>
<td>(3 credits)</td>
</tr>
</tbody>
</table>

SUMMER CONFERENCE COURSES

These courses are offered through the summer Hopkins Conference on Craft. The course depends on the conference location, which has included Maine, Italy, Baltimore, Washington, Shenandoah National Park, and elsewhere. The conference is held in conjunction with the on-site residency for the Science Writing Program. These courses require special admission procedures and fees, plus additional travel and housing costs.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>490.716</td>
<td>Reading Washington</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.721</td>
<td>Drama &amp; Playwriting</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.731</td>
<td>Film &amp; Screenwriting</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.742</td>
<td>Readings in Poetry</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.784</td>
<td>Reading and Writing New England</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.785</td>
<td>Reading and Writing Baltimore</td>
<td>(3 credits)</td>
</tr>
</tbody>
</table>

INTERNSHIP, INDEPENDENT STUDY

Advanced students should propose independent study or internships months in advance of the desired term. Review and approval of such proposals are competitive. Independent study and internships are considered only rarely and usually only for students who have completed five or more courses. Either may count as an elective or workshop, as approved. More information can be found on the program website.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>490.800</td>
<td>Independent Study in Writing</td>
<td>(3 credits)</td>
</tr>
<tr>
<td>490.805</td>
<td>Internship in Writing</td>
<td>(3 credits)</td>
</tr>
</tbody>
</table>
THESIS

Students enroll in the program’s final thesis course only after completion of all core courses, workshops, and electives required for the MA in Writing. All thesis students should submit a thesis planning form at least one month before taking the course. For more information about the thesis course and thesis process, see Program Resources at the MA in Writing program website at writing.jhu.edu. In most cases, a program thesis is based on work created and revised in previous courses.

490.801 Thesis and Publication (6 credits)
(Prerequisites: All other courses, including cores, workshops, and electives.)

490.888 Thesis Continuation

SCIENCE WRITING COURSES FOR MA IN WRITING STUDENTS

Students in the MA in Writing program also can consider earning electives through the online MA in Science Writing program. For instance, Nonfiction students might consider a Science Writing Workshop or a Science Writing reading course. All regular Science Writing courses are offered fully online; the MA in Writing program does not offer online courses in Fiction or Nonfiction. For more information about Science Writing, see page 251. The following Science Writing courses may be of interest to MA in Writing Program students:

491.658 Techniques of Science-Medical Writing (4 credits)
491.750 Contemporary Science Writing: Creative and Professional Forms (4 credits)
491.673.4, 5 Science-Medical Writing Workshop (4 credits)
491.696 The Nature of Nature (4 credits)
491.697 The Literature of Science (4 credits)
MA in Writing Course Descriptions

NONGRADUATE COURSE

490.010 Graduate Writing Techniques (1 credit)
This non-graduate course is designed for students in Advanced Academic Programs or others who want to improve their general academic and workplace writing skills. The course focuses on techniques that can be applied to classroom papers, reports, and theses, or to workplace projects and documents. The course features exercises in structure, language, usage, and form. Students critique each other’s work in a writing workshop, and some students may be able to submit writing from courses in other programs. This course is not a creative writing workshop and is not designed for students who need help with English as a second language. This course is designed primarily for students from outside the MA in Writing program.

CORE COURSES

490.652 Contemporary American Writers (3 credits)
This foundation course surveys issues and trends in recent fiction and nonfiction, with emphasis on the diverse work and methods of American writers publishing today. Students read and discuss contemporary writing and hear from accomplished writers. This core course focuses on developing skills to read as a writer, and it explores the similarities and differences between factual and nonfactual writing, including the roles of truth, accuracy, and reader expectation. This core course is required for all incoming fiction students as a prerequisite to enrolling in a workshop. Fiction students may consider this course as an elective.

490.654 Fiction Techniques (3 credits)
In this foundation course, students explore the elements of fiction, including point of view, plot, character, setting, and the forms of short stories and the novel. The course also introduces students to the writing process, the techniques of reading as a writer, and the workshop process. Readings usually include short stories, one or more novels, and books or articles on craft. Writing assignments involve exercises, response writings, and one complete piece, either an original short story or novel chapter. Revisions also may be required. This core course is required for all incoming fiction students as a prerequisite to any workshop. Nonfiction students may take it as an elective, although the program may limit the number of registrants from outside the fiction concentration.

490.656 Nonfiction Techniques (3 credits)
The intensive reading and writing exercises of this foundation course help students gather information and transform it into clear, creative prose—whether in literary essay and memoir or journalistic forms, such as profiles, reviews, or opinion. Reporting techniques include interviewing, personal observation, and examining documents. Writing techniques include structure, quotation, detail, word choice, transition, and revision. This core course is required for all incoming nonfiction students prior to enrolling in a workshop. Fiction students may consider this course as an elective.

WORKSHOPS

490.660-661-662 Fiction Workshop (3 credits)
The Fiction Workshop concentrates on intensive writing and revision, with some required reading. As members of a general workshop, students submit short stories or novel chapters to their instructor and peers for critiques. Typically, two or three stories or chapters are submitted during a semester; revisions are usually required. Workshop participants also submit detailed critiques of their fellow students’ writing. We recommend but do not require that students take at least one general workshop before progressing to more specialized workshops, and we urge students to take workshops from different instructors, if possible. Students may take Fiction Workshop up to three times, although specialized workshops can also count toward the requirement of three workshops for a master’s degree. The 660-1-2 sequential numbering of workshops relates only to the three annual academic terms and do not indicate cumulative coursework.

490.670-671-672 Nonfiction Workshop (3 credits)
These general workshops give students extensive experience in writing and revising their factual work, regardless of topic or form. Submissions are critiqued by peers as well as by the instructor. Students typically submit two to four essays, articles or book chapters. Revisions, exercises, and readings are also required. Students may take this general workshop or any specialized workshop to meet the requirement of three workshops for the MA in Writing. The 670-1-2 sequential numbering of workshops relates only to the three annual academic terms and do not indicate cumulative coursework.
490.679 Experimental Fiction Workshop (3 credits)
This specialized workshop introduces students to innovative forms and approaches in nontraditional or experimental fiction. It is designed for students who write, or wish to write, experimental fiction, or for students who generally write more traditional fiction but would like to stretch the boundaries of their work. Assignments challenge students to experiment with styles that differ from their previous writing; extensive reading assignments come from the latest collections. The course generally follows a format similar to that of 490.669 Fiction Workshop, although readings and exercises take precedence during the first few weeks. The course is open to fiction students who have completed the fiction core courses. This course counts as one of the three required workshops in fiction.

490.682 Writing the Novel Workshop (3 credits)
This specialized workshop is designed for students who are writing a novel. Students must submit a total of 40 to 75 pages of a novel in progress, plus a synopsis. Revisions also may be required. Included are readings and discussions on the particular demands of longer fiction. Prerequisite: Fiction Workshop, or permission of the program fiction adviser. Enrollees also must have completed or waived the fiction core courses. This course counts as one of the required three workshops in fiction.

490.690 Travel Writing Workshop (3 credits)
The best travel writers weave a rich “sense of place”—a trait also crucial to literary fiction, memoir, and creative nonfiction. The telling detail, apt metaphor, historical reference, cultural connection, and vivid character sketch, coupled with reflections that link these observations to broader themes, can elevate travel writing beyond the guidebook. In this specialized nonfiction workshop, students complete exercises, hear guest speakers, and analyze the works of acclaimed writers, such as Jan Morris, Barry Lopez, Ian Frazier, and Jonathan Raban. Students may be asked to visit an assigned nearby location to prepare writing. This workshop counts as one of the three required for a nonfiction degree. Enrollees must have completed or waived the nonfiction core courses. Fiction students may enroll only with program permission.

490.692 Profile and Biography Workshop (3 credits)
Articles or books about people are a central component of contemporary nonfiction. In this specialized workshop, students examine methods used in profile articles, biographies, and, to a lesser extent, fictionalized biographical accounts. Students usually write two or three profiles or biography chapters in this course, plus revisions. This workshop counts as one of the three required for a nonfiction degree. Enrollees must have completed or waived the nonfiction core courses. Fiction students may enroll only with program permission.

490.693 Writing Memoir & Personal Essay Workshop (3 credits)
Writers have long enjoyed a major impact on contemporary thought by producing compelling essays about personal experiences, feelings, or ideas. In this specialized nonfiction workshop, students experiment with memoir and the personal essay as distinct forms and as explorations of the self. Seminal essays are read to clarify students’ thoughts and to help them develop their own voice and style in personal nonfiction. This workshop counts as one of the three required for a nonfiction degree. Enrollees must have completed or waived the nonfiction core courses. Fiction students may enroll only with program permission.

490.695 Viewpoint Journalism Workshop (3 credits)
This specialized workshop in nonfiction combines extensive reading and writing in the area of opinion. Students explore the conventions governing effective editorials, personal columns, first-person writing, and other kinds of commentary. Specialists from different areas discuss their craft in guest lectures. This workshop counts as one of the three required for a nonfiction degree. Enrollees must have completed or waived the nonfiction core courses. Fiction students may enroll only with program permission.

490.698 Writing the Review Workshop (3 credits)
This specialized workshop focuses on writing reviews. Students learn that reviews and criticism require special writing skills and detailed knowledge. Students read and write reviews of various entertainment and art, including books, films, plays, television, or music. Students might be asked to attend films, concerts, and plays, or to critique certain books and recordings. This course is not focused on literary criticism. This workshop counts as one of the three required for a nonfiction degree. Enrollees must have completed or waived the nonfiction core courses. Fiction students may enroll with program permission.

490.701 Advanced Workshop (3 credits)
An advanced workshop is offered occasionally to select students, depending on enrollment and available faculty. The course may focus on a special form or topic, or it may be led by a visiting writer, special instructor, or other experienced faculty member. The concentration in which this course is offered varies. In most cases, enrollment will be competitive, and new writing samples may be required. This workshop counts as one of the three required for the degree. Interested students should discuss this course with their adviser. Application information and other details for each Advanced Workshop will be presented in the appropriate term’s course schedule. Prerequisite: At least one workshop in the student’s concentration or permission of the program director or assistant director, plus approval through any special application process.

490.746 Workshop in Review and Opinion Writing (3 credits)
This factual workshop focuses on the writing of reviews and other opinion. From blogs to columns to editorials, opinion writing is a diverse field. Among the categories are reviews, which can focus on just about any art or item, including books, film, food, and music. Critics develop specialized knowledge to help readers assess how to spend money, time, or attention. Students might be asked to attend films, concerts, and plays, or to critique certain books and recordings. In the broader area of opinion, students explore conventions governing effective editorials, personal columns, or other kinds of commentary. Students usually should complete the nonfiction core courses before enrolling in this workshop. This workshop counts as one
of the three required for a nonfiction degree. Fiction students may enroll with program permission. This course combines content from Writing the Review Workshop and Viewpoint Journalism Workshop.

COMBINED WORKSHOPS

490.667 Combined Workshop and Readings in Fiction (3 credits)
This challenging course allows students to earn either Fiction Workshop credit or a Fiction reading elective credit in a single, combined course. Students seeking workshop credit will submit fiction in the usual manner. Students needing elective credit will complete extensive fiction reading and exercises. At times, all students will engage together in workshop discussion or reading analysis. At other times, the two groups might separate for special attention to reading or the workshop. The dual goal is to expose Fiction elective students to the workshop experience as they earn reading course credit, while workshop students enjoy the full writing critique process as they complete helpful reading. Students must complete Fiction Techniques before enrolling in this course. Fiction students earn either workshop or elective credit for this course.

490.668 Combined Workshop and Readings in Nonfiction (3 credits)
The innovative experience allows students to earn either Nonfiction Workshop credit or a Nonfiction reading elective credit in a single, combined course. Students seeking workshop credit will submit nonfiction in the usual manner; enrollees needing elective credit will complete extensive reading and exercises in factual writing. At times, all students will engage together in workshop discussion or reading analysis. At other times, the two groups might separate for special attention to reading or the workshop. The dual goal is to provide nonfiction elective students with workshop experience, while workshop students enjoy the full writing critique process as they complete helpful reading. Students must complete Nonfiction Techniques before enrolling in this course. Nonfiction students earn either workshop or elective credit from this course.

490.669 Combined Workshop in Nonfiction and Fiction (3 credits)
This course allows students in nonfiction and fiction to earn a workshop credit in the same class. Students in both concentrations and from either Washington or Baltimore are urged to enroll. In most cases, this course will have a separate instructor in each concentration who will form smaller workshop groups. Those groups will then workshop material in innovative ways, including digital discussion, video conferencing, phone conferencing, or one-on-one discussion with the instructor. These workshops groups sometimes do not meet each week at a set day and time, making this course more flexible and convenient to students from different campuses. Students need advisor permission to enroll in this course.

ELECTIVES

490.676 Sentence Power: From Craft to Art (3 credits)
This craft elective focuses on revision at the sentence and paragraph level and is open to fiction or nonfiction students. Through close reading and brief exercises, students learn various techniques to assemble sentences and establish syntactic relationships within paragraphs. Students imitate other writers, as well as revise, exchange, and discuss revisions of their own work. Authors to be studied may include Updike, Munro, and Welty in fiction, and Dillard, McPhee, or Didion in nonfiction.

490.677 Shakespeare: Art and Audience (3 credits)
This reading elective focuses on Shakespeare’s ability to create art of the highest quality while remaining entertaining to large audiences—a goal that has proved elusive to many of today’s writers. Students analyze how Shakespeare created dramatic and poetic traditions and was instrumental in shaping current prose fiction. The course involves reading, discussing, and possibly attending plays, as well as critical and creative writing options. This course may be offered in conjunction with festivals or other productions of Shakespeare’s work.

490.678 Novel Form, Style, & Structure (3 credits)
This craft elective is meant primarily for fiction writers, especially those writing or wishing to write a novel. The course focuses on a writer’s analysis of novels, expanding the study of fiction into techniques and issues relating to the longer form. Topics include structure, character arcs, style, consistency of voice, techniques of backstory, and plot management. Class assignments may include response writings and original fiction as well as oral presentations. Readings usually include a number of novels, plus books or essays on novel craft.

490.680 Global Voices: Fiction From Around the World (3 credits)
In this fiction reading course, stories or novels from such authors as Kafka, Beckett, Waugh, Marquez, Malamud, Coetzee, and Tanizaki are used to explain how different cultures may have different literary traditions but how the mechanisms of good writing are universal. Class assignments may include response writings and original fiction as well as oral presentations. While this elective may still be offered from time to time, some of its fiction content is now included in 490.702 Readings in Global Fact and Fiction.

490.681 The Craft of Poetry: A Reading & Writing Workshop (3 credits)
This popular elective course helps fiction and factual writers apply the techniques, vision, and benefits of poetry to their writing. Through reading, discussion, and writing, students explore the lessons of free verse and formal poems, especially their careful attention to language, rhythm, theme, and other tenets of poetic craft. This course engages those with experience in poetry as well as those new to the field. As part of this course, students will write and workshop poems with their classmates. This on-site course also may involve some online interactivity.
490.683 Voice in Modern Fiction (3 credits)
This course explores how fiction writers create their own personality on the page, leading students to develop and refine their own writing voices. Students will consider how style, point of view, tone, word choice, structure, and culture all contribute to an author’s or narrator’s individual voice. In recognizing how authors use these elements, students engage in exercises to strengthen their own writing voices. Readings include novels, short stories, and other fictional work, as well as articles on craft. Class assignments may include response writings and original fiction as well as oral presentations.

490.684 The Heritage of Fiction I & II (3 credits)
This reading course examines the historical development of fiction craft, emphasizing the interrelationship of social and cultural development with the maturation of writing. Students learn to appreciate how contemporary authors have roots in the fiction of the past, and how they themselves might be inspired by those who came before them. The course requires extensive reading as well as creative and critical writing. Section I examines fiction before the 20th century; Section II examines the 20th century and beyond. Either section may be taken.

490.685 Identity in Contemporary Writing (3 credits)
This cross-concentration reading elective explores how personal identity is transformed into fiction stories or nonfiction essays. Writers studied include those whose race, class, gender, ethnicity, sexual orientation, or disability figure prominently in their work, as well as writers who ignore or dismiss such categorization. Students may be asked to write responses or creative pieces, or craft analyses or essays for discussion by the class.

490.687 The Short Story: Past & Present (3 credits)
This fiction reading elective begins with a brief review of the history and development of short fiction, moving to analysis of contemporary forms, trends, and practitioners. Featured authors may include Chekhov, Carver, Paley, Barthelme, Munro, and Dixon. The course focuses on intense reading, analysis, and discussion more than writing assignments. Students also may be asked to make class presentations and to review a range of literary journals.

490.688 The Evolution of Fiction Forms (3 credits)
This reading/craft elective examines the formative genres of fiction. Students will read examples of romance, confession, anatomy, and novel, and consider contemporary fiction in terms of these historical trends. Readings range from ancient Egyptian tales and Greek romances to typically misplaced 19th-century works, such as Flaubert’s The Legend of St. Julian the Hospitaller and Robert Louis Stevenson’s The Strange Case of Dr. Jekyll and Mr. Hyde. Colette, Camus, Julian Barnes, Stephen Dixon, and Lucy Ellmann also may be included in the reading. Students will respond to the readings with fictional pastiches reflecting the forms under study, culminating in a final hybridized project.

490.689 Masters of Nonfiction (3 credits)
This reading elective allows students to analyze and discuss masterworks of factual prose without the additional requirement of extensive writing assignments. While students write brief reviews and make a class presentation, the course largely involves reading and discussing prominent writers, such as McPhee, Baldwin, Didion, Talese, Boo, and others. Extensive reading is required, and students should be prepared for significant class participation. This course is designed primarily for students in nonfiction, but fiction writers also will find it of interest. The goal of the course is to develop reading and craft analysis skills to help writers grow throughout their careers.

490.699 Magazine Style and Substance (3 credits)
This reading and craft elective is designed for nonfiction writers. To improve as writers and learn about markets, students study and discuss a range of contemporary mass-market magazines and magazine writing—in print and online. Students write brief reports and deliver presentations, although the course involves a minimum of writing and a maximum of reading. Students focus on magazines such as Atlantic Monthly, Salon, Discover, Harper’s, The New Yorker, Salon, Outside, Vanity Fair, Rolling Stone, and Wired, as well as less prominent digital and print publications. This course generally does not cover literary journals and is not focused on the publication of fiction or poetry.

490.700 Readings in Creative Nonfiction (3 credits)
This elective course features intensive readings and discussion of creative nonfiction in its many current forms. While the traditional essay, memoir, and article continue to be popular, creative nonfiction has reformed these traditions into sophisticated or experimental incarnations. Creative nonfiction respects reader expectations for factual accuracy but also explores new approaches to narrative, factual expression, the blending of fact and fiction, and innovations in structure, theme, and form. Readings include short, medium, and book-length works, digital and in print. This nonfiction course is not a workshop.

490.702 Readings in Global Fact and Fiction (3 credits)
This cross-concentration elective course presents intensive readings in fiction and nonfiction from around the world. By discussing both fact and fiction, students learn how different cultures, values, and histories create differing literature. Readings include a sampling from at least three continents, with specific texts announced in advance for each section. Fiction and nonfiction students earn elective credit in this course, which focuses on craft analysis and discussion but also may involve student and team presentations and a final project of creative or analytical writing. This course combines the content of the previous International Nonfiction and 20th Century World Literature.

490.703 Principles of Journalism (3 credits)
Many of today’s finest creative writers have backgrounds in journalism, with its emphasis on research, accuracy, clarity, ethics, and public responsibility. This course features intensive study and exercises in these and other elements, including newswriting, interviewing, journalism history, objectivity, deadlines, competition, and professional standards. Students without a background in journalism are urged to consider this course as an additional foundation for broader creative writing goals. The course includes writing assignments, lectures from
practitioners, and exercises in class and off-site, with analysis of online and print newswriting ranging from broadcasts to blogs. Some program applicants or degree students may be urged to take this course to improve their writing samples or to help prepare for core courses or writing workshops. (This elective course is an optional core course.)

490.704 Readings in Essay & Memoir (3 credits)
This reading course focuses on essay and memoir both short and long, with the goal of deeper understanding of these popular writing forms. The course is designed for nonfiction students; others may consider it with an adviser’s permission. Only minor writing assignments or exercises are included. Students who want to submit essays and memoir in a writing workshop should consider 490.693 Writing the Memoir and Personal Essay Workshop or a general nonfiction workshop.

490.705 Crafting Nonfiction Voice (3 credits)
This craft elective is for factual writers. Through reading and writing exercises, students learn the techniques of re-creating voices of others and of shaping a writing voice of their own. The skill to represent a person’s character, mind, and feelings is also essential to ghostwriters, speechwriters, writing collaborators, feature writers, and novelists. This course focuses on the tools such writers use to craft a voice.

490.706 The Business of Writing (3 credits)
This cross-concentration elective course surveys a range of important publishing and business issues for writers of any form. General topics include markets, compensation, promotion, contracts, submission methods, and dealing with agents and editors. Specific concerns focus on targeting, query letters, cover letters, and book proposals, with exercises, presentations, and guest speakers included. The course may also survey trends in publishing, including digital and self-publishing. This course may be offered on-site or online.

490.711 Masterworks: Examining the Boundaries (3 credits)
This cross-concentration reading course, designed for fiction or nonfiction students, focuses on a writer’s analysis of masterworks in fiction, nonfiction, nature, travel, or poetry and how those forms may be combined in various hybrids. The course involves extensive reading, discussion of technique, and the changing boundaries among the genres. The format includes craft reports, response writing, and individual or team presentations, plus a final creative or critical work.

490.712 Teaching Writing: Theory, Practice, & Craft (3 credits)
This elective course is for fiction or nonfiction students who currently teach, would like to teach, or are curious to know what’s involved in teaching writing. The course combines practical aspects, such as creating a syllabus and responding to student writing; with an examination of the roles, values, and beliefs that contribute to good teaching. Students design two courses, one on teaching college-level writing or literature and the other of the student’s choice. The latter assignment results in a minilesson taught to fellow students. This on-site course is designed for MA in Writing program students; a separate, online version is being developed for students in a proposed new Johns Hopkins graduate program in teaching writing.

490.713 Fiction for Young Readers (3 credits)
This elective course, covering fiction for children through young adults, combines lectures, reading, discussion, exercises, and some workshopping. Besides craft elements, such as character, plot, voice, and humor, the course addresses professional issues, such as markets, agents, and reader age groups. This course is not a workshop, but students will submit some writing for review. The course is designed as an elective for fiction students, who are urged to complete Fiction Techniques before enrolling. Nonfiction students must have program permission to enroll.

490.714 Essence of Place: Description, Detail, and Setting (3 credits)
This craft elective, designed for students from any program concentration, focuses on how detail and setting combine with other techniques to create a sense of place in fiction, nonfiction, or other forms. Readings come from travel, short fiction, memoir, science, novels, nature, poetry, and creative nonfiction. Through reading, discussion, and writing exercises, students learn how to enhance the sense of place in their own writing. This course counts as an elective in nonfiction or fiction.

490.715 Hybrid Forms: Innovative Writing Across Genres (3 credits)
This cross-concentration elective course introduces students to innovative forms and approaches in nontraditional, cross-genre structures of fiction, poetry, creative nonfiction, and intermedia. The course is designed for students who write, or wish to write, in the growing markets of cutting-edge forms—e.g., hybrid memoir, prose poetry, magic realism, lyric essay, intermedia, temporal prose, and more. The course will also interest students who want to explore inspiring and exciting new paths for their writing, even if they have written only in traditional forms. The course, which includes readings, exercises, and later workshops, is open to students and alumni from any program concentration and may count as a workshop with an adviser’s permission.

490.717 The Novel in the 21st Century (3 credits)
This new course explores current trends in longer fiction, comparing innovative and traditional visions of the novel, as well as changing techniques of style, pace, character, structure, and language. The modern novel, in print or digital form, has expanded into interactivity, shaped text, alternative history, and graphic forms; new technologies allow broader experimentation uncurated by traditional publishers. For this course, readings might include novels with innovative forms, such as Cloud Atlas and A Visit from the Goon Squad, in which an entire chapter is delivered in PowerPoint, or novelists who experiment with language, such as Jamaica Kincaid in See Now Then, Peter Carey in The True History of the Kelly Gang, or David Foster Wallace and Mark Richard. We’ll also consider traditional novels influenced by culture, science, and history, such as Cormac McCarthy’s The Road or Ian McEwen’s The Children Act.
490.718 Studies in Digital, Intermedia, and Multimedia Forms (3 credits)
This new course exposes fiction and nonfiction students to the latest forms and innovations arising from digital tools, new media, and collaborative arts. The course generally divides into a section focusing on multimedia factual forms, including journalism, essays, and literary nonfiction, and a second section that flows from fiction, creative nonfiction, and poetry. Like a multimedia “reading” course, both parts provide models for student experience, discussion, and inspiration. A central theme will be how technology allows synergistic combinations, such as fiction and photography, journalism and music, video and creative essays, or poetry, artwork, and music. Students will be offered analytical and creative options for final projects that involve individual or cooperative expression.

490.720 Technology Tools, Multimedia and Digital Publications for Creative Writers (3 credits)
This course explores the tools and theories of multimedia storytelling, with examples from cutting-edge digital media, guest lectures by communicators, and lots of hands-on practice. Students critique pieces from the real world to learn how multimedia is being used today. They become familiar with tools to create stories using photos, illustrations, audio, video, animation, and data visualization, and they learn about platforms where this content can find an audience. Each student creates a multimedia package around a single story to be published in an online magazine. This on-site course in Baltimore or Washington is for MA in Writing program students and focuses on fiction and nonfiction. A separate online course, 490.719, is designed for Science Writing students, focusing on science, medicine or technology.

490.721 Drama & Playwriting (3 credits)
This fiction craft elective involves intensive writing and reading to introduce students to basic elements of drama studies and playwriting. Students write part or all of a short play for class critique and may be asked to attend one or more local productions. The course is designed primarily for fiction students who have completed Fiction Techniques. Others, including those in nonfiction, need program permission to enroll. Registrants should recognize the extensive writing requirements of this course if they decide to pair it with a workshop.

490.722 Advanced Techniques in Revision and the Elements of Fiction (3 credits)
This elective course is designed to hone skills in the elements of fiction through an intensive revision process. The course is intended for fiction students who have a significant body of writing. All enrolling students must have completed at least one, and preferably two, fiction workshops. The course explores in depth such techniques as expanding/slowing down/”exploding” a scene, defining and refining character and plot arcs, and using syntax and word choice to strengthen sentences. Students hone these and other techniques by reviewing and revising their own writing. While some workshop methods will be employed, this course will focus more on specific techniques and exercises than a workshop-style evaluation of student writing.

490.731 Film & Screenwriting (3 credits)
In this intensive writing course, students are introduced to the basics of film studies and screenwriting by reading scripts, examining films from a writer’s perspective, and writing one or more short screenplays. Topics include dialogue, characterization, plot, subtext, and visual storytelling. This craft elective is designed primarily for fiction students who have completed Fiction Techniques; others should obtain program permission before enrolling. Registrants should recognize the extensive writing requirements of this course if they decide to pair it with a workshop.

490.742 Readings in Poetry (3 credits)
This reading elective invites students to read closely and discuss the work of recent English-language poets and others who will be experienced in translation. The course features extensive reading, analysis, and discussion, with occasional opportunities to write. Fiction or nonfiction writers are equally welcome to enroll.

490.745 Voice in Modern Fiction and Nonfiction (3 credits)
In this cross-concentration craft elective, students examine aspects of voice in fiction and factual writing, considering how style, point of view, tone, structure, and culture all contribute to an author’s or narrator’s individual writing personality. Students use exercises to strengthen their individual styles or the voices of the characters they portray. Readings include novels, short stories, essays, articles, and nonfiction books, as well as articles on craft. Class assignments may include response writings, original fiction or nonfiction, and oral presentations. This course is the dual-concentration version of 490.683 Voice in Modern Fiction, which covers only fictional works, and 490.705 Crafting a Nonfiction Voice, for factual writers.

490.747 Advanced Revision Techniques in Fiction (3 credits)
This elective course is designed to hone skills in the elements of fiction through an intensive revision process. The course is intended for fiction students who have a significant body of writing. All enrolling students must have completed at least one, and preferably two, fiction workshops. The course explores in depth such techniques as expanding/slowing down/”exploding” a scene, defining and refining character and plot arcs, and using syntax and word choice to strengthen sentences. Students improve the use of these and other techniques by reviewing and revising their own writing. While some workshop methods will be employed, this course will focus more on specific techniques and exercises than a workshop-style evaluation of student writing.
INTERNED AND INDEPENDENT STUDY

490.800  Independent Study in Writing  (3 credits)
An independent study is a special project that an advanced student proposes to complete within a single semester, for either elective or workshop credit. Most independent studies in the MA in Writing program involve a student working one on one with a faculty member or other writer or editor. The project must involve writing, reading, or writing-related work equivalent to a full-semester, graduate-level course, and the project should not duplicate any course or other part of the program’s curriculum. Students usually are not eligible to propose independent studies until they have completed at least five courses, including at least one workshop. The tuition for an independent study is the regular single-course rate for the term in question. Proposals for an independent study should be submitted in writing to program leadership no later than 60 days before the start of the target semester. Proposals are evaluated competitively after that date, and only a small number of proposals will be approved. This course number is only for MA in Writing program students. Science writers should consider 490.807.

490.805  Writing Internship  (3 credits)
Advanced students in the MA in Writing program may propose an internship to receive on-the-job experience in writing or a writing-related profession. An approved internship receives one full course credit toward the MA in Writing degree—usually an elective. Students may propose to participate in existing internship programs or they may arrange a unique experience. In most cases, students should have completed four or more courses toward their degree before seeking an internship, and proposals must be submitted in writing to program leadership at least 60 days before the start of the target term. Proposals are evaluated on a competitive basis. Only a limited number will be approved, and priority will be given to students who have completed the most degree-level courses and who submit proposals that demonstrate the best internship experience. Internships may be paid or unpaid. Because students receive academic course credit for internships, they pay tuition levels equal to one graduate course.

SUMMER CONFERENCE COURSES:

The Hopkins Conference on Craft

490.784  Reading and Writing New England  (3 credits)
From Emerson, Frost, Melville, and Wharton, through such contemporary writers as John Updike, Marilynne Robinson, Tracy Kidder, and Elizabeth Strout, New England is rich in literary heritage. This cross-concentration reading and craft course for the Hopkins Conference on Craft in Bar Harbor, Maine, focuses on a writer’s analysis of essays, poems, stories, or books set in or written by writers from this region. We’ll cast a particular eye toward a sense of place, and we’ll look at how works grow out of the New England literary tradition. Participants write creative and reflective responses to the readings and discussions. This condensed course counts as an elective for students in any concentration.

490.785  Reading and Writing Baltimore  (3 credits)
This cross-concentration reading course offers students in fiction or nonfiction a chance to experience the best writing of Charm City, whose long history of literature ranges from Fitzgerald and Poe, to Douglass and Dos Passos, to Mencken and Baker. Courses readings include essays, stories, poems, and books from those writers or from contemporary authors, such as Anne Tyler, Madison Smartt Bell, or John Waters. Besides reading, the course features literary tours, guest speakers, and opportunities for students to test their own writing about one of America’s great cities. This course was first offered at the 2013 Hopkins Conference on Craft in Baltimore.

490.786  Reading Appalachia: Narratives of America’s Eastern Valleys and Mountains  (3 credits)
Based in world-renowned Shenandoah National Park, this special, one-week reading course focuses on fiction and nonfiction inspired by or set in the beautiful mountain chain that binds the historical and cultural narrative of the eastern United States. The course, part of the Hopkins Conference on Craft, features discussion and analysis of essays, short stories, books, and other works relating to Appalachia. The course includes indoor/outdoor class discussion, writing exercises, hikes, film screenings, fireside storytelling, author visits, and nature lectures. Reading Appalachia counts as a full elective course in the MA in Writing program.

490.787  Reading the Sea: Narratives of Oceans, Rivers, and Other Waters  (3 credits)
Our planet’s waters have long inspired and engaged writers, with a fascination that stretches from rivers and bays to lakes and the deepest oceans. This fiction/nonfiction reading course, to be first offered in 2016 in Annapolis, Maryland, and around the Chesapeake Bay, features essays, short stories, novels, or factual books that, as Norman Mclean wrote, are haunted by waters. Students read, discuss, and learn as they also enjoy writing exercises, field trips, and other activities focused on the Chesapeake and its surrounding lands. This intensive one-week course, which requires advance reading of most material, provides a full elective credit for degree students.

490.716  Reading Washington  (3 credits)
From Frederick Douglass to Gore Vidal, from Rachel Carson to Edward P. Jones, the nation’s capital has been the home of or setting for some of America’s finest writers and writing. This special elective course focuses on everything in D.C. from mystery and politics to the inner city and the plight of immigrants. The reading will be cross-concentration, supplemented by author visits, field trips, and special surprises. This course was offered during the 2014 Hopkins Conference on Craft in Washington, D.C., and may be offered again in the future.
THESIS

490.801 Thesis and Publication (3 credits)
This final course is required for all degree candidates in fiction or nonfiction and is offered only in the fall and spring terms. The two course goals are the completion of a successful thesis and an enriching, challenging capstone experience for the entire program. A creative writing thesis must be of considerable ambition and length—portions of a novel or a nonfiction book, or a collection of short stories, essays, or articles. Thesis students should select their best, most revised work from previous program courses; not all program writing will become part of a thesis. Thesis students submit a full thesis draft in the first week of the course; the author spends the term revising this draft. To provide extensive time for revision, thesis students meet as a class only for certain weeks during the term. During those class sessions, students create a class literary journal, engage in forward-looking discussions on the writing life, participate in a program-capping roundtable discussion, and rehearse and conduct a public reading. Prerequisite: All other required and elective courses. Students may not take another course during their thesis term without program permission; such a course must be in addition to program requirements. Students enrolling in this course should submit a thesis planning form at least 30 days in advance. For more information about the thesis course and process, see the MA in Writing program website under “Program Resources.”

490.888 Thesis Continuation
This course is for students who completed 490.801 Thesis and Publication or 490.802 Thesis and Careers in Science Writing but failed to finish an approved thesis and were not approved for an incomplete. If both conditions are met, students must register for this course and pay its accompanying fee for every term (including summer) until a final thesis is approved.
Master of Arts and Graduate Certificate in Teaching Writing

The Master of Arts and Graduate Certificate in Teaching Writing Program help teachers at all levels, K-University, in all disciplines, learn to become master teachers of writing, acquiring new and innovative ways to teach writing to their students, studying theories and best practices on the teaching of writing that they can share with their colleagues, and pursuing their own writing in an exciting and supportive online community of teachers and writers. The Teaching Writing Program allows participants to address individual situations, needs, and interests while learning within a diverse community. By offering flexible, interactive, and customized learning, the program provides a model for teaching writing and a forum where all teachers can learn and grow together as teachers of writing, and as writers too.

While we are not a teacher certification program, our courses support writing requirements in Common Core and other state or national standards. Our curriculum is nearly entirely online, with a brief residency required only for the MA; the residency is optional for the certificate. Students apply for and take courses in any of three annual terms, including fall, spring, and summer. Financial aid is available in the form of student loans, with many students expected to receive tuition assistance from employers. The program should satisfy continuing education requirements for most K-12 teachers.

The Program is built around five core principles:

1. Teachers of writing must write. Every course devotes some time and attention to having teachers explore their own writing, in whatever form or forms that course is built around.

2. Teachers can learn from studying theories and best practices in the teaching of writing. Some readings and discussions about both accepted practices and the theories behind those practices are included in every course.

3. Teachers can learn from and share with each other. Participants in the program will have experience and expertise in teaching and writing. Every course provides opportunities for participants to share that knowledge with their classmates, and to learn from each other.

4. Teachers must have the freedom and encouragement to apply what they learn to meet their own specific needs and situations. The makeup of every class includes teachers teaching at different grade levels and in different disciplines. Every course encourages teachers to reflect on what they are learning and adapt that material to suit their individual needs.

5. Teachers learn best in an interactive classroom (even a virtual one). Every course seeks to establish a sense of

Degree Requirements

The MA in Teaching Writing requires the successful completion of nine courses (36-credit hour equivalency), including the core Teaching Writing course, one course from the genre writing group, one from the reading group, one on-site residency, the thesis course, and four additional courses of the student's choice. The program offers a full slate of courses in fall, spring, and summer, with the 7-10-day residency taking place in July. Students have five years to finish their degree; extensions of up to two additional years are possible.

The Graduate Certificate in Teaching Writing requires the successful completion of five courses, including the core Teaching Writing course, one course from the genre writing group, one from the reading group, along with two additional courses of the student's choice. Certificate students enroll in the same courses as MA degree seeking students. The on-site residency is optional for certificate students and there is no thesis. Students have three years to finish their certificate; extensions of up to two additional years are possible.

All courses except the residency are fully online. We recommend, but do not require students to take the Teaching Writing core course first; however, all eight previous courses must be completed before students can take the Thesis course. Otherwise, courses may be taken in any order the student chooses. With permission, students may take as electives one or two courses in another AAP program.
Applications are considered year-round, and an accepted student may start in any of the three semesters following acceptance. Certain highly qualified applicants may be eligible for Advanced Standing. Some applicants may be granted provisional status, with permission to take one or two courses and then be reconsidered for the degree. Applicants not interested in a degree or certificate may seek permission to take individual courses as a special student; such applicants must follow the usual application process and obtain advisor approval for any course desired.

TEACHING WRITING APPLICATION REQUIREMENTS

> Completed Application
> Résumé or Curriculum Vitae
> Transcripts from all college studies and latest degree.
> 750-1000 word Statement of Purpose, describing your professional goals and interests in using writing in your teaching and in exploring your writing.
> Up to ten pages (2500 words) of a writing sample or samples of any genre or type.
> Optional: Up to three letters of recommendation directly related to teaching skill, writing, or teaching promise.

APPLICANT REVIEW PROCESS

> Once an application is complete, the Admissions Department will submit a request for review by the Program Admissions Committee.
> The Program Admissions Committee consists of the Program Director and faculty members.
> Applications are reviewed as they are received by the committee so that review times may vary depending on the number of completed applications submitted.
> The committee reserves the right to contact the applicant for additional evidence of qualifications or to clarify provided materials.
> Once admitted to the program, the student will be allowed to register, after speaking to a faculty advisor.

Statement of Purpose

The Statement of Purpose should describe the applicant’s education, experience and interest in both teaching writing and exploring the applicant’s own writing. The statement should not exceed three double-spaced typewritten pages, and should specify whether the applicant is seeking the M.A. degree, the Graduate Certificate, or individual courses as a special student.

Writing Samples

The writing sample may be in any form or genre, on any subject, and should not exceed ten typed, double-spaced pages.

Faculty

The Teaching Writing Program’s faculty features long-time, award-winning teachers who are also practicing writers. Our faculty members have taught at all levels, from kindergarten through graduate school, including colleges and community colleges and public and private K-12 schools. Our approach combines principles about teaching writing learned from the National Writing Project with an approach to writing developed over our more than twenty years’ experience with the Johns Hopkins M.A. in Writing Program.

The program is chaired by Brad Leithauser, a novelist, poet, essayist, journalist, and professor at The Writing Seminars at Johns Hopkins. The program director is Mark Farrington. Among our senior faculty are Ed Perlman, Susan Muaddi Darraj, Heidi Vornbrock Roosa, and Joanne Cavanaugh Simpson. Other visiting and adjunct instructors include Evan Balkan, Nick Maneno, Kim Sloan, and Catherine Hailey.

PROGRAM CHAIR

Brad Leithauser

Brad Leithauser, a novelist, poet, essayist, journalist, and professor at The Writing Seminars at Johns Hopkins, is the chair of the MA in Teaching Writing Program, the MA in Writing Program and the Science Writing Program in the Advanced Academic Programs at Johns Hopkins. As chair, Leithauser advises the programs and their leadership on academic issues and serves as liaison with the Writing Seminars, the full-time Hopkins faculty, and with university leadership.

PROGRAM DIRECTOR

Mark Farrington, Program Director, Sr. Lecturer

Mark Farrington is the Program Director for the new Teaching Writing Program. He was previously Assistant Director and Fiction Advisor in the Johns Hopkins M.A. in Writing Program, where he taught for twelve years. He has also taught creative writing, composition, technical writing and literature at George Mason University and first-year writing at Mary Washington College. He taught High School English and Dramatics at Abington Friends School, and also taught creative writing to students in grades 4 through 6 during a one-year appointment as writer-in-the-schools, a program funded by the Massachusetts Arts Council. For more than twenty years, he has been a Teacher/Consultant with the Northern Virginia Writing Project and is a member of their advisory board. Three times he received the M.A. in Writing Program’s Outstanding Teaching Award, and has also received the Outstanding Faculty Award from the Advanced Academic Programs.

SENIOR FACULTY

Joanne Cavanaugh-Simpson is a writer and lecturer in the Writing and Teaching Writing Programs. She is a former staff writer for The Miami Herald and Johns Hopkins Magazine, and she has written feature articles and foreign correspondence for such venues as the Baltimore Sun, USA Weekend, Style Magazine, Atlanta Journal-Constitution, and The American Journalism Review, including a series of articles reported from Cuba and China. Her literary essays have appeared in the journal Creative Nonfiction and the essay collection, Letters to J.D.
Salinger. Cavanaugh-Simpson earned her bachelor’s degree in journalism from the University of Maryland and her MA from Johns Hopkins’ Writing Seminars. Her master’s thesis, on Cuba’s dissident journalists, was funded by Harvard University’s Goldsmith Research Award.

Susan Muaddi Darraj earned her MA in English Literature from Rutgers University, where she also taught classes in fiction. Her recent collection of short fiction, A Curious Land, won the 2016 American Book Award, the AWP Grace Paley Award for Fiction and the Arab American Book Award. Her collection of short stories, The Inheritance of Exile, was named a finalist in the 2003 AWP Book Awards Series and published in 2007 by University of Notre Dame Press. She previously edited Scheherazade’s Legacy: Arab and Arab American Women on Writing (Greenwood/Praeger Press 2004) and co-edited Approaches to Teaching the Work of Naguib Mahfouz (Modern Language Association 2012). Susan’s fiction has appeared or is forthcoming in New York Stories, The Orphic Literary Review, Mizna, and elsewhere. Her articles, essays, and reviews have appeared in City Paper, Full Circle, The Philadelphia Inquirer, Pages Magazine, Sojourner, Calyx, The Christian Science Monitor, Jouvert, and in many other publications. She has contributed book chapters to several anthologies and collections, and she has authored several nonfiction titles for children and young adults for Chelsea House and Rosen Publishers. She has spoken about fiction writing and publishing at the Rutgers Summer and Spring Writer’s Conferences, the Baltimore Writer’s Conference, and the Saint Joseph’s University Reading Series; she’s also been a featured speaker at the University of Miami, Fairfield University, Stanford University, University of Richmond, University of Hartford, and elsewhere. She co-founded Conversations and Connections, an annual Washington DC-area conference aimed at helping writers improve their craft. In addition to her teaching duties in the Hopkins Writing Program, she is currently associate professor of English at Harford Community College.

Ed Perlman is the publisher and senior editor of Entasis Press, an independent literary press publishing poetry, fiction, and creative nonfiction. His poetry, essays, and reviews have appeared in numerous journals including Tin House, The Sewanee Theological Review, Passages, Outside In, and The Living Church, and in various anthologies. He has received an artist fellowship grant from The Washington DC Commission on the Arts and Humanities and the NEA, and has been an associate artist at the Atlantic Center for the Arts. He teaches in both the M.A. in Teaching Writing and the M.A. in Writing programs at Johns Hopkins University, where he was the program’s poetry advisor. He has a BA in philosophy from William and Mary, an MA in Education from Virginia Tech, and an MA in Writing from Johns Hopkins University. He has more than thirty years of classroom teaching experience, including high school English and humanities, community college English, and both undergraduate and graduate level writing.

Heidi Vornbrock Roosa has taught composition and creative writing at both the undergraduate and graduate levels. The Johns Hopkins M.A. in Writing program granted her the student-nominated 2015-2016 Award for Teaching Excellence. Vornbrock Roosa also provides critiques for private creative writing clients. Additionally, she teaches undergraduate fine arts and humanities and formerly acted as the Gallery editor at The Doctor T. J. Eckleburg Review. Her creative short work has appeared or is forthcoming in The Normal School, Pear Noir!, 3QR, Literary Mama, The South Dakota Review, and was chosen by Madison Smartt Bell for inclusion in the Sampler. As well, her pseudonymous genre and crime fiction has been published by CUSP Books, Shots (UK); has received the Malice Domestic Grant; and has been awarded a place on the British CWA’s Debut Dagger shortlist.

### COURSES

Courses in the Teaching Writing program will include (but are not limited to):

#### Core Course

**492.612.81 Teaching Writing**

This core course is designed for teachers in all disciplines and at all grade levels who use writing in their teaching and who have an interest in exploring their own writing as well. Someone not currently in a classroom can also complete the course successfully. The course has three main goals: 1. To help participants add to their existing knowledge of teaching writing, focusing particularly on writing as process and the various methods and practices that focus on each individual stage of that process (prewriting, drafting, responding, revising, editing and publishing). 2. To encourage participants to reflect upon their current practices in teaching writing, helping them clarify for themselves their goals and methods in teaching writing, and to provide additional ideas and possibilities that might add to their existing “tool box”. 3. To allow participants to engage in their own writing and writing process, in order to experience both roles of writer and writing teacher, and to see how one’s own writing experiences can enhance one’s knowledge as a teacher of writing. In addition, participants will consider the relationship of reading and writing, will become familiar with leading theories and theorists on the teaching of writing, will share their ideas, their knowledge, and their experiences, and will be encouraged to adapt their learning to make it most useful to their individual teaching situations (grade level, discipline, student population, etc.).

#### Genre Writing Group

**492.615.81 Literary Nonfiction and Historical, Scientific, and Technical Texts**

This course includes the subgenres of exposition, argument, and functional text in the form of personal essays, speeches, opinion pieces, essays about art or literature, biographies, memoirs, journalism, and historical, scientific, technical, or economic accounts (including digital sources) written for a broad audience. The focus is on both reading these texts as writers and on writing in several of these forms. (The course would specifically address the Common Core objectives of writing informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content, and producing clear and
coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. However, it will be of interest to all teachers, regardless of whether they are involved with Common Core or not.)

492.672.81 The Power of Story: Teaching and Writing Narrative
This course is designed for participants who wish to teach and write fictional, factual, and poetic narrative. The course covers elements of narrative, including plot, character, setting, tone, pacing, dialogue, and theme, plus the terms writers use to discuss and analyze narrative. Program participants learn how to introduce this language in their classrooms and to engage their own students in discussion about assigned reading and writing. Participants in this course write original narratives from prompts and discuss those writings in a workshop environment. Participants may also read narrative poems, short stories, one or more novels or novel excerpts, and one or more nonfiction narratives, with an eye toward how reading can inform and enrich the writing experience, as well as reading articles on teaching process and theory – including recent brain research concerning the value of narrative. This course also helps teachers understand the differences between factual and nonfactual writing, and how they can be separated or combined.

Reading Group

492.650.81 Reading Like a Writer
Participants in this class will develop the skills needed to engage in the close reading of fiction, non-fiction, non-peer-reviewed science and medical writing, and poetry in order to apply what they glean from close reading to their own writing. They will also consider how they can apply the techniques of close reading to the teaching of writing in their specific subjects and grade levels. Through the exercises and assignments in “Reading Like a Writer,” participants will examine the various techniques writers use to compose their sentences, to establish syntactic relationships within paragraphs, to suit writing style to topic and purpose, and to relate syntactic structure and design to thinking and to the ideas specific writing projects intend to communicate. Through learning to “Read Like a Writer,” participants will develop strategies for improving their own writing.

492.661.81 Special Topics in Reading: Multicultural Texts
This reading course in the Teaching Writing Program covers fiction, nonfiction, and poetry written from a multicultural perspective. Texts are selected from a variety of genres aimed at various grade levels, and might include books such as Sherman Alexie’s The Absolutely True Diary of a Part-time Indian, James Baldwin’s The Fire Next Time, and Unsettling America: An Anthology of Contemporary Multicultural Poetry. Texts will be examined as models for writing and as works of current or classic literature. Course participants also present multicultural texts appropriate to the grade levels they teach.

Electives

492.661.81 Teaching Composition at the College and Community College Level
This course is for students who wish to teach composition at the college or community college level. The course focuses on all stages of the writing process and examines ways to use writing in college composition. Specific subjects include designing a composition syllabus, selecting texts, responding to and assessing writing, and working with peer response groups. The course also reviews the teaching of remedial writing and techniques for teaching adult writers. This course is based on the pro-seminar in teaching composition that many graduate programs require for college composition instructors.

492.682.81 Neuroscience, Creativity, and Writing
This course explores the latest research and practice in the effect of writing on the brain, and of the brain on writing. Students will read both theoretical texts and creative works that examine writing “under the influence” of various brain states, including typical variations throughout the writing life, as well as variations correlated to physical and psychological brain changes. Virtual guest speakers, case studies, and multimedia experiences provide students access to cutting edge expertise in this fast-growing field. Students complete exercises and semester-long writing projects to develop methods to promote creativity and tap into deeper areas of the brain to aid their own writing and that of their students.

492.660.81 Writing for Young Readers
This course focuses on reading and writing stories and books for children and young adults. Readings include poetry, fiction, and nonfiction. Participants read published writing geared toward young readers with an eye toward understanding techniques and approaches to writing for this particular audience. They also write their own works designed for young readers. The course goals are threefold: to focus on teaching students to read children’s and young adult literature; teaching students to write children’s and young adult literature; and teaching the teacher participants to write children’s and young adult literature.

Residency (Required for all degree candidates)

492.690.81 Residency: Best Practices in the Teaching of Writing
This 7-10 day residency will take place in conjunction with the Hopkins Conference on Craft, held each summer in Baltimore, MD, Washington, DC, or other locations. Teaching Writing teachers will join with students in the Writing and Science Writing Programs for readings, roundtables, field trips and other residency events. Teaching Writing students will meet for four to six hours each day in a face-to-face, classroom environment. Students will design and present a mini-lesson involving writing that they have used, or wish to use, in their own classrooms. Students will engage in discussions of theory and best practices in the teaching of writing, and will also participate in a writing workshop focusing on their own writing. One residency is required for M.A. candidates and is optional for those seeking the certificate.
Final Course (Required for all degree candidates)

492.700.81 Thesis in Teaching Writing

In this final capstone course, students work on defining and expressing their own theories and best practices in teaching writing, while at the same time developing and refining their own writing. Students create and revise an individual portfolio that includes creative or personal writing along with writing about issues, theories and practices in the teaching of writing. Thesis students also create and research a statement of inquiry related to their specific teaching interests and situation. Students refine all these writings during this course, working with other students and independently with the instructor and/or individual project advisors. All eight prior courses must be completed before a student may enroll in Thesis.

Additional courses under consideration for development are:
Teaching Reluctant Writers; Writing Across the Disciplines;
Teaching and Practicing the Art of Revision; Peer Response and Writing Centers; Using Technology in the Onsite or Online Writing Classroom; The Power of Grammar and Usage.
Master of Arts and Graduate Certificate in Science Writing

MA online with one on-site residency; certificate fully online (Also see Writing, page 220).

advanced.jhu.edu/sciencewriting

From a flower’s delicate petal to the mysteries of a distant galaxy, science writing explores and explains how our world works. The best science writing inspires a deeper understanding, a sense of wonder or a need to act. The online /low-residency Science Writing program at Johns Hopkins strives to guide the next generation of writers and editors who will help the public comprehend the increasingly complex issues of science, medicine, and technology that affect their lives. Students choose from a nine-course Master of Arts or a five-course graduate certificate. Eligible applicants may take only a course or two of special interest as non-degree students. A brief residency course, required for the degree and optional for the certificate, provides intensive face-to-face study to complement the group and personal interaction of online courses.

The program recognizes that contemporary science writing involves journalism, communication, multimedia, and the literary arts. Our typical student hones journalistic and creative writing techniques to craft enticing, understandable prose for digital or print venues, from magazines and books to social media and websites for companies, associations, agencies, or others. Along the way, students acquire communication skills to promote viewpoints and develop expertise to thrive in the digital universe. Our writers and editors are also challenged to monitor science itself, to disclose how research can falter or be misused.

Johns Hopkins Science Writing students have visited a research island in Maine, control rooms at NASA, historic museums in Italy, and world-famous genetics and biotech labs in Washington and Baltimore. They have observed surgeons in the operating room, sailed with biologists on the Chesapeake Bay, heard from Nobel and Pulitzer winners, and met with science writers from The Washington Post, The New York Times, National Public Radio, National Geographic, Discover, Science, Nature, and other institutions. From space and the oceans to nanotechnology and climate change, from cellphones and robots to fitness and genetics, the ever-changing topics chosen by our science writers are essential to an enlightened citizenry of the 21st century.

Students in the Science Writing program do not focus on creating scientific research reports, journal articles for peer review, or other scholarly/academic constructs, nor do we teach technical writing for instruction manuals or complicated textbooks. Our curriculum also is not designed to help scientists or others who need remedial help or instruction in English as a second language. Our Science Writing students aim to translate the complicated information and trends of science, medicine, and technology into meaningful, perceptive prose for a broad audience.

Johns Hopkins Science Writing: A Long History — While Johns Hopkins has discontinued its full-time graduate program in science writing at The Writing Seminars, our program remains open and is thriving. After two decades of on-site courses in Washington and Baltimore, the program has expanded to a national and international audience through the new online/low-residency format and a new, separate master’s degree and graduate certificate.
**APPLICATION AND ADMISSION REQUIREMENTS**

**Credentials and Experience**

Applicants to the Science Writing program should possess some familiarity with reading and writing in the field, although they need not be published or professional writers. A background in science is useful but not required. Some applicants might receive permission to take a program core course or two as a provisional student. (See Admission Status below.)

Graduate writing students are expected to be proficient in grammar, punctuation, spelling, and usage. Applications lacking this proficiency will be rejected. The program does not require a graduate entrance examination or proficiency in a foreign language.

**Application Documents**

Application materials are submitted online. See http://advanced.jhu.edu/sciencewriting. “Apply Now” for more information. Admission is based on a competitive evaluation of Advanced Academic Programs (AAP) standard application materials, including an application and application fee, and the following materials, which each applicant must submit: (Applicants should closely examine the information below; improper or incomplete applications are major reasons for delay or rejection.)

- A statement of purpose explaining the applicant's aspirations as a writer and describing the applicant's recent reading (required; see below)
- Recent writing samples, including some works of science writing, demonstrating the applicant's current development as a writer (required; see below)
- Official undergraduate and graduate transcripts (required)
- Résumé or CV (required)
- Up to three recommendation letters directly relating to the applicant's experience or promise as a writer (optional)

**Statement of Purpose**

The statement of purpose should describe the applicant's education, experience, and interest in writing and share the applicant's aspirations as a graduate student and as a writer about science, medicine, or technology. Statements of purpose are reviewed for content, creativity, and interest. The statement also must describe the applicant's recent reading. The statement should not exceed three typewritten pages. The statement should specify whether the applicant seeks the degree or certificate, or permission to take only a specific course or two. The desired course(s) should be listed.

**Writing Samples**

The most important part of an application is the writing sample, which should be the applicant's best attempt at creative or journalistic writing. The samples should total 20 to 40 typewritten, double-spaced pages, or about 5,000 to 10,000 words, but samples do NOT have to be a single, lengthy piece of writing. A combination of several shorter pieces is recommended if the combined length of all pieces equals the requirements. Applicants lacking samples about science, medicine, or technology may submit writing about other topics; explanatory writing is especially appreciated. The samples themselves should be up to five separate works of prose. Any factual form or combination of forms, including news or feature article, commentary/blogs, memoir, travel, essay, review, profile, book chapters, and creative nonfiction, is permitted. Applicants may submit copies of the published equivalent (print or digital) of the above lengths, although submitted samples do not have to be published. Applicants with digital writing samples should submit a copy of the entire sample, not just a link. The samples usually should be no more than five years old. Academic papers, peer-reviewed research reports, technical writing, or government documents are not recommended as writing samples; the samples should be journalism, communication writing, creative writing, blogging, etc. Applicants may submit uncompleted work if they label it as such. Applicants should not submit the only copy of their work; samples cannot be returned.

**Admission Status**

Applications to the Science Writing program are reviewed by an Admissions Committee of program leadership and faculty members. Applicants are either rejected or accepted as an MA or certificate candidate, provisional student, or special student. (See “Student Status” in the front section of this catalog.) Earning provisional student and special student status in the Science Writing program does not eliminate the need to undergo a full admissions review when requesting MA or certificate candidacy. Additionally, the Science Writing program differs from other AAP graduate programs in the handling of provisional and special students: (1) Provisional students who want MA or certificate candidacy in science writing must complete the provisional course or courses with a grade of A- or higher to request degree candidacy. Other AAP programs require a grade of B or higher in provisional course(s). Provisional students should consult the program website at http://advanced.jhu.edu/sciencewriting for more information. (2) Special students in science writing must get adviser permission for every course they take. (3) Unlike other AAP graduate programs, Science Writing does not allow applicants to enroll in a course without some type of review of writing samples and a Statement of purpose, even if those applicants request special student status. The requirements and standards of the desired course will determine the admissions review; some courses require greater writing experience than others. Courses completed as a Provisional or special student will count toward the MA or graduate certificate if the student later earns formal candidacy.
COURSE REQUIREMENTS

Our curriculum starts with core courses that focus on fundamental skills in reporting, writing, and broad understanding of contemporary science writing forms. Students then enroll in workshops and electives, with internships and independent studies available under certain circumstances. In writing workshops, students submit their own writing and revisions for peer review and editing. Electives usually focus on reading-as-a-writer skills or specific forms or topics, such as nature writing or literary science writing. Certificate and MA students take the same courses. The MA in Science Writing requires an on-site residency course; a Residency course is optional for certificate students. The degree program concludes with a capstone thesis course in which students revise a portfolio of their best, most publishable work produced in earlier courses and prepare a formal career plan for success in the field.

Master of Arts in Science Writing
(Nine courses, including a residency and thesis.)
1. Techniques of Science-Medical Writing (online core course)
2. Contemporary Science-Medical Writing; Creative and Professional Forms (online core course)
3. Two science writing workshops (online; can be any course with workshop in title).
4. Two science writing electives, approved by adviser (online)
5. One residency course (on-site; location and topics TBA)
6. One student choice: Another workshop, elective, residency, course in another AAP Program*, or an internship or independent study
7. Thesis and Careers in Science Writing (online; final course)

Graduate Certificate in Science Writing
(Five courses, residency optional)
1. Techniques of Science Writing (online core course)
2. One science writing workshop (online)
3. One science writing elective, approved by adviser (online)
4. Two student choice courses: The second core course, a residency, another workshop or elective, an internship or independent study, or, if approved, a course in another AAP program*

Degree and certificate students should take Techniques of Science Writing first, if possible, and should complete that course before enrolling in a workshop or residency. Exceptions can be granted to this guideline with adviser approval. Some experienced journalists or writers will be allowed to replace one or both core courses with other courses, as approved. Students usually take one or two courses per term, and they may take one or two terms off as personal schedules require. Thesis and Careers in Science Writing should be taken in the last term of studies. Degree students have five years to finish the nine courses; extensions and leaves of absence are possible.

Note: Under AAP guidelines, only three certificate courses can count toward the MA in Science Writing. Certificate students who become interested in the MA degree should declare their interest early to avoid the need to complete extra courses.

RESIDENCIES

Degree candidates in science writing must complete at least one course through an on-site residency; a residency is optional for graduate certificate students. Master’s degree students who want more face-to-face interaction can take a second residency with adviser approval. The program plans to offer at least one residency course per year, with two possible in upcoming years. While new residencies are being developed, they so far include:

Medicine in Action at Johns Hopkins Hospital: A week inside the world-famous hospital in Baltimore to experience the front lines of contemporary medical care and research. This residency usually includes sessions with winners of the Nobel and Pulitzer prizes.

Science Policy, Politics, and Funding in Washington, D.C.: A week focusing on federal research, policy, and regulation, plus the interaction of the scientific community with government. Students meet with science writers and visit Capitol Hill, federal agencies, and association offices in and around Washington.

Science in Action: This Washington, D.C., and Baltimore course spotlights active research at government organizations such as NASA, the National Institutes of Health, National Institute of Standards and Technology, the EPA, Department of Energy, and Department of Homeland Security—as well as Johns Hopkins labs in space exploration, nanotechnology, and the famed Applied Physics Laboratory.

On the Bay: Exploring the Chesapeake This Annapolis, Maryland-based course focuses on the shimmering beauty, complex ecology, and environmental pressures of the nation’s largest estuary. Field excursions on and around the bay introduce students to scientists, policymakers, and authors who specialize in bay issues, with time allotted for students to report and receive coaching on their own stories.

In the Field: Science Writing in the Woods, Coasts, & Labs of Mt. Desert Island: With thriving environmental science centers and a world-class genetics laboratory, Maine’s Mt. Desert Island is a hub of cutting-edge research as well as exquisite natural beauty. Field excursions allow students to immerse themselves in the region’s stimulating natural and intellectual environments, gather story ideas, and hone reporting skills, while craft exercises and discussions provide opportunities to refine writing artistry.

For residencies, science-medical writing students pay a regular course tuition, plus a residency academic fee and costs for travel and lodging; discount housing usually is available. A residency course tuition is the same as any other course in the MA in Science Writing program; the academic fee ranges from $200 to $500, depending on location and activities.

Online Learning
Our online courses combine one-on-one feedback and group interaction. Students are trained in online learning and benefit from 24/7 technical help.

The primary platform for digital courses is a special, customized version of Blackboard, one of the nation’s major online education systems. However, instructors use a range of other tools in and outside each Blackboard course, including Adobe Connect, Skype, video, audio, email, wikis, Twitter, and Facebook.

Asynchronous Units: Most work in an online course is completed through a series of units that students complete on their own time and convenience, without the need to show up at a certain time and day each week. Students log in to their course, complete assignments or do other work, and engage with others over several days, a week, or more—whatever period the instructor has assigned. Each unit involves specific assignments and goals reached through a range of learning tools, including readings, exercises, video lectures, writing or reporting assignments, demonstrations, or asynchronous discussions with other students. The instructor is available for questions and feedback as students finish the unit on your own schedules and across multiple time zones.

Individual Help: The instructor provides one-on-one feedback and communication with students. This feedback may include assessment of a student’s work, especially for writing assignments and revision. The communication can occur by email, direct messages, private journaling, phone calls, and written comments and editing directly on a student’s writing. Online instructors also schedule individual or group appointments and hold email or video office hours.

Synchronous Discussion and Meetings: At times, students join live, synchronous discussions with fellow students and their instructor. Such synchronous discussions can occur in the course’s Blackboard site or using Skype, Adobe Connect, or other methods, audio or video. These opportunities occur less often than asynchronous unit work and are announced well in advance so students can arrange to attend. Students who cannot attend will be able to monitor recordings of the sessions.

A Program Community: In addition to each course’s digital features, science writing students join broader, programwide discussion groups, meetings, and networking. These may include chat rooms, Facebook pages, programwide information exchanges, and private discussions.

COURSES
Please refer to each semester’s course schedule for exact dates, times, locations, fees, and instructors for that term’s courses. Only a selection of courses from the curriculum is offered each term, although core and required courses are offered more often than electives and specialized workshops. Some electives are offered only every year or two. Students usually have five years to complete their degree and should consult the policies and guidelines in the front of this catalog concerning continuation of enrollment, time limitation, and leave of absence.

Note to Students From Outside the Science Writing Program: The program encourages enrollment from students in other Johns Hopkins University graduate programs. However, non-program applicants should be aware that all writing workshops and some other courses require the completion or waiver of certain prerequisite core courses, or they require an evaluation of the student’s writing skills to determine whether he or she qualifies for the desired course. Non-science writing students may be asked to submit writing samples and/or a full description of their writing experience before being allowed to register for certain courses.

Core Courses
Core courses provide foundation skills and theory in each concentration. The 490.658 Techniques course should be taken before a writing workshop, if possible. Exceptions can be made only with adviser approval.

491.658 Techniques of Science-Medical Writing (4 credits)
491.750 Contemporary Science Writing: Creative and Professional Forms (4 credits)
Workshops
Workshop requirements for the degree or certificate can be satisfied by taking any of these workshops once or more, or in any combination.

- **491.673-674-675** Science-Medical Writing Workshop (4 credits)
- **491.754** Science Narratives Workshop (4 credits)
- **491.755** Science Personal Essay & Memoir Workshop (4 credits)
- **491.756** Advanced Science Writing Workshop (4 credits)
- **491.757** Science Profiles Workshop (4 credits)

Residencies (on-site)
- **491.691** Science Policy, Funding, and Politics in Washington, D.C. (4 credits)
- **491.708** Medicine in Action at Johns Hopkins Hospital (4 credits)
- **491.709** Science in Action (4 credits)
- **491.710** In the Field: Science Writing in the Woods, Coasts, and Labs of Mt. Desert Island (4 credits)
- **491.753** Shenandoah National Park (4 credits)
- **491.781** On the Bay (4 credits)

Electives
- **491.696** The Nature of Nature (4 credits)
- **491.697** The Literature of Science (4 credits)
- **491.707** Prize Winners: The Best Writing About Science, Technology, Environment, & Health (4 credits)
- **491.719** Technology Tools, Multimedia, and Digital Publications for Writers (4 credits)
- **491.752** Advanced Reporting & Writing in Science (4 credits)
- **491.758** Current Issues in Science Writing (4 credits)

**Other Electives:** With advisor approval, science writing students may consider electives from the MA in Writing program, the MA in Communication program, and in other AAP or Johns Hopkins programs, as approved by an adviser. Science writers may especially want to consider online Communication courses in speechwriting, op-ed writing, and other applied skills that would broaden their career options. Some courses from other programs may be online, while others may be offered only on-site in Washington or Baltimore.

**THESIS**
(Required course for all MA in Science Writing students.)
- **490.802** Thesis and Careers in Science Writing (6 credits)
- **490.888** Thesis Continuation

**INTERNSHIP, INDEPENDENT STUDY**

Students should propose independent study or internships well in advance of the desired term. Review and approval of such proposals are competitive. Independent study and internships are usually only for students who have completed five or more courses. Either may count as an elective or workshop, as approved. More information can be found on the MA in Science Writing program website.

- **490.807** Internship in Science Writing (4 credits)
- **490.808** Independent Study in Science Writing (4 credits)
Science Writing Course Descriptions

### Core Courses

**491.658 Techniques of Science-Medical Writing (4 credits)**
This core course develops and hones the reporting, creative, and explanatory skills demonstrated by the best science-medical writers. The course features writing assignments and exercises in journalistic and literary writing, plus interviewing, ethics, and the use of scientific journals and databases. In some cases, students may be able to choose from a range of writing topics, including nature, technology, health, space, biology, medicine, or other scientific issues. Science writing students should complete this course before enrolling in any writing workshop.

**491.750 Contemporary Science-Medical Writing: Creative and Professional Forms (4 credits)**
This core course provides a broad foundation in the diverse forms and venues encountered in contemporary science writing careers. Students learn elements of classic forms, such as essay, profile, news article, and op-ed, and they explore magazines, institutional publications, literary journals, blogs, speeches, and even museum exhibit text. The course covers the differing goals of various forms and how they might be used in multimedia, social networks, and other digital communication. Guest speakers present real-world expertise, with students engaged in discussion, exercises, and writing assignments. Science writing students needing a stronger foundation should complete this course before enrolling in any writing workshop.

### Workshops

**491.673-674-675 Science-Medical Writing Workshop (4 credits)**
In a writing workshop, students receive professional guidance in translating complex scientific, medical, or technological knowledge and research into graceful, lucid prose. Students submit individual essays or articles, or parts of a larger work in progress. Writing submissions are critiqued by peers as well as by the instructor, then revised. Students are encouraged but not required to take this course from different instructors. (The three section numbers designate the academic term in which the workshop is offered. Students earn workshop credit by taking any section number multiple times or by combining any sections.) Prerequisite: 491.658

**491.754 Science Narratives Workshop (4 credits)**
Students in this specialized workshop explore and write science narratives, an approach that joins scientific information and storytelling. Students read and discuss examples by authors such as Rebecca Skloot, Ferris Jabr, and Lee Gutkind, as well as write their own narratives. This course provides a workshop credit for science writers. Prerequisite: 491.658.

**491.755 Science Personal Essay and Memoir Workshop (4 credits)**
In this specialized workshop, students experiment with memoir and the personal essay as distinct forms and as an exploration of the self. Seminal essays are read to clarify students’ thoughts and to help them develop their own voice and style in personal science writing. The topics of health, technology, environment, and other realms of science or medicine will be paramount, whether in reported content or within the personal experience, feelings, or ideas of the writer. This course provides a workshop credit for science writers. Prerequisite: 491.658.

**491.756 Advanced Science Writing Workshop (4 credits)**
An advanced workshop is offered occasionally to select students, depending on enrollment and available faculty members. The course may focus on a special form or topic, and/or it may be led by a visiting writer, special instructor, or other experienced faculty member. In most cases, enrollment will be competitive, and new writing samples may be required. This course provides a workshop credit for science writers. Application information and other details for each advanced workshop will be presented in the appropriate term’s course schedule. Prerequisite: 491.658.

**491.757 Science Profiles Workshop: Writing About People (4 credits)**
This workshop focuses on writing about people involved in science, medicine, technology, or policy. Students analyze models of the form, then report and write profiles of various lengths and purpose, from mini-profiles to quick features to longer, in-depth works. The course includes guest speakers who specialize in the research, interviews, and writing needed for effective, readable biographical works. This course provides a workshop credit for science writers. Prerequisite: 491.658.

### Elective Courses

**491.696 The Nature of Nature (4 credits)**
This reading course focuses on Mother Nature, human nature, and the nature of the beast. Students analyze books, essays, and articles from writers who tell gripping, true stories about topics ranging from outdoor adventure to personal reflections on illness. Readings include authors such as Richard Selzer, Diane Ackerman, E.O. Wilson, Kay Redfield Jamison, and John McPhee.

**491.697 The Literature of Science (4 credits)**
In this reading elective, students analyze current and classic books, magazine articles, and newspaper series to discover how the best science, medical, nature, and environmental writers create compelling, entertaining, factual literature. Craft topics include structure, pace, sources, content, explanatory writing, and clear, lyrical language. Assignments may include brief reviews and a team presentation of an assigned book, from such writers as Erik Larson, Atul Gawande, Rachel Carson, John McPhee, James Gleick, Lewis Thomas, Elizabeth Kolbert, or Jonathan Weiner.
**RESIDENCY COURSES**

**490.691 Science Policy, Funding, and Politics (4 credits)**
This residency course, intended to be on-site in Washington, D.C., explores how science, medicine, and technology are affected by politics and practices within government, the private sector, and the fields themselves. Students or program alumni use the evolution of science policy as context for discussion, research, and writing about contemporary issues. Students meet with leaders from Capitol Hill, the White House, and federal agencies, and they visit important sites relevant to science policy.

**491.708 Medicine in Action (4 credits)**
This special residency course based at world-renowned Johns Hopkins Hospital in Baltimore allows students, program alumni, and others to experience the front lines of medicine. Participants spend time observing doctors and nurses in action and may be assigned to follow a practitioner during a shift at the hospital. The course includes meetings with doctors, nurses, and patients, plus a final writing project. Previous sections of this course included meetings with winners of the Nobel Prize and Pulitzer Prize.

**491.709 Science in Action (4 credits)**
This residency course takes students to the front lines of scientific research, with a focus on developing writing ideas, reporting skills, and the craft of explanatory writing. Science in Action focuses on fields beyond medicine and health, including space, environment, energy, climate change, and other topics. The course involves field trips and lab visits, plus video and other links with visiting or out-of-town scientists. This Residency course is held in Washington, Baltimore or other locations, as announced.

**491.710 In the Field: Science Writing in the Woods, Coasts, & Labs of Mt. Desert Island, ME (4 credits)**
Maine’s Mount Desert Island, home to Bar Harbor and Acadia National Park, is a place of exquisite natural beauty. With thriving environmental science centers and a world-class genetics laboratory, the island is also a hub of cutting-edge research. This residency course allows participants to immerse themselves in the region’s stimulating natural and intellectual environments while honing their reporting skills, refining their writing artistry, and gathering information for stories. Extensive field excursions will be announced.

While ensconced in the remote, quiet wonder of some of the oldest, most beautiful mountains on Earth, students in this course explore their writing voices, the latest conservation and environmental issues, and a panorama of mountain forests, streams, and meadows. This course features field trips, writing exercises, hikes, and interaction with researchers, plus a student reading and other community-building activities.
490.781 On the Bay: Exploring the Chesapeake (4 credits)
This Annapolis, Maryland-based course focuses on the shimmering beauty, complex ecology, and environmental pressures of the nation’s largest estuary. Field excursions on and around the bay introduce students to scientists, policymakers, and authors who specialize in bay issues, with time allotted for students to report and receive coaching on their own stories. Students also join in writing exercises and a student reading. This intensive, one-week elective course, part of the annual Johns Hopkins Conference on Craft, supplies students with a range of writing ideas for later development.

INDEPENDENT STUDY AND INTERNSHIP

490.807 Independent Study in Science Writing (4 credits)
An independent study is reserved for Science Writing students who have special interests not covered in the program’s curriculum. Most independent studies involve a student working one-on-one with a faculty member or other writer or editor. Students should submit an independent study proposal at least 60 days before the start of any term. The proposal must include work equivalent to a full-semester, graduate-level course; interested students should consult their adviser well in advance. Only students who have completed four courses or more are eligible to propose an independent study, and only a limited number are approved each year. The tuition for an independent study is the regular, single-course rate for the term in question. With adviser approval, this course counts as an elective or workshop. For more information, see the Science Writing program website.

490.808 Internship in Science Writing (4 credits)
Internships are available to select students with adviser approval. Students should submit an internship proposal well in advance. With the adviser’s help, students may develop their own internship where they live, or they may apply for existing internships at publications, companies, agencies, or elsewhere. Internships usually are reserved for students who have completed four courses or more. In most cases, an internship counts as an elective.

THESIS

491.802 Thesis and Careers in Science Writing (6 credits)
This final degree program course involves the creation of a thesis and a final capstone experience that prepares a student for a writing career. Students usually enroll in this course after completing all other cores, workshops, and electives. Thesis: Each student's thesis is created from work in earlier courses. Students revise and refine an individual portfolio that includes creative writing, journalism, multimedia, and communication writing. The first draft of a thesis is due in the second week of the thesis term; students spend the term revising that work under the direction of a one-on-one thesis adviser. Capstone: The group experience of the course requires each participant to develop a career plan that includes personal goals, such as publication, job applications, or career advancement. Other capstone experiences may include attending science writing events or seminars, publication of a course magazine or journal, and discussions of the changing business of writing. The Science Writing program also may propose an optional mini-residency for thesis students that includes commencement and other on-site experiences at Johns Hopkins in Baltimore and Washington. Note: All thesis students should submit a science writing thesis planning form at least one month before the course begins. See the Science Writing program website for more information.

490.888 Thesis Continuation
This course is for students who completed 491.802 Thesis and Careers in Science Writing but failed to finish an approved thesis and were not approved for an incomplete. If both conditions are met, students must register for this course and pay its accompanying fee for every term (including summer) until a final thesis is approved.
Johns Hopkins Post-Baccalaureate Premedical Program

The Johns Hopkins Post-Baccalaureate Premedical Program prepares recent college graduates and “career-changers” for admission to medical school. Designed to meet the needs of talented individuals from a multiplicity of backgrounds, this program is right for you if you’ve compiled an excellent academic record in college, have taken no or few premed courses, never applied to medical school or taken the MCAT, are committed to serving others, and have the ultimate goal of entering the medical profession. Full-time study is required for at least one academic year; most students finish the program in 9 to 14 months.

This highly selective program emphasizes personal attention and academic preparation for the best medical schools. You’ll enroll in the Krieger School of Arts and Sciences day classes taught by outstanding faculty who are leaders in their fields, and you’ll complete the core premedical curriculum at Johns Hopkins, known for its rigor and quality. Students also have numerous opportunities to gain experience in areas of interest related to medicine through tutorials at the School of Medicine and elective classes at the School of Public Health.

A fulfilling post-bac experience is more than just academics. It’s also being a part of the vibrant Johns Hopkins community of students and faculty. To create a collegial and nurturing learning environment the post-bac students gather regularly for social activities, workshops, visiting speakers, and more.

For more information, please visit the Post-Baccalaureate Premedical Program website at jhu.edu/postbac or call 410-516-7748.

Johns Hopkins Summer Programs

The Johns Hopkins Summer Programs offers many different types of credit and non-credit courses to Hopkins undergraduates, visiting undergraduates, and qualified high school students. The Krieger School of Arts and Sciences and the Whiting School of Engineering sponsor the summer session courses, providing the same academic rigor as required in their spring and fall terms. In addition, to earning college credit, students experience life at Hopkins while living on campus and engaging in academic and social activities with their peers.

We offer four exciting summer options for students: Discover Hopkins, Summer University, Mini Term, and EducationUSA.

The Discover Hopkins Program is an intensive program designed to expose selected students (ages 15-18) to various programs such as Introduction to Lab Research, The Hospital, Medical Intensive, Introduction to Biology and Medicine, Psychological Profiling, Application of Abnormal Psychology to Forensic Cases, The Psychology of Police Deadly Force Encounters and more. The Discover Hopkins program runs for two-weeks and is available to both residential and commuter students during three different terms. Students may enroll for one, two, or all three terms.

The Johns Hopkins Summer University Program offers Hopkins undergraduates, visiting undergraduates, and pre-college students the opportunity to take freshman and sophomore JHU credit classes in arts and sciences and engineering with many of the same faculty that would teach the course during fall and spring terms.

Mini-Terms offer benefits of the Summer University program, but the courses are condensed into two intensive weeks. The one-credit courses offered during Mini-Term focus on a specific topic and offer a great opportunity for academic exploration.

EducationUSA Academy provides a world-class academic and cultural immersion experience for international high school students ages 15-17. Students will improve their academic English, and learn about the U.S. education system with visits to historic colleges and universities. The educational and cultural activities immerse you in the American experience. Must be non-US citizens only.

Commuter Program offers students who live within a reasonable distance from the Homewood or Montgomery Campus a chance to take JHU Summer Courses.

For more information on the programs, please visit our website at www.jhu.edu/summer. If you have any further questions about our application and admissions process, please contact the Office of Summer Programs at 410-516-4548 or summer@jhu.edu.
Presidential Cabinet, Deans, and Directors

**PRESIDENT**

Ronald J. Daniels  
President, Johns Hopkins University

**DEANS AND DIRECTORS**

David W. Andrews  
Dean of the School of Education

Marielle M. Hardiman  
Interim Dean of the School of Education

Fred Bronstein  
Dean of the Peabody Institute

Patricia M. Davidson  
Dean of the School of Nursing

Bernard T. Ferrari  
Dean of the Carey Business School

Elaine T. Hansen  
Executive Director of the Center for Talented Youth

Michael J. Klag  
Dean of the Bloomberg School of Public Health

Vali R. Nasr  
Dean of the Paul H. Nitze School of Advanced International Studies

Paul B. Rothman  
Frances W;att Baker and Lenox D. Baker Jr. Dean of the School of Medicine

T.E. Schlesinger  
Benjamin T. Rome Dean of the G.W.C. Whiting School of Engineering

Ralph D. Semmel  
Director of the Applied Physics Laboratory

Winston Tabb  
Sheridan Dean of University Libraries and Museums

Beverly Wendland  
James B. Knapp Dean of the Zanvyl Krieger School of Arts and Sciences

**PRESIDENT’S CABINET**

Kerry A. Ates  
Vice President and Chief of Staff

Andrew Conner  
Interim Vice President, Investments and Chief Investment Officer

Heidi E. Conway  
Vice President for Human Resources

Daniel G. Ennis  
Senior Vice President for Finance and Administration

Andrew B. Frank  
Special Adviser to the President on Economic Development

Helene T. Grady  
Vice President for Planning and Budget

Charlene Moore Hayes  
Senior Executive for Human Capital Strategy

Keith O. Hill  
Vice President for Corporate Security

Jason Kravitz  
Senior Adviser to the President for Communications

Sunil Kumar  
Provost and Senior Vice President for Academic Affairs

Thomas S. Lewis  
Vice President for Government and Community Affairs

Maureen S. Marsh  
Secretary of the Board of Trustees

Robert A. McLean  
Vice President for Facilities and Real Estate

Catherine Pierre  
Interim Vice President for Communications

Paul Pineau  
Vice President and General Counsel

Stephanie L. Reel  
Vice Provost for Information Technology and Chief Information Officer

Stephen M. Ruckman  
Senior Adviser to the President for Policy

Fritz W. Schroeder  
Vice President for Development and Alumni Relations

Christy Wyskiel  
Senior Adviser to the President for Enterprise Development
The Advanced Academic Programs holds classes at three locations:

**THE WASHINGTON, DC CENTER**

1717 Massachusetts Ave. NW, Suite 104
Washington, DC 20036
202-452-1280

**HOMEWOOD CAMPUS**

Wyman Park Building, Suite S740
3400 N. Charles St.
Baltimore, MD 21218
410-516-6749

**MONTGOMERY COUNTY CAMPUS**

9601 Medical Center Drive
Rockville, MD 20850
301-294-7000
ABOUT JOHNS HOPKINS UNIVERSITY

Johns Hopkins University, founded in Baltimore, Maryland, in 1876, was the first research university in the Western Hemisphere that integrally linked teaching and research for the advancement of knowledge. Its establishment engendered a revolution in U.S. higher education.

Over the course of nearly 20 years, Advanced Academic Programs has worked diligently to add new degree programs that fit within the academic structure of the School of Arts and Sciences and satisfy the demands of the marketplace. This approach to growing AAP has quickly become its hallmark, allowing it to be nimble and forward-thinking while staying true to its core academic disciplines.