KRIEGER SCHOOL of ARTS & SCIENCES
ADVANCED ACADEMIC PROGRAMS

ACADEMIC CATALOG 2013 – 2014

- Applied Economics
- Biotechnology Studies
- Communication
- Energy Policy and Climate
- Environmental Sciences and Policy
- Geographic Information Systems
- Global Security Studies
- Government
- Liberal Arts
- Museum Studies
- National Security Studies
- Nonprofit Management
- Public Management
- Writing

WHERE YOU STUDY MATTERS
### Academic and Registration Calendar

#### 2013–14

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<th>SUMMER 2013</th>
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<tr>
<td>Add/drop period for 14- and 13-week semesters</td>
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A Message from the Dean

We at the Johns Hopkins University Advanced Academic Programs want to help you get to where you want to be. We know that as an adult with a busy life you look for the flexibility and depth our part-time graduate programs offer for your personal and professional development. 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 from across the university and practitioners at the highest levels of their professions from government, industry, and the non-profit sector. Our students choose Johns Hopkins because 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 is committed to their teaching and to their own learning in professions that are rapidly changing. AAP demands that its faculty 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 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 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,

Kathleen Burke, Ph.D.
Associate Dean
Contact Information

THE WASHINGTON, DC CENTER

1717 Massachusetts Avenue, NW, Suite 104
Washington, DC 20036

Advanced Academic Programs
Admissions and Registration, Suite 101

Main number 202.452.1940
Fax Number 202.452.1970
Email aapadmissions@jhu.edu

Administrative Office, Suite 104

Main number 202.452.1280
Fax Number 202.452.8713
Email aapregistration@jhu.edu

Washington Library Resource Center, Suite 100

Main number 202.452.0714
Fax Number 202.530.9857
Email washrocklibraries@jhu.edu

MONTGOMERY COUNTY CAMPUS

9601 Medical Center Drive
Rockville, Maryland 20850

Administrative Offices, Gilchrist Hall

Main number 301.394.7000
Fax Number 301.315.2886
Student & Faculty Support Services 301.294.7162
Montgomery County Library Resource Center 301.294.7030

GENERAL INFORMATION

Course Schedules advanced.jhu.edu
Weather/Cancellation Information 410.516.7781
800.548.9004
Textbooks 800.325.3252
mbsdirect.net

HOMEWOOD CAMPUS

Wyman Park Building
Suite S740
3400 N. Charles Street
Baltimore, Maryland 21218

Administrative Offices

Main number 410.516.6749
Fax Number 410.516.6017
Student & Faculty Support Services 410.516.4578
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
Krieger School of Arts and Sciences
Administration and Faculty

ADMINISTRATION

Katherine S. Newman ........................................ James Barclay Knapp Dean
Kathleen Burke ................................. Associate Dean, Advanced Academic Programs
Laura Jack .................. Assistant Dean, Marketing & Communication
Rebecca Barron .......................... Director, Student and Academic Services
Colleen Connolly McCusker .... Associate Director, Career Services

FACULTY

Applied Economics
Laurence Ball ........................................... Program Chair
Frank D. Weiss ........................................ Program Director
Ahmed Mahmud ........................................ Program Coordinator

Biotechnology Studies
Bertrand Garcia-Moreno .......................... Program Chair
Kristina Obom .... Program Director, Biotechnology and Bioinformatics; and 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 ....................... Director, Health Science Intensive, Center for Biotechnology Education
Tom Colonna ..................... Associate Director, Regulatory Science
Robert Lessick .................... Associate Director and Senior Lecturer, Biotechnology Education
Meredith Safford ............................ Lecturer and Coordinator, Biotechnology
Jamie Austin ................. Lecturer and Coordinator, Regulatory Science
Katherine Wellman ............. Lecturer and Coordinator, Biotechnology
Beatrice Kondo ............... Lecturer and Coordinator, Bioinformatics
Tom Koval ............................ Lecturer
Sherry Ogg ............................................ Lecturer
Karen Wells ............................................ Lecturer

Communication
John Irwin ........................................... Program Chair
Memi Miscally ........................................ Program Director
Paula Weissman .................. Assistant Director

Energy Policy and Climate Environmental Sciences and Policy
Geographic Information Systems
John Boland ......................................... Program Chair
David Elbert .......................... Acting Program Director
William Burns .......................... Associate Director
Regina Ryan .... Associate Director, Geographic Information Systems

Government
Global Security Studies
Public Management
Nonprofit Management
Benjamin Ginsberg ........................................ Program Chair
Kathy Wagner .......................... Program Director and Director of the Center for Advanced Governmental Studies
Dorothea Wolfson .................. Program Director, Government
Rameez Abbas .................. Program Coordinator, Global Security Studies
Paul Weinstein .... Program Director, Public Management
Char Mollison .......................... Program Coordinator, Nonprofit Management

Master of Liberal Arts
P. Kyle McCarter .................. Program Chair
D. Melissa Hilbish .......................... Program Director and Director of the Center for Liberal Arts
Dianne Schepner ........ Program Coordinator, Master of Liberal Arts

Museum Studies
Rebecca M. Brown ........ Teaching Professor, History of Art; and Acting Program Chair
Phylis Hecht .......................... Program Director
Sarah Chicone .................. Assistant Director and Full-time Faculty
Karen Wizevich ........ Program Coordinator and Full-time Faculty
Judith Landau ........ Internship Coordinator and Faculty

National Security Studies
Steven David .......................... Program Chair, National Security Studies Certificate

Writing
John T. Irwin ........................................ Program Chair
David B. Everett .......................... Program Director
Mark Farrington .................. Assistant Director
The Krieger School of Arts and Sciences is at the heart of a small but diverse 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 the 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
> Nitze School of Advanced International Studies
> 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 Street, 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 the Krieger School of Arts and Sciences and the Whiting School of Engineering contact information is 101 Whitehead Hall, Homewood Campus, or 410.516.8174.
Graduate Degrees, Concentrations, and Certificates

The following graduate degrees, concentrations, and certificates are offered by the Advanced Academic Programs of the Krieger School of Arts and Sciences:

MASTER’S DEGREES

> MS in Applied Economics
> MS in Applied Economics/MBA
> MS in Applied Economics/Certificate in Environmental Planning & Management
> MS in Applied Economics/Certificate in Financial Management
> MS in Applied Economics/Certificate in Investments
> MS in Applied Economics/Certificate in National Security Studies
> MS in Bioinformatics
> MS in Biotechnology
  Optional Concentrations:
  • Biodefense
  • Bioinformatics
  • Bioscience regulatory affairs
  • Biotechnology enterprise
  • Health Science Intensive (pending MHEC endorsement)
  • Molecular targets and drug discovery technologies
> MS in Biotechnology/MBA
> MS in Biotechnology/Certificate in National Security Studies
> Master’s in Biotechnology Enterprise and Entrepreneurship
> MA in Communication
  Optional Concentrations:
  • Corporate and non-profit communication
  • Digital communication
  • Health communication
  • Political communication
  • Public and media relations
> MA in Communication/MBA
> MS in Energy Policy and Climate
> MS in Environmental Sciences and Policy
  Optional Concentrations:
  • Ecological management
  • Environmental management
  • Environmental monitoring and analysis
  • Environmental planning
> MS in Geographic Information Systems
> MA in Global Security Studies
  Optional Concentrations:
  • Economics security
  • Energy and environmental security
  • Strategic studies
> MA in Government
  Optional Concentrations:
  • Legal studies
  • Political communication
  • Security studies
> MA in Government/MBA
> Master of Liberal Arts
> MA in Museum Studies
> MA in Museum Studies/Certificate in Nonprofit Management
> MA in Public Management
> MS in Regulatory Science
> MA in Writing
  Concentrations:
  • Fiction
  • Nonfiction
  • Science-medical writing

CERTIFICATES

> Advanced Graduate Study in Liberal Arts
> Biotechnology Education
> Biotechnology Enterprise
> Geographic Information Systems
> National Security Studies
> Nonprofit Management
> Post-Master’s Certificate in Sequence Analysis and Genomics

At the time of publication of the 2013-2014 catalog, additional academic programs (degree and certificate programs) are under program development and are anticipated to launch in the 2013-2014 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 Avenue, NW, Suite 101, Washington, DC 20036-2001 and is open Monday through Thursday from 9am to 6pm and Friday from 9am to 5pm. Students may also reach the office by email: aapadmissions@jhu.edu or aapregistration@jhu.edu.

ADMISSIONS

Below are the general admissions criteria for all Advanced Academic Programs. Additional requirements specific to each program are listed in that program's section in this catalog.

Admissions Requirements

> Bachelor's degree from a regionally accredited US college or university. Applicants who receive their bachelor's degree in a country other than the US must have the US equivalency of a bachelor's degree from a regionally accredited institution. Programs require a minimum GPA of 3.0 on a 4.0 scale. Meeting the minimum GPA requirement does not guarantee admission. As detailed in the Student Status section that follows, an applicant with less than the required GPA may be admitted as a provisional student, on a case-by-case basis. A student admitted with provisional status must meet minimum grade requirements as specified by the program.

> AAP online application form.

> Nonrefundable application fee of $75.

> Official transcripts of all undergraduate and graduate studies completed within the United States only. A transcript is official if it is mailed or delivered in a sealed institutional envelope to the DC office or sent from the institution through SCRIP-SAFE or Docufide.

> Course-by-course credential evaluation for all coursework completed outside of the US. (Select study abroad courses may be exempt. Please contact the Admissions Office for guidance.) (See below section entitled “International College or University Coursework” for details.)

> The TOEFL or IELTS score report is required for international applicants who do not meet the criteria below. (See section entitled “English as a Second Language” for details.)

> Additional materials required by the chosen program as listed in that program's section.

All application materials submitted to the Advanced Academic Programs become the property of Johns Hopkins University and will not be returned to applicants under any circumstance.

Once the Admissions Office has received all required materials, it sends the completed application to the Admissions Committee.

Review Process

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 4-6 weeks. If a decision is not reached by the Admissions Committee in time for the upcoming semester, the program will 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.

General Records Examination (GRE)

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 by mail. To send your GRE scores, please visit: ets.org/gre. Our institutional code is: 8747 (Johns Hopkins Adv Acad Programs).

International Applicants

Collegiate level Coursework earned outside of the U.S.

Applicants who earned their post-secondary 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. The following two credential evaluation services are acceptable: World Education Services (WES) AACRAO or Educational Perspectives. Do not send transcripts from international institutions. The credential evaluation service will send us your transcript along with the evaluation. We will not review your application until both are received.

World Education Services: World Education Services (WES course-by-course evaluations must be sent to AAP officially. WES evaluations are received electronically. To send us a WES evaluation, please visit: wes.org. Our institutional code is: Johns Hopkins Advanced Academic Programs, 1717 Massachusetts Avenue NW, Suite 101, Washington DC 20036.

AACRAO: American Association of Collegiate Registrars and Admissions Officers (AACRAO) course-by-course evaluations must be sent to us officially. AACRAO evaluations are sent through the mail. To learn more, please
visit: aacrao.org. Our institutional code is: Johns Hopkins University Advanced Academic Programs, Suite 101, 1717 Massachusetts Avenue NW, Washington DC 20036.

**Educational Perspectives:** Educational Perspectives course-by-course evaluations must be sent to us officially. To send us an Educational Perspectives evaluation, please visit: educational-perspectives.org. Our institutional code is: Johns Hopkins University Advanced Academic Programs, Suite 101, 1717 Massachusetts Avenue NW, 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 or IELTS scores.
- The applicant holds a post-secondary degree from a country where English is both the official language and the only language of instruction.
- 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: 8747 (Johns Hopkins Adv Acad Programs).

**IELTS:** Submit IELTS results through their 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. All IELTS test centers worldwide are able to send scores electronically. AAP requires a band score of 7.0.

**Student Visas**
Students admitted as degree candidates who plan to take courses onsite in the US, and who take at least three courses per semester, 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 checkbox regarding initiating the visa process. AAP international students on F-1 visas can only 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 Admissions Office will assist in the certification process (aapadmissions@jhu.edu) which the student must complete with the Office of International Student and Scholar Services (OISSS). For more information, international applicants should see the frequently asked questions page for international applicants on the AAP website, advanced.jhu.edu/students/international-students.

**Applications, Acceptance, Denial of Admission, and Matriculation**
Applicants may apply throughout the year and begin study during any of the three semesters (summer, fall, spring). While applications are accepted year-round (summer, fall, spring) for all programs, all applicants are strongly encouraged to apply and complete the application process 4–6 weeks before the start of the desired semester. International applicants seeking a visa must submit all application materials three months prior to the start of the intended semester of study. Admission terms are limited to fall and spring enrollment for international students pursuing an F-1 visa.

After applicants have completed their application file it will be assessed by the program’s Admissions Committee. All materials must be received prior to the Admissions Committee review. Academic background, as well as personal, professional and field-related experience and achievements are considered in this review. Review times may vary significantly by program. If a decision is not rendered in time for an upcoming semester, the application will be reviewed for the following semester. When a decision has been reached, the applicant will be notified via US postal service for domestic applicants and via the ApplyYourself online application system. International applicants will be emailed their admission decision. All admission decisions are final.

Advanced Academic Programs accepts applications up to one year in advance of the intended semester of study. An applicant can only apply to one program at a time unless they are applying to an approved dual program in AAP. The Admissions Office requires no deadlines by which an applicant needs to submit an application. However, programs may fill early and therefore encourage early application. Once the Admissions Office receives a complete application, it is reviewed by the Admissions Committee for a decision. 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 wish to be considered for admission, must submit another application and fee and all required supporting documents.

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). However, applicants should file a deferral request form with the Admissions Office. Contact aapadmissions@jhu.edu for more details. If an admitted student does not file a deferral form and wishes to enroll beyond the year of admission, the admitted student must submit another application and fee. A student who reapplies must satisfy admission and program requirements in effect at the time of reapplication.
Acceptance of Admission
Newly accepted students are directed to a decision form available online. Access details are included in the admission letter. Starting from 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).

Denial of Admission
All admission decisions are final. Decisions are made by the Admissions committee and are mailed to applicants. 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, $75 application fee, and submit 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 students to understand administrative processes at Advanced Academic Programs and to learn about available resources. The orientation provides important steps for all AAP students to cover. The new student orientation is different from the "online orientation" for those students enrolled in online courses/programs. The new student orientation provides general information relevant to all students regardless or online or onsite. The online orientation provides specific information regarding the use of Blackboard and enrollment in online courses.

Change of Program
Students who wish to change to another degree program within the Advanced Academic Programs must fill out a “Change of Program” request form at advanced.jhu.edu. Current Students and Forms. Current students do not need to complete a new application, fee, or transcripts. Documents required by the new program, but not submitted previously, may need to be added. 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. Tuition rates in AAP correspond to the respective academic discipline/program.

Admission to Other Divisions or Programs of the University
An admitted student in the 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 Arts and Sciences’ full-time programs. Admission to the Advanced Academic Programs establishes no claim or priority for admission to other divisions or programs of the university.

Student Status
Degree/Certificate Candidates
Qualified applicants are admitted as degree or certificate candidates and structure coursework toward a specific academic degree based on the program requirements with guidance from their advisor. To be admitted as a master's degree or certificate candidate, an applicant must be in the last semester of undergraduate study or hold a bachelor's degree from an accredited college or university. Select certificate programs in AAP are Post-Masters' certificates and may also require the completion of a Masters' degree (example: Post Masters’ Certificate in Sequence Analysis and Genomics). An applicant is admitted as a degree or certificate candidate after the Admissions Committee for that program reviews the completed application and determines eligibility. A degree or certificate candidate may be admitted provisionally if the Admissions Committee determines eligibility.

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. Provisional students may be required to take specific prerequisite courses, and/or take a specific number of 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. Conditions may apply regarding financial aid for provisional students – contact Financial Aid for specifics regarding eligibility.

The Writing Program may require the submission of certain new application materials for provisional students seeking degree candidacy. Upon receipt of additional materials and committee review, a formal admissions letter will be mailed to the student.

Special Student
A special student is one eligible for admission as a degree or certificate candidate to the chosen program, but is not interested in pursuing the credential. To be able to register for any Advanced Academic Programs course, a student must submit all required admissions documents for the program in which the student desires to take courses and be accepted to the Advanced Academic Programs. Official transcripts are required. Special students are permitted to enroll in any courses for which they satisfy the stated prerequisites. In the MA in Writing Program, special students must obtain program approval for
Committee before seeking degree candidacy. Students may need to submit additional materials to be reviewed by the Admissions Committee for their program will determine if any courses completed thus far can count toward the degree. Program requirements and time limitations in effect at the time of this application will guide the admission decision.

Conditional Student
A conditional student is an undergraduate student in the last semester of undergraduate studies. These applicants can be admitted with the condition that they successfully complete their undergraduate studies and submit an official transcript in English verifying degree conferral prior to registering for their second semester.

Change of Student Status
Once provisional students have met the criteria outlined in their admissions letter, the student must formally request a change in status. Complete a Request to Change Student Status Form available at advanced.jhu.edu by selecting Current Students, Forms. The request will be reviewed by the Registration Office and the academic program advisor to verify eligibility for degree candidacy. Writing Program students may need to submit additional materials to be reviewed by the Admissions Committee before seeking degree candidacy.

Leave of Absence, Continuous Enrollment, Inactive, and Dismissed

Leave of Absence
Students who anticipate that they will not enroll in classes for a period of one year or more, but believe that they will resume their studies, must complete a Request for Leave of Absence Form at advanced.jhu.edu by selecting Current Students, Forms. In the 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 appropriate program committee will consider the request and will inform the student 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 a leave of absence, students automatically receive an extension for the same period of time. All other criteria listed in the Time Limitation section remain in place. A Leave of Absence is granted for up to two years. A leave of absence may not be granted to a student who is currently on thesis continuation. A student who has received an approved Leave of Absence does not have to continuously enroll at AAP during the approved leave period (see continuous enrollment policy).

Continuous Enrollment
All degree and certificate students entering the Advanced Academic Programs in fall 2013 (and beyond) must either register for a credit course or enroll as a continuously enrolled student for a non-refundable fee of $75. Continuously enrolled students register for a non-credit continuous enrollment course found on the schedule of classes on the advanced.jhu.edu and in ISIS. Students who do not register for a credit course, or register for the continuous enrollment course, or have an approved leave of absence on file will be deemed as a withdrawal and will become inactive for future registrations. See the frequently asked questions regarding continuous enrollment on the AAP website: advanced.jhu.edu under the Current Students page. Further details regarding the continuous enrollment policy are also described in the Tuition and Fees section of the catalog.

Inactive
Students who do no register for a credit course each term, or register for the continuous enrollment course described above, or have an approved leave of absence on file will go inactive after one semester of non-registration and will lose their active status. The student is considered to have withdrawn from the program. To resume taking courses in the 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.

Dismissed
Provisional students (degree and certificate) who do not earn a minimum of B- in any course taken in the Advanced Academic Programs while on provision are dismissed from their program. Fully admitted degree candidates must adhere to grade requirements in order to remain in the program. Degree and certificate students who earn two grades of C or lower, are automatically dismissed from the program. Any degree or certificate student who does not continuously enroll is deemed as a withdrawal and will be dismissed. Dismissed students may reapply to another degree or certificate program in Advanced Academic Programs immediately; however, admission is not guaranteed. A dismissed student must wait four years from the date of dismissal for admission in the fifth year if reapplying to the same degree or certificate program from which the student has been previously dismissed. Readmission is not guaranteed.
REGISTRATION

ISIS 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 the Integrated Student Information System (ISIS) at isis.jhu.edu.

Students can also register using the paper Registration Form. The form can be found at advanced.jhu.edu/registration. Complete the form and 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 semester/term, will have a “Hold” in the registration process and will not be allowed to register until Student Accounts processes payment and removes the “Hold.” Several business days are required to complete these processes.

Students are asked to be sure they have fulfilled the appropriate prerequisites for each course before registering. It is the student’s responsibility to make sure the requirements are met and appropriate grades are in place in order to register and advance through their academic program. Once a registration is received, allow four working days before checking your confirmation online at isis.jhu.edu.

Students registering for their first fully online course (in any program) are required to take the “Are You Ready for Distance Education?” survey at advanced.jhu.edu/online/survey before they register. An online orientation week precedes the start of each semester/term, and is a requirement for all first-time fully online course participants.

Ways to register
1. Online at isis.jhu.edu
2. Mail to Johns Hopkins University, Advanced Academic Programs, Enrollment Office, 1717 Massachusetts Avenue, NW, Suite 101, Washington, DC 20036
3. Fax: 202.452.1970
4. Hand-deliver to AAP at any of the three 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. This requirement applies also to students who are taking online classes. The form can be found at advanced.jhu.edu/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. Check the Academic and Registration Calendar for late registration deadlines. Students registering late should check the Refund Schedule. Students who wish to register late can fax their registration to 202.452.1970.

Adding/Dropping/Changing to Audit
The Add/Drop/Audit Form is for students who have registered for a course during the registration and late registration periods and who wish to add a course, drop a course, or change to audit. Complete the form by going to advanced.jhu.edu, Current Students, Forms. Students on financial aid should consult the Office of Financial Aid to ensure all required terms and conditions for aid have been satisfied. Submit the Add/Drop form to staff at the Montgomery County Campus, Homewood campus (Wyman Park Building), or Registration Office in Washington, DC. Students can also fax the request to 202.452.1970 or Email a Drop/Add form to aapregistration@jhu.edu. Deadlines for completing this procedure are given in the Academic and Registration Calendar.

Faculty 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. Requests to drop a registration must be received by fax to be processed for the appropriate refund based on the date they are received by the Advanced Academic Programs Registration Office in Washington, DC.

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 ISIS during the registration period for most courses with full enrollment.

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 if he/she has not met the stated prerequisite.

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/advisor prior to registration to ensure their course load is appropriate for their individual case.

Some programs require permission from the academic advisor 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 toward their academic program, and it is highly recommended that students take the appropriate time to do well in all courses.

Accelerated Students
In some programs (Applied Economics, Biotechnology, Environmental Studies, and Government), current Johns Hopkins undergraduates may enroll in a special program that allows them to accelerate their time to degree completion. Applied Economics, Biotechnology and Government have favorably considered academically strong and eligible candidates from JHU’s undergraduate programs for the accelerated option. In 2013-2014, the Environmental Studies program will now allow eligible, upper level students from the Global Environmental Change and Sustainability program at Johns Hopkins to begin taking limited course work in the MS in Environmental Studies program prior to completion of the undergraduate degree (see program director/advisor for further details).

Waived Classes
In some programs, students may wish to request that a core course or prerequisite course be waived based on previously completed course work. Students who wish to waive a course must contact their program director. Supporting documentation such as copies of syllabi and course descriptions will aid the appropriate committee in making a decision in the best interest of the student. All waived core courses or prerequisite courses are replaced by electives or other courses so that students take the required number of courses to complete their degree.

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 request the necessary change by filling out an Add/Drop form. Please refer to the Academic and Registration Calendar for the deadline by which to request to audit a course. Auditors are ineligible to change their status to credit seeking after the start of the semester.

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. Registration forms can be downloaded from advanced.jhu.edu/registration or are available at the Advanced Academic Programs front desk in the Montgomery County; Washington, DC; and Homewood locations.

AAP students may register online indicating payment 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 Email or fax to 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/finaid/part_time.html or email fin_aid@jhu.edu. Financial aid is available to students who take a minimum of two courses per semester. 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 advisor approval, AAP students may take up to three comparable courses and apply these courses in other JHU programs toward their master’s degree or certificate.

Interprogram
AAP students wishing to count a course outside their program toward their degree need to obtain advisor permission, unless the course is cross-listed in the Course Schedule (advanced.)
Johns Hopkins University  Krieger School of Arts & Sciences | Advanced Academic Programs

jhu.edu/registration) or otherwise listed as part of shared concentrations. To obtain advisor approval, students must forward to their advisor a written request which 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 advisor then determines if the requested course is appropriate and whether the student is eligible to take it.

Interdivisional Registration
AAP students who wish to take a course at another Johns Hopkins school/division must submit an add/drop form to the AAP Registration Office (aapregistration@jhu.edu). 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 the course to count non-AAP courses toward the AAP degree (excluding curriculum that requires courses from other JHU divisions). To obtain advisor approval, students must forward to their advisor a written request which includes documentation of 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 advisor then determines if the requested course is appropriate and whether the student is eligible to take it.

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 advisor. Non-AAP students must complete the necessary paperwork and/or procedure 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 ISIS messaging carefully for these differences.

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 ISIS. This form should be completed when registering for the last course(s) needed to complete the degree; it initiates the graduation review process without which a student cannot 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. There is a $100 graduation fee to be paid at the time of application for graduation. This fee must be paid once 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. However, students are charged the $100 graduation fee only once.

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 at the Homewood campus in Baltimore. Diplomas are mailed to graduates at the address given on the graduate application found online in ISIS. 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 non-credit, 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 normal addenda.

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 on a transcript.

Space-Available Tuition Benefit (non-credit): 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.

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 they 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 three 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 to their JHU email address.

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. Instructions for remote library access can be found at library.jhu.edu/services/computing/remoteaccess.html.

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 as well as students enrolled in on-site courses. MBS Direct offers competitive pricing, new and used books, and buy-backs from their 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 online courses. Still others have an on-ground requirement in addition to courses offered online. Each program has specific requirements, and it is the student’s responsibility to check with their program advisor to ascertain the requirements pertaining to their program.

GRADING SYSTEM

Scale
The grading scale for students enrolled for credit is A+, A, A-, B+, B, B-, C, and F. An I (Incomplete) grade is assigned by the instructor who has given the student permission to delay completion of specific course work 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. An F grade is not removed from a student’s transcript even if a course is repeated. AAP does not calculate grade point averages and a GPA will not appear on the transcript.

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. Some programs also require students who earn a C or below in a required course to repeat the course. For specific guidelines on what courses are considered core and/or required, consult the program director of the respective program.

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 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 in any course cannot repeat the course and are dismissed from the program.

Students dismissed may apply to another program in Advanced Academic Programs immediately. Admission is not guaranteed. A dismissed student must wait four years from the date of dismissal before reapplying for admission in the fifth year to the program in which he/she has been dismissed. Readmission 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. The Resolution of Incomplete form can be found at advanced.jhu.edu, Faculty, Grading Policy. The student notes the reasons for requesting the Incomplete and plans for resolving it. Student and instructor sign the form. Instructors send the completed form to the JHU Registrar.

An Incomplete is granted at the instructor’s discretion; 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” 60 days after the end of the term enrolled for that course.

Withdrawal
The W (Withdrawal) grade signifies an official withdrawal approved by the Advanced Academic Programs Registration Office. The student initiates the withdrawal by faxing a completed 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. For further information see advanced.jhu.edu/registration, and then select Refund Policy.

Transfer Credits
Graduate courses taken at any institution other than The Johns Hopkins University are not accepted and cannot count toward graduate degree requirements in the Advanced Academic Programs, unless specific approval is given in writing from the program director. If approved by a program director, the maximum number of courses that may transfer to JHU from another accredited institution is two.

Academic Standing
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 notice of an ethics violation, loss of a degree, or expulsion from the university. Please see the 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/media/files/AAP1101_CodeofConduct.pdf.

Ethics violations of any kind are taken seriously and may result in dismissal from our program. 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 Eisenhower Library of Johns Hopkins University at library.jhu.edu/research help/index.html. An equally useful resource with clear and specific definitions of plagiarism can be found at turnitin.com/static/home.html.

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. The program committee which may include other members of the AAP faculty 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 informs the student and the instructor of its decision. The committee’s decision is final.

Grade disputes must be submitted to the program committee no later than the last day of classes for the following semester.

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

Advisors
Each student accepted into a degree program or certificate is assigned an academic advisor who is available for consultation regarding the student's program of study. 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 advisor information.

Course Schedule
Courses in all programs are offered in the summer, fall and spring terms. The summer term permits a number of alternative formats; some courses meet intensively for six weeks, others for as many as 12, 13 or 14 weeks are possible, and some programs have two summer terms. The fall and spring terms may have 13 or 14 weeks for regular classes depending on the program. The spring semester includes a three-week intersession course offered at the beginning of January and the summer term includes a May intensive schedule available in select programs.

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

Course Credit
In keeping with the practice of other research universities, credit hours are not assigned to graduate-level courses (600-level and above) in the Krieger School of Arts and Sciences. However, if credits are required for transfer purposes, all courses at the 600-level and above carry the equivalent of four credits, and a memorandum to this effect can be included from the JHU Registrar's Transcript Office when a transcript is requested.

Course Cancellations
The university reserves the right 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.

Requests for enrollment verifications should be made to the Registrar's Office at the Homewood Campus in Baltimore. There is no fee for this service. Enrollment Verification can only be requested by the student via the request forms available in the Registrar's Office, 75 Garland Hall, 3400 N. Charles Street, Baltimore, MD 21218; or by using the form found on the following site: jhu.edu/registrar. Verifications may also be placed through the National Student Clearinghouse.

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. An official transcript will be mailed at the written request of the student. There is no fee for this service. Requests for transcripts should be addressed to the Office of the Registrar, 75 Garland Hall, 3400 N. Charles Street, Baltimore, MD 21218; or call 410.516.8080, or visit jhu.edu/registrar.

Second Master's Degree
After receiving a master's degree from the 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 the 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 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. Fees are not refundable. If a student registers for a course but does not attend OR drop/withdraw from the 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
Beginning in 2013-2014 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 the program of study in which the student has 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 2013-2014 (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/registration) for each term, are payable at the same time as the regular tuition charges and are nonrefundable.

Technology Fee
All fully-online and blended courses in AAP require an additional technology fee of $150 per course.

Continuous Enrollment Fee
Effective fall 2013 and beyond, all newly enrolled AAP students pursuing a master's degree or graduate certificate must continuously enroll in their academic program during Fall and Spring semesters in order to maintain good standing and admission status. January intersession, May intensive, and summer sessions have been excluded from this requirement. Students must either register for credit course(s) in their academic program during these semesters, or they must register for the continuous enrollment course specified within each academic program (see course schedule at advanced.jhu.edu). To avoid additional administrative steps later, students are strongly encouraged to do one of the two options above no later than the end of drop/add each semester.

Continuous enrollment is a non-credit course for which students are charged a fee of $75 for each term of non-credit enrollment (see excluded semesters above). Continuous enrollment entitles students to advising, career services, and use of the Johns Hopkins facilities, including library facilities. AAP students will still have a maximum of 5-years to complete all degree requirements applied toward graduation. Exemptions from the continuous enrollment policy will be granted only for documented medical emergencies, approved leave 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.

Students who neglect to register for continuous enrollment will be deemed as a withdrawal from AAP. The continuous enrollment fee is non-refundable. Students may find a frequently asked questions link at advanced.jhu.edu click under Current Students.

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 need more time to finish the thesis. Thesis continuation has a course number in the AAP schedule of classes. Thesis continuation and continuous enrollment are different. A student working on their thesis should not complete the continuous enrollment registration but rather the thesis continuation course.

Students submit a registration form with payment to the Enrollment Office. This fee also 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 from the date the student's written request for withdrawal is received in the Advanced Academic Programs Registration Office, The Johns Hopkins Bernstein/Offit Building,1717 Massachusetts Avenue, 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. 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

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
Beginning in 2013-2014 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 the program of study in which the student has 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 2013-2014 (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/registration) for each term, are payable at the same time as the regular tuition charges and are nonrefundable.

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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% refund will not have that course listed on their official transcript. Students who drop a course after the deadline for a 75% refund (receiving a 50% 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/?step=3.

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 written request is received by the Advanced Academic Programs Registration Office. Courses offered at locations other than Homewood, Montgomery County, Washington, DC, or online (e.g., international courses) may be subject to a separate refund policy.

In the case of rare or exceptional circumstances, 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 in Washington, DC 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 should be included. The appeal will be reviewed by an AAP refund appeals’ committee. 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 8 days before the start of the term — dropped at 100% (military personnel see * below)
- Eight days before the first class and prior to the 2nd week of class — dropped at 90%
- Second week of class and prior to the 3rd week of class — dropped at 75%
- Third week of class and prior to the 4th week of class — dropped at 50%
- Beginning the fourth week of classes, courses will be withdrawn ("W" appears on transcript)
- Fourth week of class, prior to the 6th week of classes — withdrawn at 25%
- Beginning the 6th week of class — withdrawn with no refund

*Students utilizing military benefits for tuition support may receive a 100% refund up to the start of the term for dropped courses. Students utilizing military benefits must comply with all other dates in the above stated refund schedule. All other students (i.e. non-military students who are not utilizing military benefits) must adhere to the above stated dates without exception.

Students who are enrolled at The Johns Hopkins University for the first time and who are receiving federal student aid are subject to a separate refund policy during their first semester of enrollment. For further information, contact the Financial Aid Office, jhu.edu/finaid. Also, 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 ISIS messaging carefully for these differences.

FACILITIES 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. 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 and offers a one-stop-shop 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 University Enterprise Directory (JHED) Login ID and password. The JHED Login ID and password are also used to access the Integrated Student Information System (ISIS) at isis.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.

New faculty 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 Login” tab and follow the instruction to activate the account. For additional assistance, the Hopkins Information Technology Systems help desk can be reached at 410.516.HELP.

Students can visit advanced.jhu.edu/students for information on student services at the various campus locations. Also located here are the steps for setting up a Johns Hopkins Email account. All official university information will be sent to the student’s JHU email address.

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 & 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 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/remoteaccess.html. For a list of resources, visit the library homepage at library.jhu.edu.

CIRLA (Chesapeake Information and Research Library Alliance)
CIRLA is a program allowing Johns Hopkins faculty 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 HITs 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 a lot 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 imperatives. 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 Street (at the corner of St. Paul and 33rd). For information and store hours, call 410.662.5850 or visit johns-hopkins.bkstore.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.

Evening Food Service
There are various food venues located on and around the campus where students can have coffee, packaged sandwiches, and a broader range of dinner items. On campus options include:
- Nolan’s at Charles Commons, located on E. 33rd St.
- Charles Street Market at Wolman Hall (convenience store with ready-to-eat options)
- Silk Road Café, located in the Mattin Center
- Café Q, located in the MSEL Library

There are also a large variety of off-campus dining options located on St. Paul Street, between E. 31st St. and E. 34th St.

Security Services
Visit jhu.edu/security for an in-depth review of security services available to student, 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 cell phone number and select the appropriate Johns Hopkins Campus.

Parking
The Parking Office is located in the South Garage, on the south end of campus, under the Decker Quadrangle. Office hours are Monday through Friday, 7:30am–10pm and Saturday and Sunday 10am–6:30pm. Evening students and faculty 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 campuses as well as to various locations in Baltimore. More information and a schedule can be found at the parking website, parking.jhu.edu/bluejayshuttle

Montgomery County Campus
The Montgomery County Campus has been serving government agencies, technology and science firms, and consulting organizations on the I-270 corridor for over twenty years. Gilchrist Hall and the Academic and Research Building include administrative offices, classrooms, computer labs, a wet lab, and auditorium, and offer services such as wireless access, a library, a café, and parking. Advanced Academic Programs administrative and faculty offices are located in both buildings.

Library Services
Under the direction of the Sheridan Libraries, the Montgomery Library Resource Center (MLRC) provides reference consultation and instruction, and maintains a collection of materials for use by campus faculty and students. Subject areas in the collection include the biosciences, education, engineering, and business.
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 audio-visual 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 J-Card at the circulation desk. The library is open year-round. During the fall and spring semesters, hours are noon to 9pm, Monday through Thursday; noon to 6pm, Friday; and 10am to 5pm 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 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
Computer facilities at the Montgomery County Campus include workstations and personal computers. In addition, students have access via high-speed data links to UNIX servers at Homewood. Open student computer lab hours are posted at web.jhu.edu/MCC/computer.html. Wireless access is available in public spaces throughout the Montgomery County Campus.

Food and Refreshments
Royal Café, located in the Academic and Research Building, serves sandwiches, soups, and fruits in the early evening hours Monday through Thursday. Other buildings have snack vending and refreshment machines. There are student and faculty lounges in all buildings.

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 and 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 cell phone number and select the appropriate Johns Hopkins Campus.

Parking
Free parking permits are issued at the front desk of the Gilchrist Hall, upon proof of identification. Those who need a valid parking permit may obtain it year-round. The entrance to the MCC parking lots has changed due to ongoing construction. Please visit web.jhu.edu/mcc for up-to-date information.

Washington, DC Center
The Johns Hopkins University Bernstein/Offit Building at 1717 Massachusetts Avenue, NW, is the administrative office for Advanced Academic Programs. Student Services, Admissions, Registration, and Career Services Center are located in Washington, just two blocks south of Dupont Circle accessible by Metro. The center includes a Library Resource Center, faculty and student lounges, an administrative and program management suite, as well as 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 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 (WLRC). The center's staff provide reference consultation and instruction, and facilitate access to a vast array of electronic 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 audio-visual 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 JCard 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 from off-campus. The library is open year-round from noon to 8pm, Monday through Thursday; noon to 5pm, Friday; and 9:30am to 1:30pm 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 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
AAP has two teaching labs and one open lab for AAP students in the Bernstein/Offit building. Internet access connects students to university-wide electronic services. Conventional and specialized software applications are installed to meet the needs of students. Hours vary each semester and are posted at the center. Wireless Internet access is available throughout the building.

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

Food and Refreshments
The 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 Avenue, NW, in the Airline Pilots Building, provides light fare to 7:30pm Monday through Thursday and is closed on weekends.

Security Services
Washington, DC 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 cell phone number and select the appropriate Johns Hopkins Campus.

At the Washington, DC Center, all students and faculty must show a JCard 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 floor that connects directly to the lobby security guard in case of an emergency.

Parking
Effective Jan. 2013, Colonial Parking at 1717 Massachusetts Ave. NW (underneath the Bernstein/Offit Building) is open Monday-Friday for student and JHU parking from 4-7pm at a rate of $7 and Saturday from 7am-6pm at a 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 Avenue NW. The garage is located in the lower level of the SEIU building on the corner of 18th and Massachusetts Avenue, with the entrance on 18th street. Students, faculty, and visitors may take advantage of the reduced fee 4:30 to 11pm 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 and regular participation is expected of all students, and the demands placed on online students are comparable to those of 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.

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

Registration Requirements for Online Courses
Students taking their first online course with the 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
AAP has a 24/7 help desk to assist students who are enrolled in fully online courses. The toll-free number is 866.311.6658. In addition, if you are enrolled in a fully online course and have a question regarding the course software (for example using the assignment tool, discussions, or exams) you can submit your question using the Web form found at, embanet.com/help/JHU. Live chat is also available at embanet.com/help/JHU.

ADDITIONAL STUDENT SERVICES

Career Services
Students and alumni seeking career counseling should contact Colleen Connolly McCusker, associate director, AAP Career Services at cmccusker@jhu.edu or 202.452.1932. Students, alumni, and faculty are encouraged to join the AAP Virtual Career Network at advancedcareersjhu.org. This site provides information about the job search process and an opportunity to join the AAP networking community. Members are encouraged to post job openings and share career information with other students and alumni.

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 to the university 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. Students should contact Rebecca Barron, Director, Student and Academic Services at rbarron@jhu.edu or 202.452.0983 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. Students should submit a request for accommodation form in addition to the appropriate documentation. Further information and a request for accommodation form can be found at advanced.jhu.edu/students/disability-accommodations. Regarding university-wide disability concerns, contact, 410.516.8949 or visit jhu.edu/oie/disability.

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, whether taking one, two, or more courses, students should contact the Office of Student Financial Services, 146 Garland Hall on the Homewood campus. Call 410.516.8028, email at fin_aid@jhu.edu or visit the financial aid web page at jhu.edu/finaid.

Alternative Loans
For students taking one course and seeking financial aid, please go to jhu.edu/finaid/grads_loans.html. For more information, call 410.516.8028.

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

- Federal Direct Student Loan
- Federal Perkins Loan
- Title IV Refunds
- Veterans Benefits

Johns Hopkins University is approved by the Maryland Higher Education Commission for the training of veterans and the widows and children of deceased veterans under provisions of the various federal laws pertaining to veterans’ educational benefits. General information and support is provided to veterans in multiple ways. The Advanced Academic Programs participates in the government initiated Yellow Ribbon program and offers a very limited number of financial assistance grants to eligible veterans. AAP students who are veterans may contact the AAP Registrar in Washington, DC with general inquiries: aapregistration@jhu.edu or 202.452.1952. For detailed information about veterans’ benefits and enrollment procedures contact: Veterans Desk, Office of the Registrar 75 Garland Hall, The Johns Hopkins University, 3400 N. Charles Street, Baltimore, Maryland 21218-2934, 410.516.7071, jhu.edu/registrar/veterans.html.

Satisfactory Academic Progress
Students who receive Federal Student Financial Aid must, in accordance with federal, state, and institutional requirements, meet stated Grade Point Average (GPA) guidelines established specifically for financial aid purposes and maintain Satisfactory Academic Progress (SAP) toward obtaining their degree or certificate. The GPA 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 SAP requirements must meet certain minimum requirements, and be at least as strict and the college’s standards for Good Academic Standing. The revised policy applies to students applying for financial aid for semesters/period of enrollment that begin with the fall 2012 semester.

For details regarding the new SAP policy, please visit: jhu.edu/finaid/part_time.html#sap.

Policy Statements
Students enrolled in course offerings provided by the Advanced Academic Programs are responsible for adhering to the policies set forth and established by Johns Hopkins University. Students are to 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 which 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, Telephone: 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 Dr. 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 (F.L. 93-538) as amended (F.L. 93-568) and any regulations which 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 Policy (ADA)
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 diagnostican 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 American 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 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:
1. Submission to such conduct is made implicitly or explicitly a term or condition of an individual’s employment or participation in an educational program;
2. Submission to or rejection of such conduct by an individual is used as the basis for personnel decisions or for academic evaluation or advancement;
3. 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 and Education, Garland Hall 130, for the university, Allison J. Boyle, Title IX Coordinator and Caroline Laguerre-Brown, Vice Provost for Institutional Equity. Complaints of sexual harassment may be brought to the 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, Allison J. Boyle, Title IX Coordinator and Director for Equity Compliance & Education, Garland Hall 130, Telephone: 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 East 33rd Street, Suite C-100, Baltimore, Maryland 21218; telephone 443.997.7000; or at the Counseling and Student Development Center located in 358 Garland Hall on the Homewood campus; telephone 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 as well as 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 non-traditional 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, as well as 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 foreign aid to the environment.

Advances in computing and the greater availability of timely data through the Internet have created an arena that demands skilled statistical analysis, complemented by economic modeling and reasoning. These skills are in very high demand by government agencies, congressional committees, international lending institutions, trade associations, private businesses (including those in the financial services sector), and private consulting firms.

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. The foundation for intelligent economic reasoning is laid with courses in Microeconomic and Macroeconomic Theory; Statistics and Econometrics create the foundation for empirical analysis. These skills are deepened by taking an advanced econometrics course. A diverse array of electives provides detailed knowledge of specific areas of economics and additional experience in economic modeling and econometric estimation. Our objective is to graduate students who have learned the skills needed to develop and estimate models with which to address the questions they face in their professional activities.

ILLUSTRATIVE CURRICULA

All curricula are available onsite; a few are also available online. Students choose their electives freely. The program’s courses in Quantitative Methods can be plugged into the curricula that students build. The following merely illustrates the great substantive flexibility of the program:

Public Policy
For contributing to any level of government policy formulation and policy making. Choose from among a rich variety of electives: Economics of Industry and Public Policy, two courses in 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.

Business Economics
For those who plan to work as economists in the private sector, breadth of training is highly desirable, and our program provides it. Choose from among Monetary Economics, Topics in Macroeconomics, International Trade, International Finance, Public Economics: Taxation, Economics of Industry & Public Policy, and Financial Economics. The relevant quantitative tools are found in Macroeconometrics, Macroeconomic Forecasting, and Survey Research Methods. Salient business skills from Accounting, Marketing, and/or Organization can be acquired or deepened by taking two or four courses (equivalent to one or two of our own courses) at the nearby Carey Business School.

Macroeconomics/ Financial Economics
These are two strongly complementary subjects, and we have a rich set of offerings: Monetary Economics, International Finance (Open Economy Macro), and Economic Growth treat the economic aggregates, while Topics in Macroeconomics additionally provide perspective. Financial Economics lays the foundation for the intertemporal and interstatial (risk) microeconomic analysis, and Financial Intermediation & Financial Markets considers how existing institutions cope with both. Depth and perspective are gained through Advanced Topics in Financial Economics and Behavioral Finance. Quantitative tools are found in Macroeconometrics, Financial Econometrics, and Macroeconomic Forecasting. Economics of the Labor Market complements Macroeconomics.

International Economics and Development
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**

For contributing to local economic policy analysis and policy making. Students choose Regional Economics and Urban Economics from the Applied Economics Program, and Geographic Information Systems (GIS) and Spatial Analysis from the GIS Program, and one additional elective from either program. The MS Degree can be earned fully on-line by students pursuing this subject.

**Environmental Economics**

For contributing to efficient policy. Students take Environmental and Resource Economics, Cost-Benefit Analysis, and Microeconometrics and/or Macroeconometrics 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 towards 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.

**Health Economics**

Brings to bear the tools of economics in this burgeoning field. Students take Economics of Health Care, Cost-Benefit Analysis, and Microeconometrics 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.

**Defense Economics**

For contributing to efficient allocation of resources in a vital sector. Students take Economics of Defense, Cost-Benefit Analysis, and Microeconometrics and/or Macroeconometrics in the Applied Economics Program. They should consider Game Theory and Economics of the Labor Market, and can choose up to two of their electives from the AAP National or Global Security Studies Programs, Strategic Studies concentration, in-house.

**Quantitative Methods**

The MS degree can be completed fully online if a student wishes to pursue this subject. Any or all of our courses offering training in advanced econometrics and empirical methods — Microeconometrics, Macroeconometrics, Financial Econometrics, Macroeconomic Forecasting, Survey Research Methods, Cost-Benefit Analysis, and Computable General Equilibrium Modeling - are sincerely recommended for consideration to non-degree seeking students and degree candidates alike. Prerequisites can be taken course-by-course, too.

### 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

#### 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 must take Math Methods for Economists and Statistics online before entering the United States, unless waived and can then commence their studies on-site in fall or spring, but not in summer.

### COURSE REQUIREMENTS

- Four Core courses (see below)
- Either 440.618 Microeconometrics or 440.614 Macroeconometrics (see below)
- Five other elective courses (see below)

Courses are offered on-site in Washington, DC. Our required 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.

#### Prerequisite Course

**440.304 Mathematical Methods for Economists**

This is a non-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
The core courses can be taken in any order except that 440.605 Statistics must be completed before a student can enroll in 440.606 Econometrics.

440.601 Microeconomic Theory
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. These concepts are then applied to various policy issues including price and quantity regulation, taxation of labor and capital, income distribution, and the minimum wage. Prerequisite 440.304 Mathematical Methods for Economists

440.602 Macroeconomic Theory
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. Finally, the theory that is developed is applied to various policy issues such as a zero inflation rule, full employment legislation, and a balanced budget amendment. Prerequisite 440.304 Mathematical Methods for Economists

440.605 Statistics
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.

440.606 Econometrics
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 multicolinearity 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. Prerequisite: 440.605 Statistics

Elective Courses
All electives are offered at least once per academic year. They are chosen in consultation with the student’s advisor and are designed to enhance a student’s understanding of the theoretical and empirical issues in a topical area. Students may also consider the relevant offerings of other Johns Hopkins University schools.

440.615 Macroeconomic Forecasting
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
(formerly 440.647) 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 (Capital Asset Pricing Model), term structure models, and volatility models (implied, stochastic volatility). Students will also learn aspects of time series econometrics for both stationary and non-stationary variables at different time frequencies, with emphasis on financial variables. Prerequisites: 440.601 Microeconomic Theory; 440.606 Econometrics; 440.640 Financial Economics, or equivalent; 440.614 Macroeconometrics is recommended

440.618 Microeconometrics
(formerly 440.648) This course covers a number of advanced techniques frequently encountered in applied microeconometric analysis. Topics include generalized method of moment’s 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

440.622 Cost-Benefit Analysis
(formerly 440.632) 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; 440.606 Econometrics

440.624 Computable General Equilibrium Modeling
This course will provide an understanding of how to independently develop, modify, run and interpret Computable General Equilibrium (CGE) 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 to use and modify existing CGE programs...
440.629 – Survey Research Methods
(formerly 440.649) This course introduces students to the theory and practice of conducting surveys. Survey methods combine both social science—economics, sociology, and psychology—and quantitative methods—mathematics, statistics, and computer science—to develop a theory of how surveys can best be used to measure important aspects of the human condition. Key topics include sample design, weighting, data collection modes, administrative operations, questionnaire design, non-response, and estimation in surveys. Prerequisites: 440.605 Statistics; 440.606 Econometrics

440.630 Monetary Economics
(formerly 440.610) 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: 440.602 Macroeconomic Theory; 440.606 Econometrics

440.632 Topics in Macroeconomics
(formerly 440.612) This course develops and critically evaluates models of economic growth, consumption, investment, asset pricing, inflation, monetary policy and unemployment. Specific topics studied include the dynamic relationship between saving rates and growth; tests of rational-expectations models of consumption, investment, and asset pricing; explanations for changes in the U.S. saving rate; linkages between real and financial variables; the equity premium puzzle; inflation inertia and the costs of disinflation; the Lucas critique and economic policy; monetary policy and the liquidity trap; and search and matching models of labor-market dynamics. Prerequisites: 440.601 Microeconomic Theory; 440.602 Macroeconomic Theory, and 440.606 Econometrics

440.634 Economic Growth
(formerly 440.624) 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, aid and growth, and policy and growth. Prerequisites: 440.601 Microeconomic Theory; 440.602 Macroeconomic Theory, and 440.606 Econometrics

440.639 International Finance
(formerly 440.619) 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 capital flows, the impact of internal debt on the balance of trade, and the interaction and potential conflicts between domestic and international economic policy objectives. Prerequisites: 440.602 Macroeconomic Theory, 440.606 Econometrics

440.640 Financial Economics
(formerly 440.642) 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 policy makers 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. Prerequisites: 440.601 Microeconomic Theory; 440.606 Econometrics

440.641 Financial Intermediation & Financial Markets
(formerly 440.620) 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 can cope with financial crises, financial fragility, and credit market frictions. Prerequisites: 440.601 Microeconomic Theory; 440.606 Econometrics

440.642 Advanced Topics in Financial Economics
Deepens selected topics in Financial Economics: Dividends policy, taxes and the capital structure of the firm, the profitability of mergers and acquisitions and their affect on capital values, management as agents of the stockholders, models of asymmetric information among employees and management. Topics may vary from semester to semester. Prerequisite: 440.640 Financial Economics.

440.646 Behavioral Finance
Most economic theory is based on rational behavior in a well defined environment. Behavioral economics treats human behavior as a much more complex process. It incorporates psychology, sociology and other social sciences to explain human behavior in evolving environments. Based on these alternative foundations to economic thinking, the course will discuss many topics salient to financial markets and especially causes and effects of inefficient stock and bond markets such as bubbles, momentum, and market timing issues, closed-end fund discounts, and limits on arbitrage. Behavioral investment models are also covered. Prerequisite: 440.640 Financial Economics.
440.650  Environmental & Resource Economics  
(formerly 440.640) 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 non-depletable and depletable (e.g., fossil fuels, natural ecosystems) resources. Various applied settings are used to demonstrate the principles developed in the course. Prerequisites: 440.601 Microeconomic Theory; 440.606 Econometrics

440.653  Economics of the Labor Market  
(formerly 440.643) The determination of earnings and the allocation of labor are examined. This course develops the theory of labor markets, focusing on the institutional structure of both labor supply and labor demand. This theory is then applied to questions of income distribution, unions, wage discrimination, wage rigidity, and government policies such as the minimum wage, affirmative action, and training and retraining programs. Prerequisites: 440.601 Microeconomic Theory; 440.606 Econometrics

440.656  Political Economy  
(formerly 440.666) 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

440.658  Economics of Industry & Public Policy  
(formerly 440.638) 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 are 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. Prerequisites: 440.601 Microeconomic Theory; 440.606 Econometrics

440.659  Law and Economics  
(formerly 440.639) 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. Prerequisites: 440.601 Microeconomic Theory

440.660  Public Economics: Taxation  
(formerly 440.630) This course develops the conceptual framework for analyzing governmental taxation. The theoretical impact of taxes on income distribution and resource allocation will be studied. Then these tools will be used to evaluate the strengths and weaknesses of the current federal tax system as well as various proposals for fundamental tax reform. Prerequisites: 440.601 Microeconomic Theory; 440.606 Econometrics

440.661  Public Economics: Expenditure Programs & Social Regulation  
(formerly 440.627) 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; and voting and bureaucracy. 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; and 440.606 Econometrics

440.663  Development Microeconomics  
(formerly 440.623) This course analyzes the constraints on households and policy makers in developing countries using econometric tools. Empirical micro-economic 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. Prerequisites: 440.601 Microeconomic Theory

440.665  International Trade  
(formerly 440.635) 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 modern manifestation as anti-dumping and safeguard measures. The causes and consequences of trade policy, too, are linked to contemporary empirical evidence. Prerequisites: 440.601 Microeconomic Theory; 440.602 Macroeconomic Theory; and 440.606 Econometrics

440.666  Regional Economics  
This course examines the effect of economies of scale, transport costs, and factor mobility on agglomeration, and spatial competition, inter alia, to explain the development of regional economies. The influences of national and regional policies are also examined. The course contains an empirical section that measures spatial concentration and uses spatial econometrics to test theories and quantify relationships.

440.667  Urban Economics  
This course examines equilibrium and optimal land use, causes of urban agglomeration such as Marshallian positive external economies, including knowledge spillovers and labor market pooling, local public goods, and negative externalities, such as
congestion. Emphasis is placed on the spatial characteristics of the urban economy, especially land use. The influence of local and national policies on the formation and growth of urban areas is also considered.

440.671 Wine Economics
(formerly 440.651) This course will survey theoretical and empirical analyses across the breadth and depth of wine economics through examination of the wine economics literature and practice. Topics covered include factors affecting the demand and supply of wine, determination of the price of wine, wine futures pricing, wine as an investment good, the production process for wine, wine in international trade and finance, the agricultural basis of wine, and human capital aspects of wine consumption. The course will suggest the unique, global research potential of wine economics. This class will also include an experiential component through visits to several local area wineries. Prerequisites: 440.601 Microeconomic Theory; 440.602 Macroeconomic Theory; 440.606 Econometrics

440.672 Economics of Health Care
(formerly 440.641) 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 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

440.675 Economics of Defense
(formerly 440.645) This course analyzes the microeconomic theory of defense acquisition and the government’s attempts to escape the monopoly/monopsony dilemma in a high tech, high investment industry, the finances and business strategies of defense companies, defense budgeting problems, prospects and procedures, and applications of economic thinking to military and national strategy. Prerequisites: 440.601 Microeconomic Theory; 440.602 Macroeconomic Theory; and 440.606 Econometrics

440.684 Game Theory
(formerly 440.644) Game theory is a mathematical tool developed for the purpose of understanding not only the interaction of economic market participants, but overall 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

440.692 Thesis
Students may undertake their own research project for credit as an 11th program course. Prior to proposing a project, interested students must have clearly identified a research topic, and a mentor who is familiar with their prospective inquiry, and is willing to provide guidance and oversee the project. The mentor must be faculty teaching at the Johns Hopkins University. Students then submit a formal proposal for review and approval to the Independent Research Committee, to be received no later than one month prior to the beginning of the term in which the student plans to enroll in the course. Students must meet with the mentor and the faculty advisor periodically for discussion of the project’s progress, and must complete a research paper, to be approved by the mentor and the Committee. The best papers will be made available to the public on Hopkins’ electronic research repository JScholarship. Instructions for applying to enroll and meeting the standards of the course are available. Enrollment of the student can only be undertaken by the Program Director. Candidates must plan on using two semesters to successfully complete an Independent Research project. Prerequisites: All four Core courses and Microeconometrics or Macroeconometrics, and one or more Applied Economics courses in the substantive area of the proposed research, plus a strong academic record (at least B+ average) in at least eight program courses, are absolute minima. Admission is by selection.

440.693 Thesis Continuation
(formerly 440.656) Students not finishing their paper during the term in which they enroll must register for Thesis Continuation in every ensuing semester (including Summer) until their papers are accepted, but Thesis Continuation does not count as a separate course. Such students must pay a continuation-of-enrollment fee of $500 for each subsequent term until a final grade has been submitted. In Applied Economics, taking Continuation once may be considered the norm. Prerequisite: Thesis

DUAL MS IN APPLIED ECONOMICS/MBA

To allow students to better exploit the strong complementary nature between business and economics, the Carey Business School of Johns Hopkins University 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 for fewer courses than if pursued separately. Those interested, including current students of either school, should apply to the dual MS in Applied Economics/MBA through Advanced Academic Programs. Course requirements, which can be pursued simultaneously at both schools, are:

MA Applied Economic Requirements

> Prerequisite Math Requirement
Those entering with only a single Calculus course must first take 440.304 Mathematical Methods for Economists, a non-credit, full-length course, at half tuition, as the first of 9 program courses. Those entering with two Calculus courses may study the extra material on their own.

> Four core courses:
440.601 Microeconomic Theory
440.602 Macroeconomic Theory
440.605 Statistics
440.606 Econometrics
> One advanced econometrics course:
   440.614 Macroeconometrics OR
   440.618 Microeconometrics (formerly 440.648)

> Three elective courses.

MBA Requirements — Carey Business School

Courses offered in Washington, DC; Columbia, MD; Baltimore, MD; and Montgomery County, MD. All courses are 2 credits with the exception of Strategic Management.

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

> Elective Courses:
   Six 2-credit courses: (students may elect a concentration in Finance, Marketing, Management, or Real Estate).

> Capstone:
   151.790 Strategic Management (4 credits)

DUAL MS IN APPLIED ECONOMICS/GRADUATE CERTIFICATES IN FINANCE

To allow students to better exploit the strong complementary nature between finance and economics, the Carey Business School of Johns Hopkins University and the Applied Economics Program have eliminated the overlap between the MS in Applied Economics and 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, including current students of either school, should apply to the dual MS in Applied Economics/Graduate Certificate in Financial Management or Graduate Certificate in Investments through Advanced Academic Programs. Course requirements, which can be pursued simultaneously at both schools, are:

**MS in Applied Economics**
1. 440.601 Microeconomic Theory
2. 440.602 Macroeconomic Theory
3. 440.605 Statistics
4. 440.606 Econometrics

**Graduate Certificate in Financial Management**
2. 231.620 Finance and Capital Markets
3. 232.701 Investments
4. 231.740 Mergers & Acquisitions
5. 800.610 Corporate Governance
6. Carey Finance Elective I
7. Carey Finance Elective II

**Graduate Certificate in Investments**
2. 231.620 Finance and Capital Markets
3. 232.701 Investments
4. 232.720 Fixed Income
5. 232.710 Derivatives
6. Carey Finance Elective I
7. Carey Finance Elective II

**To considerably ease the study of environmental matters together with economics, the Applied Economics Program of JHU Advanced Academic Programs and the Environmental Engineering, Science and Management Program of JHU 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, DC.**

Students applying to the dual degree program should download the application and submit supporting documents and application fee to the Advanced Academic Programs. The admissions department will forward the application to JHU Engineering for Professionals. Each program decides on admissions separately.
The courses necessary to earn the two diplomas are shown below:

<table>
<thead>
<tr>
<th>Applied Economics</th>
<th>Environmental Planning and Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course 1</td>
<td>440.601 Microeconomic Theory</td>
</tr>
<tr>
<td>Course 2</td>
<td>440.602 Macroeconomic Theory</td>
</tr>
<tr>
<td>Course 3</td>
<td>440.605 Statistics</td>
</tr>
<tr>
<td>Course 4</td>
<td>440.606 Econometrics</td>
</tr>
<tr>
<td>Course 5</td>
<td>440.648 Microeconometrics or 440.614 Macroeconometrics</td>
</tr>
<tr>
<td>Course 6</td>
<td>440.622 Cost Benefit Analysis</td>
</tr>
<tr>
<td>Course 7</td>
<td>440.650 Environmental &amp; Resource Economics</td>
</tr>
<tr>
<td>Course 8</td>
<td>440.6XX Elective</td>
</tr>
<tr>
<td>Course 9</td>
<td>440.6XX Elective</td>
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</tbody>
</table>

| Courses 10-14 | Selection of five 575.xxx courses with adviser approval. |

- 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

Each program maintains its own admissions requirements, but allows students to simultaneously apply to, and study in, the other field. Students initially apply to either of the two programs, mentioning their intent to pursue the dual diplomas in a statement of purpose, and requesting their applications to be forwarded to the other program. Adhering to this process will avoid the paying of two application fees.

This dual diploma is probably singular in its content and its convenient, compact form. The course components are shown in the table below:

<table>
<thead>
<tr>
<th>Applied Economics</th>
<th>National Security Studies</th>
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</thead>
<tbody>
<tr>
<td>Course 1</td>
<td>440.601 Microeconomic Theory</td>
</tr>
<tr>
<td>Course 2</td>
<td>440.602 Macroeconomic Theory</td>
</tr>
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<td>Course 3</td>
<td>440.605 Statistics</td>
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<tr>
<td>Course 4</td>
<td>440.606 Econometrics</td>
</tr>
<tr>
<td>Course 5</td>
<td>440.618 Microeconometrics or 440.614 Macroeconometrics</td>
</tr>
<tr>
<td>Course 6</td>
<td>440.675 Economics of Defense</td>
</tr>
<tr>
<td>Course 7</td>
<td>440.622 Cost-Benefit Analysis</td>
</tr>
<tr>
<td>Course 8</td>
<td>440.6XX Elective</td>
</tr>
<tr>
<td>Course 9</td>
<td>440.6XX Elective</td>
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</tbody>
</table>

| Courses 10-13 | Two courses from the list of approved electives. For specific courses visit, advanced.jhu.edu/academic/national-security/requirements |

**MS in Applied Economics/Graduate Certificate in National Security Studies**

Economics has long contributed to the analysis of national and global security matters. Prof. Arthur Pigou’s Political Economy of War, Macmillan, 1921, new ed. 1941, is probably the first full-length work that addressed this subject. While subsequent analysis has never ceased, it is currently difficult for students interested in these applications and the associated careers to find a formal, structured educational program to systematically train them in the two fields together.

To make it more convenient for students to study the two subjects together, the MS in Applied Economics and the Certificate in National Security Studies are recognizing one of each other’s courses. The total number of courses required to obtain the two diplomas is thereby reduced from 15 to 13, nine in Applied Economics and four in National Security Studies. Each program maintains its own admissions requirements, but allows students to simultaneously apply to, and study in, the other field. Students initially apply to either of the two programs, mentioning their intent to pursue the dual diplomas in a statement of purpose, and requesting their applications to be forwarded to the other program. Adhering to this process will avoid the paying of two application fees.

**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 their requirements for awarding their 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 mini-course on “Forecasting in Organizations,” will be eligible for the Certificate in Forecasting Practice. The student fee to the IIF is $200. Those already holding MS Degrees in Economics from other institutions can typically have Statistics and Econometrics waived. Non-degree seekers are welcome to apply for the IIF Certificate as Special Students.
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 to 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 life-saving 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 (JHU) 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, MD, and in our cyber campus for our online courses. Students may choose from five different degree options and four certificates offered through the Center’s Advanced Biotechnology Studies Program:

- 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 the Carey Business School)
- Master’s in Biotechnology Enterprise and Entrepreneurship
- Master of Science in Regulatory Science
- Certificate in Biotechnology Education
- Certificate in Biotechnology Enterprise
- Post-Master’s Certificate in Sequence Analysis and Genomics

**PROGRAM COMMITTEE**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bertrand Garcia-Moreno</td>
<td>Professor, Chair, Center for Biotechnology Education, Advanced Biotechnology Studies</td>
</tr>
<tr>
<td>Kristina Obom</td>
<td>Program Director, Biotechnology and Bioinformatics, Center Director, Center for Biotechnology Education</td>
</tr>
<tr>
<td>Patrick Cummings</td>
<td>Program Director, Biotechnology</td>
</tr>
<tr>
<td>Lynn Johnson Langer</td>
<td>Program Director, Regulatory Science and Biotechnology Enterprise</td>
</tr>
<tr>
<td>Alexandra Tan</td>
<td>Program Director, Health Science Intensive</td>
</tr>
<tr>
<td>Thomas E. Colonna</td>
<td>Associate Director, Regulatory Science</td>
</tr>
<tr>
<td>Robert Lessick</td>
<td>Associate Director and Senior Lecturer, Biotechnology Education</td>
</tr>
</tbody>
</table>

**FULL-TIME FACULTY AND STAFF**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jamie Austin</td>
<td>Lecturer and Coordinator, Regulatory Science</td>
</tr>
<tr>
<td>Gabrielle Congalton</td>
<td>Academic Program Coordinator</td>
</tr>
<tr>
<td>Beatrice Kondo</td>
<td>Lecturer and Coordinator, Bioinformatics</td>
</tr>
<tr>
<td>Thomas Koval</td>
<td>Lecturer</td>
</tr>
<tr>
<td>Sherry Ogg</td>
<td>Lecturer</td>
</tr>
<tr>
<td>Meredith Safford</td>
<td>Lecturer and Coordinator, Biotechnology</td>
</tr>
<tr>
<td>Katherine Wellman</td>
<td>Lecturer and Coordinator, Biotechnology Enterprise and Entrepreneurship</td>
</tr>
<tr>
<td>Karen Wells</td>
<td>Lecturer</td>
</tr>
</tbody>
</table>
Master of Science in Bioinformatics
Joint Offering with the Whiting School of Engineering for Professionals

Johns Hopkins University (JHU) 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, 5 core courses, 4 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. 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 onsite locations. All degree requirements can be completed at the Montgomery County Campus or online. Not all courses are offered at the Homewood campus.

Fully Online MS in Bioinformatics
In order to meet the needs of students who require flexibility in scheduling or who cannot relocate to the Baltimore/Washington area, we now offer an option to complete the MS in Bioinformatics degree fully online. Our unique model for online education ensures students the same academic program as our onsite students, and engages students through a variety of asynchronous interactions. Students interact with the instructor and other students through threaded discussions, group projects, and informal meetings such as chats and question and answer sessions. Course content is delivered via text notes, PowerPoint, narrated PowerPoint, streaming video and web-conferencing in order to meet the needs of various learning styles.

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 is a two-semester research project. Students should take 410.800 Independent Research project (Biotechnology) and the following semester 410.801 Biotechnology Thesis. Students interested in this option should consult with the program advisor.

PROGRAM COMMITTEE

Bertrand Garcia-Moreno
Chair, Center for Biotechnology Education,
Advanced Biotechnology Studies

Kristina Obom
Program Director, Biotechnology and
Bioinformatics; Center Director, Center for
Biotechnology Education

Thomas Longstaff
Co-Chair, Computer Science Program,
Engineering for Professionals, Whiting
School of Engineering

Eleanor Boyle Chlan
Associate Program Chair, CS, IA, and ISE;
Senior Lecturer, Engineering for Professionals,
Whiting School of Engineering

Patrick Cummings
Program Director, Biotechnology

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 Bioorganic 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
410.610 Gene Organization and Expression
410.633 Introduction to Bioinformatics OR 605.452 Biological Databases and Database Tools
410.634 Practical Computer Concepts or Bioinformatics OR 605.441 Principles of Database Systems
605.421 Foundations of Algorithms

Concentration Courses
Choose four
410.635 Bioinformatics: Tools for Genome Analysis
410.639 Protein Bioinformatics
410.640 Molecular Phylogenetic Techniques
410.661 Methods in Proteomics
410.666 Next Generation DNA Sequencing and Analysis
410.671 Microarrays and Analysis
410.698 Bioperl
410.712 Advanced Practical Computer Concepts for Bioinformatics
410.713 Advanced Genomics and Genetic Analysis
410.736 Genomic and Personalized Medicine
605.443 The Semantic Web
605.451 Principles of Computational Biology
605.453 Computational Genomics
605.456 Computational Drug Discovery and Development
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: Technology and Applications
605.462 Data Visualization
605.481 Distributed Development on the WWW
605.484 Collaborative Development with Ruby on Rails
605.701 Software Systems Engineering
605.741 Distributed Database Systems
605.746 Machine Learning
605.747 Evolutionary Computation
605.759 Independent Research Project in Bioinformatics
605.782 Web Applications Development with Servlets and JavaServer Pages
605.787 Rich Internet Applications with Ajax

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

COURSE DESCRIPTIONS

Prerequisite Courses

605.201 Introduction to Programming Using Java
The objective of this course is to allow 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 foundational topics including basic syntax, primitive data types, iteration, conditional expressions, arrays, object references, methods, exception handling, and an introduction to object oriented programming. Students will learn problem-solving techniques and gain experience detecting and correcting software errors though several programming assignments. The course will also cover the standard libraries for string processing, mathematical routines, and input and output streams. Prerequisites: One year of college mathematics.

605.202 Data Structures
This course investigates abstract data types (ADTs), 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. NOTE: This course DOES NOT count toward the Master of Science in Computer Science degree. Prerequisites: One year of college mathematics and 605.201 Introduction to Programming using Java or equivalent.

410.302 Bio-Organic Chemistry
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 general or inorganic college chemistry.

410.601 Biochemistry
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
This course provides a comprehensive overview of the key concepts in molecular biology. Topics 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 include methods in recombinant DNA technology, micro-arrays and microRNA. Prerequisite: 410.601 Biochemistry.

410.610 Gene Organization and Expression
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.

410.633 Introduction to Bioinformatics
Retrieval and analysis of electronic information are essential in 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 as well as interpretation is 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
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 Perl 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.

605.421 Foundations of Algorithms
This follow-on course to data structures (e.g. 605.202) provides a survey of computer algorithms and examines the fundamental techniques in algorithm design and analysis. Topics include advanced data structures (red-black and 2-3-4 trees), recursion and induction, algorithm analysis and computational complexity (recurrence relations, big-O notation), sorting and searching, string processing (Boyer-Moore, Knuth-Morris-Pratt, and pattern matching), graph algorithms (depth-first and breadth-first search, connectivity, union-find, minimum spanning trees and network flow), and computational geometry (points, lines, polygons and convex hull). Selected advanced topics (dynamic programming and NP-complete problems) are also introduced. Grading is based on problem sets, programming projects and examinations. Prerequisites: Working knowledge of data structures and Java C++, or C.

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 the emerging intense interest in proteomics and molecular structure, have caused an enormous explosion in the need for biological databases. The first half of this course surveys a wide range of biological databases and their access tools, and seeks to develop proficiency in their use. These may include general sequence databases such as GenBank and SWISS-PROT as well as more specialized databases such as those on protein structure, enzymes, biomolecular pathways, human gene indices and genomes of other organisms. The second half of the course focuses on the design of biological databases including the computational methods to create the underlying data, as well as the special requirements of biological databases such as interoperability, complex data structures consisting of very long strings, object orientation, efficient interaction with computational operators, parallel and distributed storage, secure transactions and fast recall. Practical issues of data capture and integration will be explored, including data captured by DNA arrays. The emerging SBML standard will be discussed. Students will create their own small database as a project for the course as well as complete homework assignments using databases. Students will become familiar with the needed software tools such as UNIX, Perl, XML, CGI, and CORBA as necessary, as well as search methodologies such as BLAST and FASTA. Prerequisites: 605.441 Principles of Database Systems or a working knowledge of SQL and some knowledge of molecular biology or bioinformatics.

Concentration Courses
410.635 Bioinformatics: Tools for Genome Analysis
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. To assign 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.

410.639 Protein Bioinformatics
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 and statistical verification. Also covered are graphic visualization of 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 and 410.633 Introduction to Bioinformatics.

410.640 Molecular Phylogenetic Techniques
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 and 410.633 Introduction to Bioinformatics.

410.661 Methods in Proteomics
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.

410.666 Next Generation DNA Sequencing and Analysis
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 to 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

410.671 Microarrays and Analysis
This course will focus on the analysis and visualization of microarray data. The general aim is to introduce students to the various techniques and issues involved with analyzing gene expression data and visualize the results using modern statistical scripting software. Topics include detecting and attributing sources of data variability, assessing sample size and power, identifying differentially expressed genes with relevant statistical tests, and controlling for false positive discovery. An introduction to linear and nonlinear dimensionality reduction methods, pattern recognition (clustering), and supervised classification techniques will be covered. Assignments and concepts will make use of real experimental data sets from platforms such as Affymetrix, Agilent, Illumina and custom cDNA. Analysis will be conducted in R using Bioconductor packages, with applications focused on target identification, biomarker discovery, pathogen detection and many others. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.645 Biostatistics, 410.633 Introduction to Bioinformatics.

410.698 Bioperl
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, 410.633 Introduction to Bioinformatics 410.634 Practical Computer Concepts for Bioinformatics

410.712 Advanced Practical Computer Concepts for Bioinformatics
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 Perl 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 a brief introduction to the PHP scripting language. Class time in the latter weeks of the class will be devoted to individual assistance on student projects as well as to short lectures on advanced Perl topics, object-oriented Perl and installing Perl modules. The last two weeks will be devoted to student presentations and a peer critique of their project. Once again, whenever possible, this course will emphasize relevance to solving problems in molecular biology and bioinformatics. Prerequisites: Bioinformatics core courses.

410.713 Advanced Genomics and Genetics Analyses
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 410.671 Microarrays and Analysis to address the analysis of both genetic variation and genomics content using technologies measuring splice variants such as exon arrays, single nucleotide polymorphisms (SNPs) for genome-wide association studies (GWAS), copy number variation (CNV) and transcription factor binding sites. Analysis methods for high throughput sequencing (HTS) technologies are also introduced including quantitative mRNA content (RNA-Seq) and whole genome assembly methods with de novo and reference-based approaches. Prerequisites: Bioinformatics core courses and 410.671 Microarrays and Analysis.

410.736 Genomic and Personalized Medicine
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, amongst others. Class discussions will include ethical, legal, regulatory, and economic implications of genomic medicine. Students and faculty will regularly report on new developments in the field as they emerge throughout the course. Prerequisites: Molecular Biology, Introduction to Bioinformatics.

605.443 The Semantic Web
The Semantic Web is an activity by the WWW Consortium to create a large set of XML-based languages, along with information on how various tags relate to real world objects and concepts. This course covers Semantic Web technologies, including RDF (Resource Description Format—a structure for describing and interchanging metadata on the Web) and OWL (Web Ontology Language), with domain-specific standards and ontologies (formal specifications of how to represent objects and concepts). Representative applications of RDF, OWL and ontologies will be discussed. Students will complete a Semantic Web project in an application area of interest to them. Examples will be drawn from several application areas throughout the course, including the life sciences, knowledge management, electronic commerce and web services choreography. Domain-specific implementation strategies, such as LSID (Life Sciences Identifier) and various vertical ontologies will be addressed.

605.451 Principles of Computational Biology
This course is an interdisciplinary introduction to the 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 for sequence alignment, such as Smith-Waterman, FASTA and BLAST; hidden Markov models, such as the forward, Viterbi and expectation maximization algorithms; and a range of gene-finding algorithms, phylogeny tree construction and clustering algorithms. Prerequisites: Bioinformatics core courses.

**605.453 Computational Genomics**
This course focuses on current problems of computational genomics. Topics include computational aspects of genome sequencing and assembly; genome annotation including finding genes in DNA sequence data, identifying biological functions and finding regulatory features such as ribosome binding sites, terminators and operons; analysis of microarray data; and computational approaches to study genomes and their evolution including analysis of nucleotide and codon usage, gene order conservation, gene and genome duplications, building and interpreting phylogenetic trees, and predicting lateral gene transfer events. Prerequisites: Bioinformatics core courses.

**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 translation medicine with the discovery/development platforms. The course will build on concepts from a number of areas including bioinformatics, computational genomic/proteomics, in-silico system 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. Prerequisites: Bioinformatics core courses.

**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 swarm-like 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 Bio. Prerequisites: Bioinformatics core courses.

**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, 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. Prerequisites: Bioinformatics core courses.

**605.754 Analysis of Gene Expression and High Content 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: Bioinformatics core courses.

**605.755 Systems Biology**
During the last decade, systems biology has emerged as an effective tool for the investigation of complex biological problems, placing emphasis on the analysis of large-scale datasets and quantitative treatment of experimental results. In this course, students will explore recent advances in the 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 the 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 the basics of microfabrication and microfluidics. As a course project, students will develop a model of a signal transduction or metabolic pathway. Prerequisites: Bioinformatics core courses and differential equations.
Electives

Computer Science Electives

Choose one

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 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: Technology and Application
This course covers the concepts, technology and applications of XML (Extensible Markup Language), especially to web-based technologies. The course concentrates on XML fundamentals and associated technologies, and processing XML using Java. Topics include the XML Specification; XML Namespaces; Document Type Definitions (DTDs); XML Schemas; XML Transformation (XSLT); XML Links and XML Pointers; and parsing XML using the Document Object Model (DOM) and Simple API (Application Programming Interface) for XML (SAX), the Java API for XML Processing (JAXP), and the Java Document Object Model (JDOM). Additional topics may be drawn from Cascading Style Sheets (CSS); XQuery; the Simple Object-Oriented Protocol (SOAP); Web Services Description Language (WSDL); Universal Description, Discovery and Integration (UDDI); applications of XML such as RDF; and the architecture of Web Service, EAI and B2B systems using XML. (This course is the same as 655.781 XML: Technology and Applications.) Prerequisite: 605.481 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.

605.481 Distributed Development on the World Wide Web
This course examines three major topics in the development of applications for the World Wide Web. The first is web site 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, multi-threaded 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 Collaborative 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 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 (MVC) 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.

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 engineering 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 the 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 change, 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 Distributed Database Systems
This course investigates the principles of distributed database systems, including design and architecture, query processing, transaction management, locking, recovery and RAID technology. The course also covers JDBC programming through a variety of interfaces including stand-alone Java programs, Java applets on Web browsers, and Common Gateway Interface programs on Web browsers. The course blends theory with practice, and students will use distributed database concepts to develop JDBC applications and JDBC drivers for implementing web-based, distributed databases. Prerequisites: 605.441 Principles of Database Systems; 605.481 Distributed Development on the World Wide Web, or equivalent knowledge of Java and HTML.
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. Prerequisite: 605.445 Artificial Intelligence 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. Prerequisite: 605.445 Artificial Intelligence recommended but not required.

605.759 Independent 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 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 Application Development with Servlets and JavaServer Pages (JSP)
This project-oriented course investigates the techniques for building server-side programs for dynamically generated websites, electronic commerce, web-enabled enterprise computing, and other applications that require WWW access to server-based resources. Particular attention will be paid to methods for making server-side applications efficient, maintainable and flexible. Topics include handling HTTP request information, generating HTTP response data, processing cookies, tracking sessions, designing custom JSP tag libraries, and separating content from presentation through use of JavaBeans components and the MVC (Model 2) architecture. Prerequisite: 605.481 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 non-interactive 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 the 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.

Biotechnology Electives
Choose one

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

410.604 Advanced Cell Biology II
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.
410.612 Human Molecular Genetics
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, dis-equilibrium mapping, and ethical dilemmas associated with the Human Genome Project. Prerequisites: 410.601 Biochemistry; 410.602 Molecular Biology.

410.615 Microbiology
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 measures. Prerequisites: 410.601 Biochemistry; 410.602 Molecular Biology; 410.603 Advanced Cell Biology I.

410.616 Virology
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, viroids, 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, virion structure, virus cycle, pathogenesis, clinical features, epidemiology, immunity and control. The viral vectors and their applications in biotechnology are discussed. Prerequisites: 410.601 Biochemistry; 410.602 Molecular Biology, 410.603 Advanced Cell Biology I.

410.622 Molecular Basis of Pharmacology
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.

410.629 Genes and Disease
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
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 start-up companies as well as established biotechnology and pharmaceutical companies. An overview of proprietary and patent issues in gene therapy is part of the course. Prerequisites: All four core courses.

410.632 Emerging Infectious Diseases
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 the 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; 410.602 Molecular Biology; 410.603 Advanced Cell Biology I.

410.636 Biology of HIV and AIDS
This course includes an overview of the biology and life cycle of the immunodeficiency virus, including the simian viruses (SIVs). 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 the global economic impact. Prerequisites: 410.601 Biochemistry; 410.602 Molecular Biology; 410.603 Advanced Cell Biology I.

410.638 Cancer Biology
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. The discussion of various aspects of cancer epidemiology, prevention, and principles of drug action in cancer management is part of the course. Prerequisites: All four core courses.

410.641 Clinical and Molecular Diagnostics
This course covers the 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 and 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.

410.648 Clinical Trial Design and Conduct

Through a case study approach, this course will cover the basic design issues of clinical trials. The design of specific trials will be studied to illustrate the major issues in the design of these studies, such as end point definition, control group selection and eligibility criteria. The course also covers the analysis of these studies, including approaches that are central to clinical trials, such as stratified analysis, adjustment factors and “intention-to-treat” analysis. The analytical techniques will include the analysis of correlated data (i.e. clustered and longitudinal), survival analysis using the proportional hazards (Cox) regression model and linear models. The course will also cover various aspects of statistical computing, including organizing data, data management, and performing analysis using computer software. The ethical reporting of clinical trial results will also be covered with reference to the medical research literature. Prerequisites: 410.651 Clinical Development of Drugs and Biologics; 410.645 Biostatistics (or equivalent).

410.656 Recombinant DNA Laboratory

This laboratory course introduces students to methods for manipulating and analyzing nucleic acids. Students gain extensive hands-on experience with plasmid purification, restriction mapping, ligations, bacterial transformations, gel electrophoresis, as well as 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.

410.652 High Throughput Screening and Automation Laboratory

This course will utilize hands-on instruction in automated bioassay systems for high throughput screening (HTS) 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.

410.800 Independent Research in Biotechnology

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 graduate-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. Prerequisites: All four core courses.

410.801 Biotechnology Thesis

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 up-date of the 410.800 proposal) for review and approval by the faculty advisor and biotechnology program committee one month prior to the beginning of the term. Students must meet the faculty advisor 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 their 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 Re-search Project and 410.645 Biostatistics.

Thesis Guidelines

If students work on sponsored research, the thesis advisor (or sponsoring institution) and the student should sign a letter of agreement on publication rights and authorship before work on the thesis begins.

Research expenses, such as lab supplies, related travel and services essential to the collecting and processing of data, are paid for by the thesis advisor or sponsoring organization. Special costs of thesis production are the student's responsibility, such as typing, art work and duplicating the thesis.

Thesis Format

The student must follow the University’s “Guidelines for the Preparation of Dissertations and Theses,” to ensure thesis acceptance. The guidelines are available at library.jhu.edu/services/cbo/guidelines.html.

Thesis Committee

The thesis committee includes the thesis advisor (mentor), faculty advisor, and a member of the program committee (or their designate).
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

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
  410.602 Molecular Biology
  410.603 Advanced Cell Biology I
  410.604 Advanced Cell Biology II

> Six elective courses (see course descriptions, must include at least two science electives)

> Course requirements differ for the certificate and concentration programs

For information on exact dates, times, locations, fees and instructors for any semester/term, students should consult the Course Schedule at advanced.jhu.edu. Courses are open only to students who meet enrollment requirements.

Please note: Many of the elective courses require prior completion of core courses. Requests to waive core science courses will only be considered if a GRE subject test score accompanies the written request to the program advisor.

FELLOWSHIP PROGRAMS

The Johns Hopkins University (JHU) Advanced Biotechnology Studies Program, with our partners at the Center for Cancer Research/National Cancer Institute (CCR/NCI) and the United States Army Medical Research Institute of Infectious Diseases (USAMRIID) have developed two innovative graduate fellowships that prepare the next generation of scientists in the emerging fields of drug discovery and biodefense. These fellowships in Molecular Targets and Drug Discovery Technologies and Biodefense fully integrate the didactic training and hands-on laboratory experience required for graduates to contribute to the advancement of knowledge and research in these fields. Fellows earn an MS in Biotechnology with a concentration in Molecular Targets and Drug Discovery Technologies or Biodefense, participate in important basic and applied research, work in CCR/NCI or USAMRIID laboratories, 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 one of the fellowship programs.

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

Fellowship

> One course in probability and statistics or biostatistics
> Graduate of an accredited university/college
> A US citizen or permanent resident

For information about concentration requirements, see Concentration in Biodefense or Concentration in Molecular...
**MS IN BIOTECHNOLOGY DEGREE 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. The Molecular Targets and Drug Discovery Technologies Concentration is 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.

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

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<td>410.601</td>
<td>Biochemistry</td>
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<td>410.602</td>
<td>Molecular Biology</td>
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<td>410.603</td>
<td>Advanced Cell Biology I</td>
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<td>410.633</td>
<td>Introduction to Bioinformatics</td>
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<tr>
<td>410.692</td>
<td>Biological and Chemical Response and Forensics</td>
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<tr>
<td>410.693</td>
<td>Science, Medicine and Policy in Biodefense</td>
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<td>One Laboratory Course (410.652, 410.656, 410.657, 410.658, 410.659, 410.660, 410.731 or 410.752)</td>
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**Biodefense Electives**
*Choose three*

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<td>Principles of Immunology</td>
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<td>410.621</td>
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<td>Infectious Diseases</td>
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<td>Emerging Infectious Diseases</td>
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<td>Biology of HIV and AIDS</td>
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<td>Molecular Phylogenetic Techniques</td>
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<td>Recombinant DNA Laboratory</td>
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<td>Biodefense and Infectious Disease Laboratory</td>
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<td>410.659</td>
<td>Advanced Recombinant DNA Laboratory</td>
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<td>410.660</td>
<td>Immunological Techniques in Biotechnology</td>
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<td>Epidemiology</td>
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<td>Genomic Sequencing and Analysis</td>
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<td>410.667</td>
<td>Theory and Application of Immunoassays</td>
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<td>410.669</td>
<td>Immunology of Infectious Diseases</td>
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<td>Crisis Management</td>
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<td>Microarrays and Analysis</td>
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<td>410.696</td>
<td>Bioassay Development</td>
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**MS in Biotechnology, Concentration in Biodefense/National Security Studies (NSS) Certificate**

Students pursuing a biodefense concentration with an interest in national security policy can obtain an additional credential by completing three additional courses offered by the National Security Studies Certificate Program in AAP. This combined credential will provide professionals with the policy language of national security along with the scientific expertise garnered through the MS in Biotechnology with a biodefense concentration. This combined credential will require students to complete 13 courses.

**NSS Certificate requirements**

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<th>Course Code</th>
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<tr>
<td>406.661</td>
<td>Preserving American Security in a Dangerous World</td>
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<td>470.606</td>
<td>American National Security in the 21st Century</td>
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**Two electives from the NSS electives list below:**

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<th>Course Code</th>
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<tr>
<td>406.662</td>
<td>Threats to America's National Security: Theory and History</td>
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<td>406.665</td>
<td>The Art and Practice of Intelligence</td>
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<td>406.666</td>
<td>Contemporary Terrorism and the American Response</td>
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<td>406.669</td>
<td>Homeland Security: Threats, Challenges and Solutions</td>
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<td>406.670</td>
<td>Crisis Management</td>
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<td>406.671</td>
<td>Congress and Homeland Security</td>
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<td>406.693</td>
<td>Constitutional Issues in National Security</td>
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<td>470.634</td>
<td>Foreign Policy in the Age of Global Terrorism</td>
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<tr>
<td>470.635</td>
<td>Executive Politics and Policymaking</td>
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<tr>
<td>470.663</td>
<td>Administering Homeland Security</td>
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**Concentration in Bioinformatics**

Given the vast amounts 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
- 410.634 Practical Computer Concepts for Bioinformatics
- 410.635 Bioinformatics: Tools for Genome Analysis
- 410.639 Protein Bioinformatics
- 410.640 Molecular Phylogenetic Techniques
- 410.645 Biostatistics
- 410.661 Methods in Proteomics
- 410.666 Next Generation DNA Sequencing and Analysis
- 410.671 Microarrays and Analysis
- 410.698 Bioperl
- 410.712 Advanced Practical Concepts for Bioinformatics
- 410.713 Advanced Genomics and Genetic Analysis
- 410.736 Genomic and Personalized Medicine

### 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
- 410.627 Translational Biotechnology: From Intellectual Property to Licensing*
- 410.637 Bioethics
- 410.642 Economic Dynamics of Change in Biotechnology
- 410.644 Marketing Aspects of Biotechnology Enterprise
- 410.645 Biostatistics
- 410.646 Creating a Biotechnology Enterprise
- 410.647 Research Ethics
- 410.649 Introduction to Regulatory Affairs
- 410.650 Legal Aspects of Biotechnology
- 410.651 Clinical Development of Drugs and Biologics*
- 410.665 Bioscience Communication
- 410.678 Marketing in a Regulated Environment
- 410.680 Managerial Finance for Biotechnology
- 410.681 Commercializing Biotechnology
- 410.684 Technology Transfer and Commercialization
- 410.685 Emerging Issues in Biotechnology
- 410.687 Ethical, Legal, and Regulatory Aspects of Biotechnology Enterprise
- 410.688 Project Management
- 410.689 Leading Change in Biotechnology
- 410.703 Strategic Planning for the Biotechnology Enterprise
- 410.704 Social Entrepreneurship in Bioscience
- 410.728 Managing Innovation in the Life Sciences
- 410.729 Regulatory and Economic Fundamentals of Drug Pricing and Reimbursement
- 410.732 Funding a New Venture

* Also counts as science elective.

### 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
- 410.696 Bioassay Development
- 410.750 Molecular Targets and Cancer
- 410.751 Chemical Libraries and Diversity
- 410.752 High Throughput Screening and Automation Laboratory

### Elective Courses
(contact advisor for course selection)
Two required
- 410.633 Introduction to Bioinformatics
- 410.639 Protein Bioinformatics
- 410.671 Microarrays and Analysis
- 410.678 Microfluidics and Biosensors
- 410.679 Cell Culture Techniques
- 410.683 Current Topics in Molecular and Cellular Biology
- 410.685 Biostatistics

### Concentration in Bioscience Regulatory Affairs
Developed in consultation with representatives from the Food and Drug Administration (FDA), the Regulatory Affairs Professional Society (RAPS) 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 Science Concentration Courses
Choose four
- 410.606 Clinical Trial Management
- 410.627 Translational Biotechnology: From Intellectual Property to Licensing
- 410.648 Clinical Trial Design and Conduct
The Johns Hopkins University (JHU) Advanced Biotechnology Studies Program 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 from academia, the private sector and the government.

You may complete the degree requirements completely online for the Master of Science in Biotechnology, Bioinformatics or Regulatory Science, the Master’s in Biotechnology Enterprise and Entrepreneurship, and the Certificate in Biotechnology Enterprise. (Note that not all concentrations for the MS in Biotechnology can be completed online.)
COURSE DESCRIPTIONS

410.302 Bioorganic Chemistry
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 towards requirements for the master's degree in biotechnology. Prerequisite: Two semesters of college chemistry.

410.303 Foundations of Bioscience
Formerly Bioscience for Enterprise and Regulatory Affairs
This course examines the fundamental underlying scientific concepts utilized in the creation and development of biotechnological 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 towards requirements for the master's degree in biotechnology or regulatory science, and is required as a prerequisite course for some students entering the Master of Science in Regulatory Science or the Masters in Biotechnology Enterprise and Entrepreneurship.

Core Science Courses
Students must complete four core courses before they are allowed to enroll in most of the science electives. A student who has mastered some or all of the material covered in the core courses in previous academic work may request that one or more of these courses be waived. After reviewing the student's request, the program committee may approve a waiver. The student then is required to replace the waived core course(s) with science electives. Electives should be chosen in consultation with the student's advisor and should accommodate individual career goals.

410.601 Biochemistry
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
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
This course covers cell organization and subcellular structure. Students examine the evolution of the cell, chromosome and plasma membrane structures and behaviors, mechanics of cell division, sites of macromolecular synthesis and processing, transport across cell membranes, cell dynamics, organelle biogenesis and cell specialization. Students also are introduced to the experimental techniques used in cell biology to study cell growth, manipulation and evaluation.

410.604 Advanced Cell Biology II
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.

Science Elective Courses
Please note that many of the elective courses require prior completion of most core courses.

410.610 Epigenetics & Gene Organization and Expression
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
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
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 (oligonucleotide 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
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, autoimmune disease, and vaccination. Prerequisites: 410.601 Biochemistry; 410.602 Molecular Biology; 410.603 Advanced Cell Biology I.

410.614 Pathogenic Bacteriology
Lecture and discussion augmented by guided readings on pathogenic bacteria, with special attention to microorganisms that cause human disease. The course is designed to impart to the student an appreciation as well as 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
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 measures. Prerequisites: 410.601 Biochemistry; 410.602 Molecular Biology; 410.603 Advanced Cell Biology I.

410.616 Virology
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, viroids, 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, virion structure, virus cycle, pathogenesis, clinical features, epidemiology, immunity and control. The viral vectors and their applications in biotechnology are discussed. Prerequisites: 410.601 Biochemistry; 410.602 Molecular Biology; 410.603 Advanced Cell Biology I.

410.617 Marine Biotechnology
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 the discovery of drugs and enzymes from marine microbes and macro organisms, 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.

410.618 Parasitology
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.

410.619 Molecular Evolution and Phylogenetics
This course covers the principles of molecular evolution and phylogenetics. Topics include patterns and analyses of DNA polymorphism, genetic evolutionary trees, molecular clocks, the evolution of multigene families, gene duplication and shuffling, transposition and horizontal gene transfer, gene number and genome size, organellar and nuclear genetic markers, genetic mutation and selection, genes in populations, viral evolution, human evolution, and the theoretical background for molecular phylogenetics. Examples of each concept will be drawn from the scientific literature in epidemiology and human or animal genetics. Prerequisites: 410.601 Biochemistry; 410.602 Molecular Biology.

410.620 Advanced Topics in Immunology
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, THF), dendritic cells, negative and positive costimulation, viral immunity including HIV, 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 predominantly used in science papers such as flow cytometry, confocal microscopy, gene arrays, ELISAs, western blots, carbon cycling and genomics of marine organisms.

**Biotechnology Studies**
also study metabolic physiology in the context of exercise and respiratory, digestive, renal and reproductive systems, as well will learn the structure and function of the cardiovascular, by the central nervous and endocrine systems. Students involves the study of organ systems and how they are regulated

This course is the second half of the Physiology sequence and

410.624 System and Integrative Physiology
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 cardiovasculare, 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 the functioning of many of these systems. 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
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, 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 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I

410.622 Molecular Basis of Pharmacology
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 and Cellular Physiology
Students in this course gain an understanding of how the 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, there 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-busting hormone. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I.

410.625 Industrial Microbiology
This course covers the principles of various processes associated 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 (cGMP). Emphasis is on large-scale production methods and production of recombinant proteins for diagnostic and clinical applications. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.603 Advanced Cell Biology I.

410.626 Molecular Development
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
This course provides an extensive overview of a process for development of a pharmaceutical by a biotechnology 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 (FDA). Students learn to appreciate the importance of quality control and assurance, good manufacturing practices, preclinical and clinical testing, and the lengthy regulatory processes which 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. Prerequisite: 410.303 Foundations of Bioscience, or 410.601 Biochemistry and 410.603 Advanced Cell Biology; or admission to the MS in Bioscience Regulatory Science, or admission to the Masters in Biotechnology Enterprise and Entrepreneurship.

410.628 Neurobiology
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 neurological and neurodegenerative diseases such as multiple sclerosis, amyotrophic lateral sclerosis, Parkinson’s, and Alzheimer’s. Prerequisites: All four core courses.

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

410.630 Gene Therapy
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 start-up 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; 410.602 Molecular Biology; 410.603 Advanced Cell Biology I.

410.631 Infectious Diseases
This course focuses on the 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 of pathogenesis and epidemiology will be covered. More cursory 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 on an ongoing basis. Prerequisites: 410.601 Biochemistry; 410.602 Molecular Biology; 410.603 Advanced Cell Biology I.

410.632 Emerging Infectious Diseases
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 the 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; 410.602 Molecular Biology; 410.603 Advanced Cell Biology I.

410.633 Introduction to Bioinformatics
Retrieval and analysis of electronic information are essential in 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
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 Perl 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
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.

410.636 Biology of HIV and AIDS
This course includes an overview of the biology and life cycle of the immunodeficiency virus, including the simian viruses (SIVs). 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 I.
410.638 Cancer Biology
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 the 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
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 and statistical verification. Also covered are graphic visualization of 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
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 ration-ale 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 and Molecular Diagnostics
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 and 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
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 the statistical design of experimental trials for biological products/devices. Prerequisites: Basic mathematics (algebra); scientific calculator.

410.648 Clinical Trial Design and Conduct
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
This course introduces students to the planning and work required to develop potential new drugs and biologics efficiently. Students gain a thorough appreciation of FDA and ICH regulations and guidelines. Because the course emphasizes the importance of planning before the execution of any of the necessary steps, lectures use a “backwards” approach, discussing the final analysis and report before developing protocols. Topics also include an overview of pre-clinical investigations; NDA/BLA format and content; clinical development plans; product and assay development; the IND; and trial design, implementation and management. Prerequisites: 410.601 Biochemistry; 410.602 Molecular Biology or admission to the MS in Regulatory Science.

410.653 Tissue Engineering
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
This course will review types of ionizing radiation and their differences, physical and chemical interactions of radiation with key biological molecules, 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 US population, and other practical situations involving radiation. Prerequisites: 410.601 Biochemistry; 410.602 Molecular Biology; 410.603 Advanced Cell Biology I.

410.666 Clinical Trial Management
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.

410.667 Theory and Applications of Immunoassays
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), spectrosocopic methods (UV/Vis, fluorescence, CD), analytical ultracentrifugation, microarrays, mass spectrometry, amino acid analysis, sequencing, and methods to measure protein-protein interactions. Prerequisites: 410.601 Biochemistry; 410.602 Molecular Biology.

410.668 Epidemiology: Diseases in Populations
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.

410.669 Current Topics in Molecular and Cellular Biology
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 knock-out 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.

410.670 Next Generation DNA Sequencing and Analysis
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; 410.631 Introduction to Bioinformatics; 410.634 Practical Computer Concepts for Bioinformatics.
410.669 Immunology of Infectious Diseases
Immunology of Infectious Diseases 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 (polio virus), plasmodium parasites (malaria), intestinal protozoa (amoebiasis), trichinella, and candidiasis (thrush) and other opportunistic mycoses. Immunology topics 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
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 treatments. Prerequisites: 410.601 Biochemistry and 410.603 Advanced Cellular Biology I.

410.671 Microarrays and Analysis
This course will focus on the analysis and visualization of microarray data. The general aim is to introduce students to the various techniques and issues involved with analyzing gene expression data and visualize the results using modern statistical scripting software. Topics include detecting and attributing sources of data variability, assessing sample size and power, identifying differentially expressed genes with relevant statistical tests, and controlling for false positive discovery. An introduction to linear and nonlinear dimensionality reduction methods, pattern recognition (clustering), and supervised classification techniques will be covered. Assignments and concepts will make use of real experimental data sets from platforms such as Affymetrix, Agilent, Illumina and custom cDNA. Analysis will be conducted in R using Bioconductor packages, with applications focused on target identification, biomarker discovery, pathogen detection and many others. Prerequisites: 410.601 Biochemistry; 410.602 Molecular Biology; 410.645 Biostatistics, and 410.654 Practical Computer Concepts for Bioinformatics or an undergraduate computer programming course.

410.673 Biological Processes in Regulatory Affairs
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 used 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: 410.601 Biochemistry; 410.603 Cell Biology or admission to the MS in Regulatory Science program.

410.692 Biological & Chemical Threat Response and Forensics
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 classic 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, and Policy in Biodefense
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
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: 410.601 Biochemistry; 410.602 Molecular Biology; 410.603 Advanced Cell Biology I.

410.696 Bioassay Development
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 promise 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
Microfluidics (Lab-on-a-chip technology) is the miniaturization of laboratory operations for micro-scale chemistry, high-throughput drug screening, environmental sensors, biotreat 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, analyte 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
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 an 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
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 nanotechnology 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.

410.705 Communication for Health Care Professionals
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. Coursework 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 techniques. 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
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 have become a necessity in 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 a leader and team member. 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
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 feasibly be completed with limited resources.

410.712 Advanced Practical Computer Concepts for Bioinformatics
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 Perl and CGI to create forms that can be acted upon, and
Discussions will also include topics on what defines a angiogenesis targets, integrins and matrix metalloproteinases receptors, the TGF beta signaling pathway, cell cycle check-cancer including receptor tyrosine kinases, G-protein coupled

This course will investigate potential molecular targets in molecular biology and bioinformatics. **Prerequisites:** 410.601 Biochemistry; 410.602 Molecular Biology; 410.634 Practical Computer Concepts for Bioinformatics with a grade of A- or above or permission of program committee.

### 410.713 Advanced Genomics and Genetics Analyses

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 410.671 Microarrays and Analysis, to address analysis of both genetic variation and genomics content using technologies measuring splice variants such as exon arrays, single nucleotide polymorphisms (SNPs) for genome-wide association studies (GWAS), copy number variation (CNV), and transcription factor binding sites. Analysis methods for high throughput sequencing (HTS) technologies are also introduced including: quantitative mRNA content (RNA-Seq) and whole genome assembly methods with de novo and reference-based approaches. **Prerequisites:** Bioinformatics core courses and 410.671 Microarrays and Analysis.

### 410.736 Genomic and Personalized Medicine

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, amongst others. Class discussions will include ethical, legal, regulatory, and economic implications of genomic medicine. Students and faculty 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 and Cancer

This course will investigate potential molecular targets in cancer including receptor tyrosine kinases, G-protein coupled receptors, the TGF beta signaling pathway, cell cycle checkpoints, kinases and phosphatases, chemokine and chemokine receptors, nuclear receptors, suppressor proteins, metastasis and angiogenesis targets, integrins and matrix metalloproteinases. Discussions 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 and Diversity

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 silico 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

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 is-sues, 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.

### 410.777 Biofuels

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 methods 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 to 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 Molecular Biology, 410.603 Cell Biology I.

### 410.800 Independent Research in Biotechnology

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 graduate-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. Prerequisites: All four core courses and four elective courses.

410.801 Biotechnology Thesis (option)
Students wishing to complete a thesis may do so by enrolling 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 advisor and biotechnology program committee one month prior to the beginning of the term. Students must meet the faculty advisor 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 the project to a faculty committee both orally and in writing. The student must follow the university’s “Guidelines for the Preparation of Dissertations and Theses,” to ensure thesis acceptance. The guidelines are available at library.jhu.edu/services/cbo/guidelines.html. Prerequisites: All four core science courses and six elective courses, which must include 410.800 Independent Research Project and 410.645 Biostatistics.

Laboratory Elective Courses
All the following electives are wet lab courses. Students must bring lab coat and safety glasses to all meetings of the course.

410.652 Cell Culture Techniques
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, primary cultures, cultivation of cell lines, detection of contamination, cryopreservation, transfection 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
This laboratory course introduces students to methods for manipulating and analyzing nucleic acids. Students will gain extensive hands-on experience with plasmid purification, DNA quantification, restriction enzyme digestion, mapping, ligations, bacterial transformations, RNA purification, gel electrophoresis, PCR, qPCR, and an introduction to automated DNA technologies. This course is not recommended for students with substantial experience in these methodologies. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology.

410.658 Biodefense and Infectious Disease Laboratory Methods
Formerly 410.658 Biodefense Laboratory Methods
This laboratory course introduces students to the methods and techniques used for biothreat detection, surveillance and identification. Using biosimulants and demonstrations, various biodetection platforms will be discussed and presented, such as point-of-detection devices and methods, laboratory based screening and identification technologies (culture, RT-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 Laboratory
This course is a continuation of Recombinant DNA Laboratory (410.656), 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; quantitative real time PCR (qRT-PCR); cell transfection; electroporation; recombinant protein expression and analysis; and control of gene expression by RNA interference (RNAi). Students will be introduced to high throughput/high content screening procedures such as robotic liquid handling, capillary gel electrophoresis, thermocycler technologies and utilization of bioinformatic tools. Prerequisites: 410.601 Biochemistry, 410.602 Molecular Biology, 410.656 Recombinant DNA Laboratory, or consent of program committee.

410.660 Immunological Techniques in Biotechnology
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 hybridoma 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
This course will provide students with hands-on experience in the 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 will then purify the product after optimizing purification conditions.
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: 410.641 Biochemistry, 410.602 Molecular Biology, 410.603 Cell Biology I.

410.752 High Throughput Screening and Automation Laboratory
This course will utilize hands-on instruction in automated bioassay systems for high throughput screening (HTS) as an entry point to covering pertinent aspects of HTS, such as data manipulation, storage and analysis; liquid handling robotics; micro-titer 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 410.646 Bioassay Development.

Enterprise and Regulatory Science Elective Courses

410.607 Proseminar in Biotechnology
The Biotechnology Proseminar introduces students to the 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 science and enterprise content, methods, and tools of inquiry and analysis.

410.637 Bioethics
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
Governments around the world are beginning a long-term process that reviews and redesigns their 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 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 generic industry. Emphasis will be placed on the application of economics.

410.643 Managing and Leading Biotechnology Professionals
The roles of managers and leaders within biotechnology companies undergo constant change. Biotechnology managers 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 as a competitive advantage. The student is able to address current 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 goal integration. Students research a biotechnology organization and analyze what is working and not working within the management systems and suggest alternatives.

410.644 Marketing Aspects of Biotechnology
This course introduces students to the strategic and tactical approaches used in the marketing of biotechnological products 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
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 a 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 start-up and present the plan to a panel of industry experts and financiers. Leaders from our local bioscience community will be guest lecturers for many of the classes.

410.647 Research Ethics
This course covers the basic ethical notions in the conduct of biomedical research with animals and human subjects which 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
Regulatory affairs (RA) comprise the rules and regulations governing product development and post-approval marketing. In the US, the Food and Drug Administration (FDA) establishes and oversees the applicable regulations under several statutes and partnerships 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 impact 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
This course is an overview of the major legal principles that arise to protect and market biotechnological inventions and of the procedures required as a biotech company is established, evolves and brings products to market. The course will cover legal concepts and explore the interrelationship between business and legal challenges. The student is able to analyze business situations and identify potential legal risks. Students that have taken 410.687 Ethical, Legal, and Regulatory Aspects of the Biotechnology Enterprise will benefit from this course as they will be conducting an in-depth analysis of contracts and various statutes and court decisions that impact the biotechnology industry.

410.665 Bioscience Communication
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; they hone their expertise at making both formal and informal oral presentations; they prepare poster presentations and develop their own public speaking strategies. The course also presents personal strategies for improving daily communications, cross-cultural communications and non-verbal 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
The 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 United States; however, the strategy requires careful planning and interaction with the US 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 US will be compared and discussed. Students will explore the European Union (EU) 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 General Agreement on Tariffs and Trade (GATT).

410.676 Food and Drug Law
The Food, Drug, and Cosmetic Act (FD&C Act) governs the regulatory approval process for bringing a drug, biologic, medical device, food or cosmetic to market. The class will discuss the 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
The federal Food, Drug and Cosmetic Act (FD&C Act) requires that a drug be the subject of an approved marketing application before it is transported or distributed across state lines. Because a sponsor will likely enter interstate commerce in the preparation or study of the investigational drug, it must seek an exemption from that legal requirement. The Investigational New Drug Application, or IND, is the means by which a sponsor obtains this exemption from the FDA. The New Drug Application, or NDA, is the application which, when approved by the FDA, provides the legal basis for marketing a new drug product. Beginning with the IND and moving through the NDA this course provides a comprehensive review and discussion of the IND and NDA, and all related submissions required for life cycle maintenance of these applications.

410.678 Marketing in a Regulated Environment
This course is designed to help students understand, use and comply with the laws, regulations, and policy guidance documents governing advertising and promotion of products regulated by FDA. The course provides an overview of the regulations, discussion of the FDA’s advertising oversight and FDA enforcement activities. The course content introduces students to advertising approved products. It provides insights on comparing competitor products, the need for head-to-head comparative data, dietary supplements, Rx products, OTC products, unapproved investigational products and unapproved research products. The course also covers the different regulations from FDA, FTC and CPSC. Labeling requirements, DoT, OSHA, and other international advertising activities are also covered.

410.679 Practicum in Regulatory Science
This integrative case-based course will focus on applying knowledge gained from previous courses in the MS in Regulatory Science program to actual cases from the US FDA. For each case, students will assume the role of either a regulatory specialist, an FDA reviewer or senior-level policymaker, 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 that this course is only open to students in the MS in Regulatory Science and should only be taken after all required courses are completed.

410.680 Managerial Finance for Biotechnology
The management of money is a key ingredient for the success of any enterprise, and even more so for the entrepreneur seeking to achieve both translation of an idea to a product while concurrently making money for the investors. Students will become aware of the challenges business leaders are faced with during each milestone of a company’s development. In this course we begin with the basics of money management such that the student will learn the correct vocabulary and understand the important concepts when speaking to potential investors. Students will analyze a term sheet, a contract and a balance sheet. Important topics include understanding the concepts of risk and the time value of money. Students will study real world biotechnology issues, mergers and acquisitions to enhance the value of the course.

410.681 Commercializing Biotechnology
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
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 the 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
Current Good Manufacturing Practice regulations are the minimum standards for the design, production, and distribution of drugs, biologics, and medical devices in the US and internationally. In the US, they are codified at the federal level, in the FD&C Act and the CFR, and actively enforced by the FDA. These regulations, however, only begin to describe the practices used in the pharmaceutical and biotech industries. Additional sources of insight and guidance include 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 and Commercialization
This course is an introduction to the multidisciplinary aspects involved in the process of bringing technical developments, particularly research emanating from universities and other nonprofit organizations, into commercial use. The course will provide an overview of the key policies, concepts, tools, issues, practices and trends that are shaping the technology transfer field, with an emphasis on the life sciences sector.

410.685 Emerging Issues in Biotechnology
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 foods, the impact of recombinant therapeutics on the pharmaceutical 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 QA/QC for the Pharmaceutical and Biotechnology Industries
Many new quality initiatives for drugs, biotech products and medical devices recently have been introduced. These include risk-based, science-based and systems-based assessments. Students will be presented with a comprehensive overview of the current best practices in quality assurance and quality control. Students will also be exposed to the most recent theories and expectations from the FDA.

410.687 Ethical, Legal, and Regulatory Aspects of the Biotechnology Enterprise
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.

410.690 Technical Writing in a Regulated Environment
In this practical course, students will learn both the basic concepts and the steps involved in writing documents and reports commonly associated with compliance and regulatory requirements, in the biotech and pharmaceutical industries. Through course lectures and interactive exercises, students will learn how to write and revise clear, instructive and readable regulatory documents, policies and reports. This course will cover what to write, how to write, and why documents should be written in certain terms to assure successful communication, as well as compliance in a regulated environment.

410.691 Drugs, Medical Devices, and Government
In bringing a food, drug or medical device to market, Patent Office and FDA activities will come into play. The course will explore the administrative roles of each agency and those instances where an intersection or overlap of activities of the agencies occurs. For example, the patentability requirements of utility and enablement of therapeutic methods can depend on the onset of clinical trials. A major nexus occurs in the regulatory approval of a generic form of a patented ethical or “name brand” drug. The patent holder can have the term of the patent extended as compensation for the often prolonged time to obtain regulatory approval. Thus, the patent term is extended beyond the 17-year or 20-year term. Conversely, the generic manufacturer can enter the regulatory process before the patent term expires. Thus, the generic manufacturer legally can make and use the patented invention of another. That is an excused infringement. The earliest generic manufacturer that files an ANDA also may be granted a monopoly period for exclusive sale. The practical aspects associated with the interplay of those two activities will be explored as will the ethical and policy issues raised by the two activities.

410.701 Introduction to Food Safety
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 US Department of Agriculture (USDA) have primary responsibility for the 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 (GM) and the protection of the food supply will provide an in-depth analysis of food regulation in the US. The FDA and USDA regulate the safe practice and delivery 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 the FDA and USDA’s 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 towards food safety, security, genetic modifications, dietary supplements and food labeling etc. Students will have the option to design projects to propose effective food safety net that can assist in the supply chain of our nation’s food safety and security.

410.702 Biomedical Software Regulation
Software continually grows more complex and is becoming relied upon by health care professionals in the treatment of patients. This course describes how the US government regulates software used in delivering health care including the regulations utilized by the FDA, as well as, the Center for Medicare and Medicaid Services (CMS). 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 recordkeeping and software used in clinical trials, laboratory information management systems (LIMS), and Health Insurance Portability and Accountability Act (HIPAA) privacy rules and security standards.

410.703 Strategic Planning for the Biotechnology Enterprise
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 to manage business risks. Best practices in strategic planning and managing the planning process also are provided.

410.704 Social Entrepreneurship in Bioscience
This course will explore how biotechnology innovators are solving social issues. Because of the dynamic nature of social entrepreneurship, this course will vary by semester. Topics may include 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 the 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.

410.715 Medical Device Regulation
This course provides a comprehensive introduction into medical devices and how they are regulated by the US FDA. Topics that will be covered include: (1) an overview of the laws and regulations that govern medical devices; (2) the FDA’s organizational structure and responsibilities for medical device
410.727 Regulatory Strategies in Biopharmaceuticals
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 the different regulatory strategies that several players of the US 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 biosimilars. 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
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 the available capital resources: financial capital, human capital, intellectual capital and physical capital. They should manage those resources to gain leverage and maximize the 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, and 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.

410.729 Regulatory and Economic Fundamentals of Drug Pricing and Reimbursement
The US government is now the single largest purchaser of drugs in the world. As the realities of the economic crisis and long-term health care reform take root, pricing of pharmaceutical products and the reimbursement regulations that attach to drugs will shape research and development for years to come. As regulatory hurdles continue to climb, the burden of proof will increasingly continue to be on the pharmaceutical industry to prove the value of an individual pharmaceutical product. This course will examine the elements of pharmaceutical pricing and reimbursement to better understand accepted drug pricing models, and how both government and industry look at drug pricing and reimbursement. This will include cost-efficiency modeling of the drug development and manufacturing process, therapeutic cost utility and cost benefit analysis, US and international pharmaceutical product registration, accepted methods for valuing pharmaceuticals, macro- and microeconomic analysis and drug development decision modeling as part of a framework for health care economic evaluation, and the political and ethical underpinnings of health care reform as it reflects on the need for government and society to define the fundaments of drug pricing and reimbursement. The goal will be to provide the framework for the pharmaceutical industry professional to better understand the regulatory and economic fundamentals of drug pricing and reimbursement.

410.732 Funding a New Venture
This course is designed to introduce students to the new venture creation, concept pitching and company funding processes from a venture capital perspective. Students will learn how to take a new idea, technology or business model and evaluate its merits for forming a new biotech venture. Students will also engage in projects and real world experiences to learn how to develop a business plan for presentation to potential investors. The class will also utilize case studies and guest speakers to provide insight into how entrepreneurs successfully pitch their ventures to investors to obtain funding for building new companies.

410.756 Grants and Federal Funding for Biotechnology Enterprises
This course is designed to help students working for life science 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.

410.802 Independent Studies in Regulatory Science
Students in the regulatory science program have the opportunity to enroll in an independent study course. This elective course is an option after a student has completed at
least five graduate-level 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 teaching in the regulatory science program, 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 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. Please note that 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 five courses have been completed.

410.803 Bioscience Regulatory Affairs Thesis

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 advisor and biotechnology program committee one month prior to the beginning of the term. Students must meet the faculty advisor periodically for discussion of the project’s progress. Graduation with a thesis is subject to approval by the thesis committee and program mentor, and requires the student to present their 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 and Entrepreneurship

This course synthesizes the knowledge and skills acquired in the Masters in 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 start-up or a nonprofit organization. This course is only open to students completing the Masters in Biotechnology Enterprise and Entrepreneurship program.

410.805 Practicum in Project Management

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 start-up or a nonprofit organization. This course is only open to students completing the Certificate in Biotechnology Enterprise, Project Management Focus.

410.806 Independent Studies in Biotechnology Enterprise and Entrepreneurship

Open only to students in the MBEE program. The independent studies in biotechnology enterprise and entrepreneurship provides students an opportunity to apply knowledge gained from previous courses in a real world situation. Prior to proposing a project, interested students must have identified a study topic, and a mentor (or work with the program committee to identify a project 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 project can be at your work but must be outside your normal course of duties. The mentor may be a faculty member teaching in the enterprise 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 enterprise and entrepreneurship 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. The student will work with the instructor on a proposal that does not duplicate other course work. The student will work independently on a project such as forming a new business venture or commercializing a product. A written business plan and oral presentation are required course work. Please note this course is only open to students in the MBEE and should only be taken after all required courses are completed.
Master of Science in Biotechnology/MBA
Dual Degree Program with the Carey Business School

biotechnology.jhu.edu

Johns Hopkins University (JHU) 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. Students receive two diplomas: one from the Krieger School of Arts and Sciences and one from the Carey Business School. Students may count 3 courses from their MS program toward the Carey 54-credit Professional MBA program and, as a result, complete the MBA with 42 credits of Carey courses.

For more information on the dual degree program at JHU, visit the website at biotechnology.jhu.edu or call 202.452.1940.

Applicants must meet the following criteria to be considered, and should review the admissions requirements for the specific biotechnology masters 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
- Non-refundable application fee: $75 US
- 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, 600 on the paper-based test or 100 on the Internet-based test.

Currently, international applicants to the MS in Biotechnology/MBA Program 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 seven or less. Consequently, an F-1 student would not be able to meet their full-time requirements as defined by the US Citizenship and Immigration Services (USCIS) regulations. If an international is interested in obtaining a nonimmigrant visa type other than an F-1 visa, he/she should contact the US embassy in their home country. Students who have visa- or immigration-related questions may contact the International and Disability Services office (IDS) at ids@jhu.edu or 202.452.0983/410.516.1013, option 6.

Course Descriptions
See Master of Science in Biotechnology for Krieger School of Arts and Sciences course descriptions.

Contact businessbiotech@jhu.edu for the Carey Business School course descriptions.
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, (no more than one elective may be a business course) or they may choose a concentration in Bioscience Communications 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.

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 onsite. 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 Food and Drug Administration (FDA).

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

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

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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.

**410.303 Foundations of Bioscience**

Prerequisite: 410.303 Foundations of Bioscience, or 410.601 Biochemistry

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 towards requirements for the master's degree in either biotechnology or regulatory science.

### Required Courses

**410.607 Proseminar in Biotechnology**

The Biotechnology Proseminar introduces students to the 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 enterprise disciplines (science, regulatory affairs, marketing, finance, legal, communications, etc.). It explores how these disciplines can be used as powerful tools to strengthen the biotechnology organization, create effective leadership and productive collaborations within the industry, while improving managerial decision-making. The Proseminar frames and integrates the combined science and enterprise content, methods and tools of inquiry and analysis.

**410.627 Translational Biotechnology: From Intellectual Property to Licensing**

This course provides an extensive overview of a process for the development of a pharmaceutical or biotechnology 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 FDA. Students learn to appreciate the importance of quality control and assurance, good manufacturing practices, preclinical and clinical testing, and the lengthy regulatory processes which 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. Prerequisite: 410.303 Foundations of Bioscience, or 410.601 Biochemistry and 410.603 Advanced Cell Biology or admission to the MS in Bioscience.

**410.643 Managing and Leading Biotechnology Professionals or 410.689 Leading Change in Biotechnology**

The roles of managers and leaders within biotechnology companies undergo constant change. Biotechnology managers 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 as a competitive advantage. The student is able to address current 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 goal integration. Students research a biotechnology organization and analyze what is working and not working within the management systems and suggest alternatives.

**410.644 Marketing Aspects of Biotechnology**

This course introduces students to the strategic and tactical approaches used in the marketing of biotechnological products 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.

**410.680 Managerial Finance for Biotechnology**

The management of money is a key ingredient for the success of any enterprise, and even more so for the entrepreneur seeking to achieve both translation of an idea to a product while concurrently making money for the investors. Students will become aware of the challenges business leaders are faced with during each milestone of a company's development. In this course we begin with the basics of money management, such that the student will learn the correct vocabulary and understand the important concepts when speaking to potential investors. Students will analyze a term sheet, a contract and a balance sheet. Important topics include understanding the concepts of risk and the time value of money. Students will study real world biotechnology issues, mergers and acquisitions to enhance the value of the course.

**410.687 Ethical, Legal and Regulatory Aspects of the Biotechnology Enterprise**

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 the 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.

**410.804 Practicum in Biotechnology Enterprise and Entrepreneurship**

This course synthesizes the knowledge and skills acquired in the Masters in 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 start-up or a nonprofit organization. This course is only open to students completing the Masters in Biotechnology Enterprise and Entrepreneurship program.

**MASTER’S IN BIOTECHNOLOGY ENTERPRISE AND ENTREPRENEURSHIP CONCENTRATIONS (OPTIONAL)**

Students wishing to focus on a specialized discipline within the Master’s in Biotechnology Enterprise and Entrepreneurship Program may enroll in one of two concentrations: Bioscience Communications or MBEE Legal/Regulatory Affairs.

**Concentration in Bioscience Communications**

In addition to the six core courses and practicum, degree candidates must complete any three of these courses to satisfy the Bioscience Communications concentration requirements:

- 410.665 Bioscience Communication
- 410.678 Marketing in a Regulated Environment
- 410.681 Commercializing Biotechnology
- 410.690 Technical Writing in a Regulated Environment

**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
- 410.648 Clinical Trial Design and Conduct
- 410.650 Legal Aspects of Biotechnology
- 410.651 Clinical Development of Drugs and Biologics
- 410.673 Biological Processes
- 410.676 Food and Drug Law
- 410.683 Introduction to CGMP Compliance
- 410.684 Technology Transfer and Commercialization
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 (FDA) current Good Manufacturing Practices (cGMPs) and Quality Systems Regulations (QSRs). 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 a combination of online and 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.

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 onsite.

ADMISSION REQUIREMENTS

- One semester of Biochemistry and Cell Biology at the undergraduate or graduate level
- 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 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.

410.303 Foundations of Bioscience

Prerequisite for provisional students accepted in program who have not previously taken biochemistry or cell biology

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 towards requirements for the master’s degree in either biotechnology or regulatory science.

REQUIRED COURSES

410.627 Translational Biotechnology: From Intellectual Property to Licensing
This course provides an extensive overview of a process for the development of a pharmaceutical by a biotechnology 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 FDA. Students learn to appreciate the importance of quality control and assurance, good manufacturing practices, preclinical and clinical testing, and the lengthy regulatory processes which 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. Prerequisite: 410.303 Foundations of Bioscience, or 410.601 Biochemistry and 410.603 Advanced Cell Biology or admission to the MS in Bioscience Regulatory Science or admission to the Masters in Biotechnology Enterprise and Entrepreneurship.

410.649 Introduction to Regulatory Affairs
Regulatory Affairs (RA) comprises the rules and regulations governing product development and post-approval marketing. Biotechnology products may be classified as drugs, biologics, medical devices or combination products. Each type is regulated by a different center within the FDA. This course provides an overview of RA and its impact on product development. Topics include RA history, regulatory agencies, regulatory information, requirements for submissions and approval, regulated products, compliance with GXP, Quality Systems Regulations, ethics and FDA inspections.

410.651 Clinical Development of Drugs and Biologics
This course introduces students to the planning and work required to develop potential new drugs and biologics efficiently. Students gain a thorough appreciation of FDA and ICH regulations and guidelines. 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.

410.673 Biological Processes in Regulatory Affairs
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 used 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.

410.676 Food and Drug Law
The Food, Drug, and Cosmetic Act (FDCA) governs the regulatory approval process for bringing a drug, biologic, medical device, food or cosmetic to market. The class will discuss the 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 FDCA, as well as other statutes like the Public Health Service Act, which regulates the development and approval of biologics.

410.679 Practicum in Regulatory Science
(Open only to MS in BSRA students and should be taken only after completion of core required courses in program.) This integrative, case-based course will focus on applying knowledge gained from previous courses in the MS Regulatory Science Program to actual cases from the US FDA. For each case, students will assume the role of a regulatory specialist, an FDA reviewer or senior-level policymaker, or other involved stakeholders (such as a consumer group or 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.

410.683 Introduction to cGMP Compliance
There are many sources describing current Good Manufacturing Practice. The fundamentals are published in the Federal FDCA and in 21 Code of Federal Regulations part 211. These regulations, however, only begin to describe the practices required in the pharmaceutical and biotech industries. Additional sources include guidance published by the FDA, EIRs, Form 483s, warning letters and podium comments from FDA speakers. Students will learn the history of the regulations and of the FDA. Students will also learn practical solutions to the regulatory issues faced in the pharmaceutical and biotech industries today.
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 courses 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

410.303 Foundations of Bioscience
410.601 Biochemistry
410.602 Molecular Biology
410.800 Independent Research Project in Biotechnology
(formerly ED410.731 Bioscience Education)

At least one laboratory course

410.652 Cell Culture Techniques
410.656 Recombinant DNA Laboratory
410.658 Biodefense and Infectious Disease Laboratory Methods
410.660 Immunological Techniques in Biotechnology

Students requiring hands-on laboratory skills must enroll in our laboratory courses offered at the Homewood and Montgomery County campuses. Laboratory courses are not offered online.

For course descriptions, see page 49.
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 program in Biotechnology Enterprise.

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

**Pick two to three of the following**

- 410.643 Managing and Leading Biotechnology Professionals
- 410.644 Marketing Aspects of Biotechnology
- 410.680 Managerial Finance for Biotechnology

### Electives

**Pick two to three of the following for a total of five courses**

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

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

For course descriptions, see page 49.

* 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 new 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 onsite.

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
>
> One semester of Molecular Biology or equivalent or 410.602

Required Courses

410.633 Introduction to Bioinformatics
410.634 Practical Computer Concepts for Bioinformatics
410.666 Next Generation Sequencing and Analysis

Elective courses

Choose two

410.635 Bioinformatics Tools for Genomic Analysis
410.639 Protein Bioinformatics
410.640 Molecular Phylogenetic Techniques
410.645 Biostatistics
410.671 Microarrays
410.712 Advanced Practical Computer Concepts
410.713 Advanced Genomics and Genetic Analysis
410.736 Genomics and Personalized Medicine

For course descriptions, see page 49.
Master of Arts in Communication
communication.jhu.edu

The MA in Communication Program helps professionals advance or switch their careers. Although many of our students are already working in communication, 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 so forth in various organizations, such as government agencies, associations, non-profits, and corporations. Students and alumni have access to our exclusive job opportunities listserv and Career Services Center.

Students from anywhere can earn their MA in Communication onsite or online. Those who live in the Washington metropolitan area can attend class at our Washington, DC Center. Most classes take place on weekday evenings, a few occur on Saturday mornings. Our location is within walking distance from the Dupont Circle Metro stop, and reduced rate garage parking is available. In addition, anyone around the globe can take the course online. Admission and course requirements are the same for either option. Students do not have to attend any courses, workshops, seminars, or other events on-site if they choose the online course.

Students have a flexible course schedule and can start and continue their studies during the spring, summer, or fall. They are bound to few course requirements and thus can tailor their coursework to their needs.

DEGREES

Master of Arts in Communication
Ten courses are required to complete the MA in Communication. Full-time students can complete their coursework 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 can 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.

Dual Master in Communication and 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 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 be awarded two separate degrees. Students may complete one degree first and be awarded the diploma before continuing in 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.

Read more about the MA in Communication Program and start an application online at communication.jhu.edu or contact us at 202.663.5776.

APPLICATION

Individuals who wish to apply for the MA in Communication Program must do so through the 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 the 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 prior to enrolling in the MA in Communication 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.
➢ Statement of purpose: Explain why you are interested in earning the MA 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).

PROGRAM COMMITTEE

John Irwin Chair
Memi Miscally Director
Paula Wessiman Assistant Director

Johns Hopkins University  Krieger School of Arts & Sciences | Advanced Academic Programs
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 coursework 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 MA 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 post-secondary 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, if necessary: 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). 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 Visas

Students who have been admitted as degree candidates and who take at least three courses per semester, which is full-time classification, may request certification for an F1 visa. Students for whom this may be a possibility should indicate Yes on their admissions application at the appropriate checkbox regarding initiating the visa process. The Admissions Office of the Advanced Academic Programs will assist in the certification process (aapadmissions@jhu.edu) which the student must complete with the Office of International Student and Scholar Services.

Curriculum

The curriculum of the MA 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 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. They may have to take some courses online and also have the option of following a strategic planning or research track. Note that the orders of the courses in the lists below do not necessarily reflect the order in which students take their courses; students should work with their advisors to determine the best coursework plan.

Students who choose the strategic planning track must take:

> Research and Writing Methods
> At least three core courses from the Informing Practice through Research group or the Applied Research for Communication Professionals group
> Six electives

Students who choose the research track must take:

> Research and Writing Methods
> At least two core courses from the Informing Practice through Research group
> At least one core course from the Applied Research for Communication Professionals group
> Thesis and, if necessary, Thesis Continuation
> Five electives

Required Courses

Strategic planning and research track students must complete Research and Writing Methods during their first semester before enrolling in any core courses. In addition, research track students must take Thesis and if necessary Thesis Continuation during their last semesters. 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.

480.600 Research and Writing Methods
480.860 Thesis
480.888 Thesis Continuation

Core Courses

Core courses fall within the Informing Practice Through Research and Applied Research for Communication Professionals groups. Students must complete Research and Writing Methods before taking core courses. Research
track students must complete their core requirements prior to beginning Thesis. Students who earn a C or below in a core course may not count that course toward core requirements.

Informing Practice through Research Group
480.601 Introduction to the Digital Age
480.602 Changing Behavior through Communication
480.604 Media Effects
480.606 Persuasion

Applied Research for Communication Professionals Group
480.610 Applied Research

Electives
Students may take electives in any of the areas listed below, regardless of concentration. Students may take up to two communication-related courses in other Johns Hopkins University departments, subject to the approval of the program director. Students may take additional core courses as electives.

CONCENTRATIONS

All students earn an MA in Communication. 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 concentration requires at least three courses in an area. A single course cannot count toward two concentrations; students who want to earn two concentrations must take six electives. 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 covers everything from pitching and planning to budgeting and executing a comprehensive communication campaign. Courses include public relations, media relations, crisis communication, and strategic communication program management. Private companies, non-profit organizations, and federal agencies all employ communication strategies and need employees knowledgeable in theory and practice.

480.629 Public Relations in the Age of Digital Influence
480.631 Effective Web Design and Strategy
480.634 Publishing and Journalism in the Digital Age
480.635 Communication.org: Not-for-Profits in the Digital Age
480.637 Using Social and Digital Media
480.642 CSR Strategies
480.643 Branding and Advertising
480.653 Communicating for Social Change
480.654 Strategic Communication Program Management

480.657 Introduction to Public Relations
480.658 Public Relations Writing
480.659 Crisis Communication
480.660 Media Relations
480.661 International Public Relations and Public Diplomacy
480.662 Opinion Writing
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
480.678 Spokesperson Development and Training

Political Communication
The concentration in political communication addresses issues from campaign strategies to running a press office to influencing public policy. Courses include public policy advocacy, campaign communication, crisis communication, and speech writing. Whether people are governing, running for office, or pushing for policy change, communication lies at the heart of politics.

480.623 Political Communication Campaigns
480.624 Press Secretary: Theory and Practice
480.625 Rise of Communications Technologies
480.631 Effective Web Design and Strategy
480.632 Digital Political Strategy
480.637 Using Social and Digital Media
480.658 Public Relations Writing
480.659 Crisis Communication
480.661 International Public Relations and Public Diplomacy
480.662 Opinion Writing
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
480.672 Polling for Strategic Communication
480.675 Public Policy Management and Advocacy
480.677 Grassroots Communication
480.678 Spokesperson Development and Training

Health Communication
The concentration in health communication considers 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. Courses include social marketing, health psychology, emergency and risk communication, and developing and evaluating communication campaigns. Health communication professionals must develop, deliver, and evaluate modern health communication programs. This concentration explores what has been done, what works, and why.

480.653 Communicating for Social Change
480.654 Strategic Communication Program Management
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. Courses include effective web design and strategy, public relations in the digital age, using digital and social media, and devising a digital strategy for a non-profit organization.

Digital communication tools are an important part of the modern communication workplace.

Corporate and Non-Profit Communication
The concentration in corporate and non-profit communication examines all of the important components of communication in an organizational context. Students study how managers communicate with staff, how businesses and non-profits communicate with the media, and how advertisers and marketers persuade potential consumers and donors. Courses include branding and advertising, integrated marketing communication, corporate social responsibility strategies and managerial communication. Successful organizations have solid internal and external communication strategies.

Required Courses

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>480.600</td>
<td>Research and Writing Methods</td>
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<td></td>
<td>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 experiments 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.</td>
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<td>480.630</td>
<td>Multimedia Authoring</td>
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<td>480.631</td>
<td>Effective Web Design and Strategy</td>
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<td>480.632</td>
<td>Digital Political Strategy</td>
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<td>480.633</td>
<td>Interactive Marketing/Advertising</td>
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<td>480.634</td>
<td>Publishing and Journalism in the Digital Age</td>
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<td>480.643</td>
<td>Branding and Advertising</td>
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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: Research and Writing Methods

480.602 Changing Behavior through Communication
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: Research and Writing Methods

480.604 Media Effects
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: Research and Writing Methods

480.606 Persuasion
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: Research and Writing Methods

480.610 Applied Research
Communication employers require not only researchers but also practitioners to conduct primary research that guides planning and refinement. For example, professionals need to understand target audience perceptions and information-seeking habits, audit news media messages, obtain reactions to advertisements, and test the effectiveness of a campaign in order to develop and refine strategies, materials, and media plans. By the start of the course, students must identify a problem and develop research questions that will yield findings that will guide the formulation of solutions. They also must choose a research pathway and method. Those on the qualitative pathway may pilot one of the following methods: the qualitative content analysis, in-depth interviews, focus groups or case study. Students on the quantitative pathway may use one of the following methods: the quantitative content analysis, survey or experiment. Throughout the course, students must design, implement, and analyze the data from their study. They also write a report with their research questions, method and results. Students on the qualitative pathway will need Google+ Hangout and possibly Screencast-O-Matic, and students on the quantitative pathway will need Excel with the Data Analysis ToolPak and possibly SurveyMonkey, which may require a nominal fee. It is recommended that if students plan to complete a thesis, they take this course the semester before enrolling in Thesis. Prerequisite: Research and Writing Methods

Elective Courses

480.605 Organizational Communication
This course explores the complexities and strategies of internal and external communication in public, private, and non-profit organizations. As a leadership tool, communication serves a political, informational, symbolic and influential function. Organizational theory and research are core components of this course. Specifically, this course equips students to critique and develop the fundamentals of: vision and mission statements, strategic plans, white papers, annual reports, crisis communication, and marketing and promotional communication.

480.623 Political Communication Campaigns
This course will cover the final few months of the 2012 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 advisor or communication director, and the news media professionals who cover them.
480.624 Press Secretary: Theory and Practice
This class focuses on the skills required to be a press secretary and communication advisor working both inside and outside of government. It examines the roles, duties and responsibilities of press secretaries in a variety of settings: working for members of Congress, federal agencies, the White House, industry associations, non-profits, advocacy organizations and political campaigns. It provides insight from journalists — the immediate audience for much of a press secretary’s efforts — about effective techniques. Students create a variety of materials and deal with typical situations that a press secretary faces in the course of a day. By the end of the course, students will be able to draft and distribute materials such as press releases, op-ed pieces, “talking points,” press strategy memos, and how to plan a press conference.

480.629 Public Relations in the Age of Digital Influence
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
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
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
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/Advertising
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 and Publishing in the Digital Age
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
Students examine the primary reasons non-profit 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 non-profit communicators can capitalize on these trends for the benefit of their organizations. Finally, they will devise practical solutions to one or more of a non-profit “client’s” challenges, using one or more of a wide variety of communication tools offered in the current media landscape.
480.637 Using Social and Digital Media
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 is 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.

480.642 Corporate Social Responsibility Strategies
The Corporate Social Responsibility (CSR) 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
Branding and advertising are major components of any business or non-profit 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 time-lines, research and purchase visual imagery, and how to determine appropriate media for particular branding and advertising campaigns.

480.646 Managerial Communication
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?

480.653 Communicating for Social Change
This course is what Social Marketing is all about – using techniques and proven theory from the field of Marketing to address social issues mainly through attempting to change behavior in ways that benefit an individual, community or society. Students in this skills-based course will study and work in teams to apply the health communications step-by-step model to create a Social Marketing Campaign for a real world situation.

480.654 Strategic Communication Program Management
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.

480.655 Introduction to Public Relations
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
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
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 Media Relations
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.

480.661 International Public Relations and Public Diplomacy
In today’s global world, reaching international audiences is a key function of U.S. government-funded public diplomacy programs, corporate public relations, and non-governmental 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
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 policy makers 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
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 tool kit 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
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, as well as 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.

480.666 Understanding Markets and Audiences
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 and Risk Communication
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 environment. In this course, students become familiar with the core principles of emergency and risk communications and risk perception and have an opportunity to apply strategic
Communication approaches to real-world risk scenarios. Students learn to apply strategic communication approaches used in emergency preparedness, environmental health, food security, national security and financial security.

480.670 Law for Communication Professionals
Communication professionals encounter the law in many ways. They need to know what they can put on a website, 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
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
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 and Advocacy
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 audiences 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 Grassroots Communication
Grassroots communication is critical for candidates and for causes. This course explores how grassroots 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 grassroots 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 grassroots political organizing is immense.

480.678 Spokesperson Development and Training
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 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.

480.681 Developing and Evaluating Health Communication Campaigns
This course prepares health communication professionals to lead the planning, implementation and refinement of communication campaigns that affect individual-level behavior change and thus address public health problems. Throughout the semester, students practice the various stages of a health communication campaign based on real world conditions. They draw from health behavior theory; formative (including pretesting), process, impact, and outcome research; and expert opinion.

480.682 Health Psychology and Behavior Change
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.

480.686 Behavior Change and Education through Entertainment
This course explores the various ways communication professionals can use entertainment to educate people and encourage them to adopt and enjoy improved life styles. 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
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.
Master of Science in Energy Policy and Climate

The MS in Energy Policy and Climate Program will prepare the next generation of interdisciplinary professionals to address the challenges of climate change and sustainable energy systems.

Graduates will be able to demonstrate an understanding of the science related to a changing climate, the impacts of 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.

This program is housed in the Morton K. Blaustein Department of Earth and Planetary Sciences of the Krieger School of Arts and Sciences. Oversight by the eminent faculty of this department sustains the academic integrity and excellence of the program. 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 US response to climate change, as well as a familiarity with multilateral agreements and non-US based approaches to both mitigation 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 lead to comprehension of projected future climate changes and their impacts.
- Knowledge of the impacts of 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.
- Business and management skills for designing and implementing carbon-constraint policies and carbon offset structures.
- Understanding of policy options being considered at the local, state and national level, including both regulatory and market-based approaches, for addressing long-term climate change.
- Knowledge of multilateral agreements and non-US based approaches to both mitigation and adaptation to climate change.

**PROGRAM COMMITTEE**

**John J. Boland**
Program Chair, Environmental Sciences and Policy

**David Elbert**
Acting Program Director, Environmental Sciences and Policy

**Wil Burns**
Associate Director, Master of Science in Energy Policy and Climate

**Tom Haine**
Morton K. Blaustein Chair and Professor of Earth & Planetary Sciences

**Benjamin F. Hobbs**
Theodore M. and Kay W. Schad, Professor in Environmental Management

**Michael Mehling**
President, Ecologic Institute, Washington, DC

**Cindy Parker**
Director, Global Environmental Change and Sustainability Major, Department of Earth and Planetary Sciences

**Darryn Waugh**
Professor, Earth & 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.
> Two semesters of undergraduate chemistry, and
> It is highly desirable, but not required, that applicants have taken one semester of undergraduate microeconomics.

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, or;
2. Take 420.301 Quantitative Methods for Environmental Sciences; or
3. Pass a math placement test, administered by the admissions staff.

Students who are admitted provisionally due to lack of training in chemistry have the option to:
1. Take two semesters of general chemistry at an accredited college or university; or
2. Take 420.302 Chemistry of Natural Processes.

Admissions Documents

> AAP application and fee
> A current résumé
> A statement of purpose (500 words)
> Two letters of recommendation, preferably including one academic reference
> Official undergraduate and graduate transcripts

Admission Requirements Exceptions

If you do not meet all the required criteria for admissions, you may still be admitted to the program and are encouraged to apply. Admission in these cases is determined on a case-by-case basis. Some candidates may also be granted provisional status.

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 in the course descriptions section), may choose to take a mathematics assessment test. If successfully passed, provisional students will place out of the prerequisite.

This test is administered on the Baltimore campus and at the Washington, DC Center 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 Admissions Office in Washington at 202.452.1940.

COURSE REQUIREMENTS

Conditional prerequisite courses

Provisional students who have not fulfilled one or more of the required courses for admission are required to complete one or more of the following prerequisites:

420.301 Quantitative Methods for Environmental Sciences

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

Provisional students may also fulfill this prerequisite by taking two semesters of general chemistry at an accredited university. Provisional students should discuss these options with their advisor.

MS in Energy Policy and Climate

> Four core courses
> Five electives
> Capstone project

For more information about core and elective courses, please see course descriptions. 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.

Electives should be chosen in consultation with the student’s advisor and should accommodate individual career goals.
Students may also consider the related courses in other divisions of the graduate program in Arts and Sciences, including Environmental Sciences and Policy, Government and Applied Economics, as well as pertinent courses in the schools of Engineering, Public Health, SAIS, Business or Education (see Registering for Courses in Other Divisions/Programs). Students are permitted, with the written consent of the Associate Director of the program, to take up to two pertinent courses outside of the Energy Policy and Climate curriculum to fulfill their requirements towards the degree.

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.

**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 towards their degree.

**425.601 Principles and Applications of Energy Technologies**

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, 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 fuels 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.

**425.602 Science of Climate Change and Its Impacts**

The course begins examining the basic processes of the climate system, and 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.

**425.603 Climate Change Policy Analysis**

After a study of the historical development of climate change policy, this course analyzes current policy options for mitigating for and adapting to long-term climate change. The course will examine various approaches available in the US 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.

**425.604 Carbon Management and Finance**

This course helps students develop analytical tools to manage and assess company/institution's exposure to climate change risks and their greenhouse gas (GHG) emissions. In addition, students will develop the financial analytic skills needed for carbon management, including analysis of the risks and opportunities for companies associated with emissions trading. Topics will also include carbon offset contract structures, in-depth study of project-based mechanisms (Clean Development Mechanisms and Joint Implementations), and GHG project certification protocols. In addition, the course will emphasize the principles of disclosure and issues of measurement, reporting and verification.

**ELECTIVES**

Choose five

**425.605 Introduction to Energy Law & Policy**

This course will cover the major types of regulation and market oversight that apply to energy systems. Topics covered will include the extraction of oil and gas; siting and regulation of infrastructures; operation and control of the international market for crude oil and products; basic principles of rate regulation and public utilities; regulatory reform in electricity and gas; stranded costs such as nuclear power investments; major environmental regulations that apply to the energy sector and the implications of new climate change and renewable energy mandates for the electric power sector. Most of the course will be empirical, but attention will be given to major theories of market failure as well as theories from political economy that explain why and how governments regulate energy systems, as well as how energy issues are entangled in deeper social and environmental contexts. Most case material will be drawn from the experience in the US, but the course will also include comparisons with other countries—notably in Western Europe and also in the major developing countries including Brazil, China and India, as well as international institutional energy policies.

**425.620 Climate Change Impacts, Adaptation, and Vulnerability**

The Earth’s changing climate is projected to result in significant impacts on natural and human systems at global, regional and local scales. This class will study methods for assessing the
vulnerability and risk associated with climate change impacts at the regional and local levels. Students will learn how to assess the adaptive capacity of biological and ecological systems, critical infrastructure, social networks and different sectors of the economy. Social and economic barriers and technological limits to various adaptive options will be evaluated. The role of public policy and the need for institutional and management reform will be assessed, as will the use of decision support tools for prioritizing options for strengthening existing capabilities and/or for developing new ones. The class will analyze several case studies to identify what factors determine the degree of successful implementation of regional and local adaptation plans for increasing resilience, and reducing vulnerability to the impacts associated with climate change. Prerequisite: Science of Climate Change and Its Impacts.

425.621 Applications of Remote Sensing to Climate
Remote sensing is becoming an increasingly important component of studying the climate system. This course surveys the physical basis for the primary remote sensing techniques used to study the climate system. Both active and passive systems will be surveyed. In addition, many of the main applications of these data to the climate problem will be examined. Prerequisite: Science of Climate Change and Its Impact.

425.623 Transportation Policy in a Carbon-constrained World
This course examines how transportation decisions and policy 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 is covered in detail in this course. Prerequisite: Science of Climate Change and Its Impact, Climate Change Policy Analysis.

425.624 Wind Energy: Science, Technology and Policy
Topics include the assessment of wind resources, basic principles of wind turbines and power transmission, electricity 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. Prerequisite: Energy Production Technologies.

425.625 Solar Energy: Science, Technology and Policy
The course focuses on the two main technologies—photovoltaic cells (PV) and concentrated solar power (CSP), 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 of solar technologies. The course also examines the market structure considerations for solar technology development. Prerequisite: Energy Production Technologies.

425.626 Alternative Fuels: Science, Technology and Policy
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: Energy Production Technologies.

425.627 Conventional Energy Generation and Climate Change Policy
Coal, natural gas and nuclear technologies provide the majority of existing electric power, and will be an important part of the future energy mix. Adjusting these technologies to reduce their climate impact is a challenge. The course will cover the possible future technologies related to these sources as well as the technological, policy, and economic barriers to making the necessary changes in conventional power generation. The role of carbon capture and sequestration from coal as well as the potential of integrated gasification combined cycle will be covered in-depth. In addition, the environmental challenges from increased nuclear power generation will be examined. Prerequisite: Energy Production Technologies.

425.628 Renewable Energy Project Development and Finance
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. Prerequisite: Carbon Management and Finance.

425.629 Energy Efficiency: Demand Side Options
The focus of this course is on reduction of energy use on the demand side with a focus on buildings (their structure, design, the contents, e.g. refrigerators, standards, integration) and communities, and to a lesser extent industry technologies (e.g. timber, 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: Science of Climate Change and Its Impacts, Climate Change Policy Analysis.

425.630 Cities and Climate Change
This course examines the energy demands of cities and the 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. Prerequisite: Science of Climate Change and Its Impacts, Climate Change Policy Analysis.

425.631 Ecological Impacts of Climate Change
In this course, students will study ecosystem responses to climate change. The course will investigate how various climate-related stresses alter both ecosystem structure and function. The analysis will be at multiple scales and locations. The topics include species change, shifts in range and distribution, seasonal shifts, fire and ecosystem response. Also included is the study of techniques that are used to understand how ecosystems are changing in response to human-induced climate change. Prerequisite: Science of Climate Change and Its Impacts.
425.632 Water Resources and Climate Change
The future effects of climate change on water resources will be significant. This course focuses on the potential effects of climate change on hydrology and water resources of the nation with emphasis on several major water basins such as the Colorado, Mississippi and Columbia rivers. Course assesses changes of the basins’ water resources by comparing simulated hydrologic and water resources scenarios derived from downscaled climate simulations. Also, impacts on water management of the climate change related uncertainty will be stressed. Implementation of adaptation measures, such as water conservation, use of markets to allocate water, and the application of appropriate management practices will have an important role to play in determining the impacts of climate change on water resources. Prerequisite: Science of Climate Change and Its Impacts.

425.633 Ocean Issues and Global Climate Change
The course looks at the most important issues facing the world’s oceans as a result of the changing climate. The topics are addressed from a science-policy perspective. Topics include ocean acidification, sea level rise, saltwater intrusion into coastal aquifers and collapse of ocean fisheries. Prerequisite: Science of Climate Change and Its Impacts.

425.634 Climate Change and Human Health
This course examines the potential impacts on human health from global climate change and the possible responses to and adaptations for these impacts. Topics include impacts on health of climate extremes, climate change and infectious diseases, health and climate refugees, national assessments of health impacts of climate change, monitoring the health effects of climate change, and public health policies for climate change. Prerequisite: Science of Climate Change and Its Impacts.

425.635 Understanding Future Climate through the Use of Climate Models
This course is a survey of the history of climate modeling and the application of models for understanding the Earth’s climate on seasonal to centennial time scales. Students will examine emerging questions of societal significance, e.g., trends and rates of observed climate change, irreversibilities and abrupt changes in the climate system, and assumptions used in climate-forcing scenarios. Topics covered include uncertainties and model intercomparison for near-term and long-term climate projections, spatial resolution issues and limitations in modeling climate, and large-scale climate phenomena e.g., monsoons and El Niño Southern Oscillation. Prerequisite: Science of Climate Change and Its Impacts.

425.636 Regional Climate Change
This course looks at specific regions of the world under various climate change scenarios. The focus is on regional climate patterns and how the global shifts will impact each region differently. While regions around the world will be examined, the Chesapeake Bay region will receive particular focus. Prerequisite: Science of Climate Change and Its Impacts.

425.637 International Climate Change Law & Policy
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. Prerequisite: Science of Climate Change and Its Impacts, Climate Change Policy Analysis.

425.638 Adaptation to Climate Change
This course considers the basic conceptual approaches for adaptation, trade-offs, challenges, and relevant institutions for dealing with the ongoing and anticipated future effects of climate change on water, biodiversity, coastal communities, agriculture, infrastructure, insurance, and other aspects of natural resources and society. The course highlights the linkages between science and policy, particularly how to manage in light of significant uncertainty. Financing adaptation will be covered in-depth, but the course also examines a range of different approaches, ranging from market mechanisms to insurance to regulatory approaches. Prerequisite: Science of Climate Change and Its Impacts, Climate Change Policy Analysis.

425.639 International Institutions and Climate Change
This is a European-based course, enabling students to study with staff from the key international institutions involved in climate change policy making and implementation. Possible locations and organizations include UNFCCC secretariat (Bonn), the IUCN Environmental Law Center (Bonn), World Trade Organization (Geneva), UNHCR (Geneva), Joint UNEP/OCHA Environment Unit (Geneva), the European Union (Brussels), UNEP’s Division of Technology, Industry and Economics (Paris). Prerequisite: Science of Climate Change and Its Impacts, Climate Change Policy Analysis.

425.640 The Future of the US Electric System in a Carbon-Constrained World
The course looks at the future of the US 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 consumers requirements. The course will assess the strengths 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. Prerequisite: Energy Production Technologies, Climate Change Policy Analysis.
425.642 Offshore Wind, Ocean Energy and Offshore Grid Infrastructure
The course examines global offshore wind and ocean energy resources. Significant offshore wind developments are underway in Europe, with further extensive offshore wind developments proposed for China, India, Japan and Korea. Ocean energy results from thermal energy from the sun, and mechanical energy from tides and waves. Offshore wind and ocean energy technologies, resources and pilot projects are reviewed. Rights issuance, economic costs, environmental and spatial planning, social acceptance, electricity tariffs, and regulatory regimes are examined for offshore wind and ocean energy in Europe, North America and Asia. The offshore electricity grid infrastructure required to support offshore wind and ocean energy is also examined including: economic costs, environmental and spatial planning, social acceptance, transmission tariffs and regulatory regime. Throughout the course, there is an examination of global institutions and initiatives for sustainable energy development and any implications for marine renewable energy.

Suggested Electives from Environmental Sciences and Policy
420.633 Geographic Information Systems (GIS)
420.649 Strategic Management for Sustainability
420.659 Management for Environmental Results with Performance-based Measurement
420.656 Environmental Impact Assessment and Decision Methods
420.657 Environmental Issues and Congressional Policymaking

Suggested Electives from Global Security Studies
470.734 Energy, Vulnerability and War

Electives from Other Johns Hopkins University Divisions
Engineering for Professionals
575.723 Sustainable Development and Next Generation Buildings
575.710 Financing Environmental Projects
Master of Science in Environmental Sciences and Policy

To manage the Earth's environment effectively, we must understand the processes that shape our planet's surface, control the chemistry of our air and water, and produce the resources on which we depend. At the same time, to implement scientific solutions to environmental problems, we must establish and execute policies that are politically, socially, and economically feasible. Designed to address this challenge, the MS program in Environmental Sciences and Policy occupies a broad position centered at the juncture of science and policy. 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 our 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. It provides a comfortable entry to relevant areas of science for students with limited scientific background. Core course work includes geology, hydrology, oceanography, meteorology, ecology, and policy making. Electives range across a spectrum from courses strongly oriented toward policy to ones focused more heavily on science. Electives are selected by students with guidance but no constraints. Case studies and student projects receive special emphasis.

This program is rooted in the Morton K. Blaustein Department of Earth and Planetary Sciences of the Krieger School of Arts and Sciences. Oversight by the eminent faculty of this department sustains the academic integrity and excellence of the program. 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.

PROGRAM COMMITTEE

John J. Boland
Professor Emeritus, Department of Geography and Environmental Engineering;
Program Chair, Environmental Studies

David Elbert
Acting Program Director, Environmental Studies; Associate Program Director,
Environmental Studies

Tom Haine
Professor and Morton K. Blautstein Chair,
Earth and Planetary Sciences

John M. Ferry
Professor of Earth and Planetary Sciences

Sharon Kingsland
Professor, History of Science

Cindy Parker
Director, Global Environmental Change and Sustainability Major, Department of Earth and Planetary Sciences; Assistant Professor, Johns Hopkins School of Public Health

Katalin Szlavecz
Associate Research Scientist, Earth and Planetary Sciences

Peter Wilcock
Professor, Geography and Environmental Engineering
ADMISSION REQUIREMENTS

In addition to the materials and credentials required for all programs (see Admission Requirements), the Master of Science in Environmental Sciences and Policy program 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
- One semester of undergraduate calculus and one semester of undergraduate statistics
- Two semesters 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 advisor);
2. Take 420.301 Quantitative Methods for Environmental Sciences; or
3. Pass a math placement test, administered by the admissions staff.

Students who are admitted provisionally due to lack of training in chemistry have the option to:
1. Take two semesters of general chemistry with laboratory at an accredited college or university; or
2. Take 420.302 Chemistry of Natural Processes.

Admissions Documents

- AAP application and fee
- A current résumé
- A statement of purpose (500 words)
- Two letters of recommendation, preferably one academic reference
- Official undergraduate and graduate transcripts

Admission Requirements Exceptions

If you do not meet all the required criteria for admissions, you may still be admitted to the program and are encouraged to apply. Admission in these cases is determined on a case-by-case basis. Some candidates may be granted provisional status.

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 in the course descriptions section) may choose to take a mathematics assessment test. If successfully passed, provisional students will place out of the prerequisite. This test is administered on the Baltimore campus and at the Washington, DC Center 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 Admissions Office in Washington at 202.452.1940.

COURSE REQUIREMENTS

Conditional prerequisite courses

Provisional students who have not fulfilled one or more of the required courses for admission are required to complete one or more of the following prerequisites.

420.301 Quantitative Methods for Environmental Sciences

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

Provisional students may also fulfill this prerequisite by taking two semesters of general chemistry at an accredited university. Provisional students should discuss these options with their advisor.

MS in Environmental Sciences and Policy

No Concentration

- Five core courses
- Five elective courses

Electives should be chosen in consultation with the student’s advisor 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 offerings, or from environmental policy
offerings. Students may also consider the related courses in the schools of Engineering, Public Health, SAIS, 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. Courses are open only to students who meet enrollment requirements.

Residency Requirement
Many courses are offered online, however at least two courses must be taken in an onsite classroom or in-person field study to fulfill the requirements of the degree. Intensive courses are offered in three-week formats in January and May to help facilitate the residency requirement. The core course, 420.611 Principles and Methods of Ecology, is not offered online but is offered in a three-week format in May.

Capstone Project
The Capstone Project is optional for students pursuing the MS degree without a concentration. Students in the MS in Environmental Sciences and Policy with a particular academic or professional interest who wish to pursue independent research may do so through 420.800, the Capstone Project in Environmental Sciences and Policy.

The Capstone Project is required for the MS with a concentration. Research must be original and bring 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 can be found in the online course description for 420.800.

FOUR OPTIONAL CONCENTRATIONS

See page 91 for degree requirements with no concentrations.

Environmental Monitoring and Analysis
This concentration focuses on identifying, assessing, monitoring, and quantifying environmental problems as well as progress towards the redress of these problems. The concentration enables students to work on various topics with a focus on measurement and analytical techniques.

Required Courses
420.614 Environmental Policymaking and Policy Analysis
420.800 Independent Graduate Project

Choose three of the following:
420.601 Geological Foundations for Environmental Sciences
420.604 Hydrology and Water Resources
420.608 Oceanic and Atmospheric Processes
420.611 Principles and Methods of Ecology

Electives
Choose five of the following:

Environmental Sciences and Policy Electives
420.619 Ecological Assessment
420.621 Natural Hazards: Impact Assessment and Mitigation
420.624 Contaminant Transport
420.626 Field Methods in Ecology
420.631 Field Methods in Stream and Water Quality Assessment
420.651 Risk Assessment and Risk Management
420.654 Environmental and Natural Resource Economics
420.656 Environmental Impact Assessment and Decision Making
420.659 Management for Environmental Results with Performance-based Measurements
420.660 Strategies in Watershed Management
420.661 Climate Change: Science and Policy

Biotechnology Electives
410.662 Epidemiology: Diseases in Populations

Geographic Information Systems Courses
430.601 Geographic Information Systems
430.602 Remote Sensing: Earth Observing Systems and Applications
430.603 Geospatial Data Modeling (formerly Advanced GIS Modeling)

Public Health Electives
187.610 Principles of 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
420.614 Environmental Policymaking and Policy Analysis
420.800 Independent Graduate Project

Choose two of the following:
420.601 Geological Foundations for Environmental Sciences
420.604 Atmospheric and Oceanic Processes
420.608 Hydrology and Water Resources
Electives
Choose five of the following:

Environmental Sciences and Policy Electives
- 420.619 Ecological Assessment
- 420.620 Soils in Natural and Anthropogenic Ecosystems
- 420.622 Ecotoxicology
- 420.623 Freshwater Ecology and Restoration of Aquatic Ecosystems
- 420.625 Chesapeake Bay: Ecology and Ecosystem Management
- 420.626 Field Methods in Ecology
- 420.628 Ecology and Management of Wetlands
- 420.631 Field Methods in Stream and Water Quality Assessment
- 420.637 Biodiversity and Wildlife Conservation
- 420.638 Coastal Geology and Policy
- 420.640 Advanced Modeling
- 420.641 Natural Resources Law
- 420.642 Public Lands—Private Interests
- 420.660 Strategies in Watershed Management
- 420.662 Coral Reefs and Caves: The Geology of the Bahamas
- 420.680 Landscape Ecology

Geographic Information Systems Courses
- 430.601 Geographic Information Systems

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
- 420.800 Independent Graduate Project

Choose three of the following:
- 420.601 Geological Foundations for Environmental Sciences
- 420.604 Atmospheric and Oceanic Processes
- 420.608 Hydrology and Water Resources
- 420.611 Principles and Methods of Ecology

Electives
Choose five of the following:

Environmental Sciences and Policy Electives
- 420.629 Drinking Water, Sanitation, and Health
- 420.630 Waste Policy
- 420.632 Air Quality Management
- 420.634 Bioremediation and Emerging Environmental Technologies
- 420.641 Natural Resource Law and Policy
- 420.642 Public Lands—Private Interests
- 420.644 Sustainable Cities
- 420.645 Environmental Challenges for Energy Policy
- 420.646 Transportation Policy and Smart Growth
- 420.649 Strategic Management for Sustainability
- 420.650 International Environmental Policy
- 420.651 Risk Assessment and Risk Management
- 420.652 Environmental Justice
- 420.654 Natural Resource and Environmental Economics
- 420.656 Environmental Impact Assessment and Decision Methods
- 420.657 Environmental Issues and Congressional Policymaking
- 420.659 Management for Environmental Results with Performance-based Measurements
- 420.661 Climate Change: Science and Policy
- 420.662 Coral Reefs and Caves: The Geology of the Bahamas

Applied Economics Electives
- 440.632 Cost-Benefit Analysis

Government Program Electives
- 470.667 The Administrative State: How Washington Regulates

Carey Business School Electives
- 786.701 The Nonprofit Sector: Scope, Structure, and Dynamics
- 786.702 Managing the Nonprofit Organization: A Strategic Framework
- 786.704 Financial Management for Nonprofits
- 786.706 Resource Development (fund raising)
- 761.724 Project and Team Management

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
- 420.800 Independent Graduate Project
Choose three of the following:
420.601 Geological Foundations for Environmental Sciences
420.604 Oceanic and Atmospheric Processes
420.608 Hydrology and Water Resources
420.611 Principles and Methods in Ecology

Electives
Choose five of the following:

Environmental Sciences and Policy Electives
420.619 Ecological Assessment
420.621 Natural Hazards: Impact Assessment and Mitigation
420.629 Drinking Water, Sanitation and Health
420.630 Waste Policy
420.639 Landscape Ecology
420.641 Natural Resources Law
420.642 Public Lands–Private Interests: The Struggle for Common Ground
420.644 Sustainable Cities
420.645 Environmental Challenges for Energy Policy
420.646 Transportation Policy and Smart Growth
420.651 Risk Assessment and Risk Management
420.652 Environmental Justice
420.653 Practicum in Environmental Planning
420.654 Environmental and Natural Resource Economics
420.656 Environmental Impact Assessment and Decision Methods
420.659 Management for Environmental Results with Performance-based Measurements
420.660 Strategies in Watershed Management
420.661 Climate Change: Science and Policy

Geographic Information Systems Courses
430.601 Introduction to Geographic Information Systems
430.602 Remote Sensing: Earth Observing Systems and Applications
430.603 Geospatial Data Modeling (formerly Advanced GIS Modeling)

Whiting School of Engineering
575.731 Water Resources Planning

Real Estate Division of the Carey Business School
767.651 Environmental Issues in Real Estate
767.695 Urban Redevelopment

BA/MS OPTION FOR JOHNS HOPKINS UNIVERSITY GECS MAJORS

Undergraduates majoring in Global Environmental Change and Sustainability (GECS) may apply for accelerated status towards an MS in Environmental Science and Policy (ESP). These students should declare their intention to pursue the MS during their junior or early in their senior year of undergraduate study by contacting either the undergraduate GECS Director, Cindy Parker (ciparker@jhsph.edu) or the Associate Director of the ESP program, David Elbert (elbert@jhu.edu). GECS students may apply up to three courses taken as undergraduates towards 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 advisor, but will continue to be advised by their GECS advisor for all matters concerning the BA degree.

Course Requirements for BA/MS
GECS students will receive two separate degrees and so the requirements of both degrees must be fulfilled. Students may not earn the MS degree without completion of the BA, however, 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 towards the ten 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:

- 270.108 Oceans and Atmospheres may substitute for 420.608 Oceanic and Atmospheric Processes
- 270.308 Population and Community Ecology may substitute for 420.611 Principles and Methods of Ecology
- 270.403 Environmental Policymaking and Policy Analysis may substitute for 420.614 Environmental Policymaking and Policy Analysis
  (Note that the Environmental Policymaking and Policy Analysis course will be a combined GECS undergraduate and ESP masters class.)

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 advisor 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 for Environmental Sciences

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 the mathematical principles fundamental to environmental sciences, and 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.

420.302 Chemistry of Natural Processes
This course provides students with a basic understanding of the fundamentals of chemistry, of Earth’s interrelated chemical systems, and of how to manipulate and interpret chemical data. 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.

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, although it is recommended that students begin with 420.601 Geological Foundations of Environmental Science. 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
This course provides an overview of the 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, the Earth’s resources and public policy. Two field trips required for in-person sections.

420.604 Hydrology and Water Resources
This course provides students with an introduction to the global hydrological cycle and the influence that climate, geology, and human activity has on water resources. Students study the principles of precipitation, evaporation, and transpiration; surface and groundwater flow; storage in natural and artificial reservoirs; water quality and pollution; and water resource management and regulation. One field trip is included for in-person sections.

420.608 Oceanic and Atmospheric Processes
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 in in-person sections.

420.611 Principles and Methods of Ecology
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 field trips are included. This course is not offered online.

420.614 Environmental Policymaking and Policy Analysis
This course provides students with a broad introduction to US environmental policymaking and policy analysis. Included is a historical perspective as well as 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 proper perspective.

ELECTIVE SCIENCE COURSES

420.619 Ecological Assessment
This course introduces students to the 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, bio-assessment, 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. Prerequisite: 420.611 Principles and Methods of Ecology, equivalent course, or experience.

420.620 Soils in Natural and Anthropogenic Ecosystems
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 dissect 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 how to use available soil data. Current issues regarding the proper use and management of soils are investigated. Field trips are included.

420.621 Natural Hazards: Impact Assessment and Mitigation
This course examines several major natural hazards both from the standpoint of their causes (including what human factors turn a natural hazard into a disaster) and the efforts to cope with and mitigate their effects on society. The course focuses on the factors that make us vulnerable to natural hazards and considers policies that can make society more resilient. Topics include methods of mitigation, monitoring, prediction and warning systems, hazard awareness, the role of technology in hazard reduction, emergency response and community redevelopment. The course explores a sequence of individual hazards, while concentrating on the connections between them. The course is taught in the seminar-style and includes guest lectures by experts in disaster policy. Prerequisites: 420.601 Geological Foundations of Environmental Science and 420.608 Oceanic and Atmospheric Processes, equivalent courses, or experience.

420.622 Ecotoxicology
This course begins with an overview of the basic principles of ecology including trophic structure, food-web dynamics, bioaccumulation, and effects of toxic materials upon ecosystems and individual organisms. Students then are introduced to the principles of toxicology, including chemical action upon organisms, organ systems and cellular functions. Models help to define fate and transport mechanisms, concentration effects, and selective toxicity. Also covered are toxicity testing, risk assessment, toxics reduction, and examples of bioremediation. Prerequisite: 420.61 Principles and Methods of Ecology, equivalent course, or experience.

420.623 Freshwater Ecology and Restoration of Aquatic Ecosystems
This course focuses on the ecology, protection, and restoration of non-tidal waters. Students study the biological, chemical and physical characteristics of Maryland waters and riparian zones, as well as the ecological responses to anthropogenic activity, and the approaches that can protect freshwater ecosystems or mitigate damage to them. 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 part of the course. Prerequisite: 420.61 Principles and Methods of Ecology, equivalent course, or experience.

420.624 Contaminant Transport
This course presents the basic principles underlying the movement of contaminants in the main environmental media: surface water, groundwater, and the atmosphere. These principles and the models built to understand and predict the transport of contaminants in different media are the tools 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. The students will be able to ask the right questions of modelers, to understand the information provided by models as well as its limitations, and to communicate effectively this information to the public and decision makers. Students should have strong mathematical reasoning skills. Prerequisites: 420.604 Hydrology and Water Resources, equivalent course or experience.

420.625 Chesapeake Bay: Ecology and Ecosystem Management
This course examines the physical, chemical, and biological processes affecting coastal and estuarine ecosystems by using the Chesapeake Bay as a model system. Human influences on these 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 Chesapeake Bay. Field trips are part of the course. Prerequisite: 420.61 Principles and Methods of Ecology, equivalent course, or experience.

420.626 Field Methods in Ecology
In this course students conduct fieldwork in various ecosystems. Field methods include quadrat, transect and SAV sampling, as well as various techniques for surveying animal communities and monitoring water quality. While analyzing their own data, students become familiar with concepts such as species-area curves, importance values, species diversity, and community similarity indices. Students also are 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 course students conduct their studies in the forests, fields and wetlands of the area. Fieldwork is scheduled for a succession of Saturdays; some sections may conduct field trips on one or two Fridays and/or Sundays. Prerequisite: 420.61 Principles and Methods of Ecology, equivalent course, or experience.

420.628 Ecology and Management of Wetlands
This course explores the biological, physical, chemical and ecological aspects of tidal and non-tidal 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, of various regulations and of human perturbations, are related to successful water management and the use of wetlands as biotic resources. Several field trips provide hands-on experience and demonstrate the significance of wetland mitigation, restoration and construction projects. Prerequisite: 420.61 Principles and Methods of Ecology, equivalent course, or experience.
420.631  Field Methods in Stream and Water Quality Assessment
This course provides an overview of the 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. Prerequisite: 420.61 Principles and Methods of Ecology, equivalent course, or experience.

420.632  Outdoor Air Quality Management
This course provides an overview of the principles and policies involved in outdoor air quality management, with an emphasis on the public health impacts of outdoor air pollution. Course topics include the history of air quality management; major air pollutants and sources; atmospheric chemistry, transport and dispersion; measurement and monitoring; control technology; effects on human health, ecology, climate and materials; regulatory requirements and non-regulatory management approaches; and air quality management assessment tools. The effectiveness of the Clean Air Act, external factors impacting air quality management, and regulatory case studies will also be discussed. Prerequisite: 420.60 Oceanic and Atmospheric Processes, equivalent course, or experience.

420.634  Bioremediation and Emerging Environmental Technologies
This course presents a brief review of environmental policy from its historical beginnings to present day impacts resulting from hazardous chemicals and endocrine blockers. The course presents remediation technologies available for reclaiming contaminated resources and reducing health risks. It covers the application of various physical and chemical technologies, but emphasizes the biological systems for the cleanup of hazardous chemicals. Students are introduced to the nature of hazardous waste, the behavior of chemicals in the subsurface, the biochemistry of microbial degradation and technology applications. Students will become familiar with the technologies of bioremediation: including bioventing, air sparging, monitored natural attenuation or intrinsic remediation, and chemical oxidation. Students will learn to select appropriate technologies for more detailed assessment on their use for cleanup of contaminated sites, design a monitoring program for assessing the applicability of bioremediation for site cleanup, examine the analytical data from a site monitoring program and assess the applicability of various bioremediation techniques, develop biological conceptual models for natural attenuation, and understand the key principles for design. However, this is not a design course. Case studies and problem sets acquaint students with field applications and introduce modeling techniques for predicting performance. Prerequisites: 420.601 Geological Foundations of Environmental Science and 420.604 Hydrology and Water Resources, equivalent courses, or experience.

420.637  Biodiversity and Wildlife Conservation
This course examines the meaning of biodiversity, the disciplines associated with conservation biology, including taxonomy, genetics, small population biology, chemical ecology and marine biology. It explores how conservation biology differs from other natural sciences in theory and in application. Students learn the major threats to biodiversity and what natural and social science methods and alternatives are used to stop the threats. The course also explores the economic and cultural tradeoffs associated with each conservation measure at the global, national, regional and local levels. The course is taught in the seminar-style with a different lecturer from the specific field covering each class session. Prerequisite: 420.61 Principles and Methods of Ecology, equivalent course, or experience.

420.639  Landscape Ecology
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 how they can be applied to enhance the effectiveness of environmental policy, management, regulation, and assessment. Prerequisite: 420.61 Principles and Methods of Ecology, equivalent course, or experience.

420.662  Coral Reefs and Caves: The Geology of the Bahamas
This course will present 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., ground-water flow, cave development and soil development), and the environmental impacts of human activities on carbonate platforms. The course consists of a week of intensive study at Johns Hopkins University, followed by a week of field study at the Forfar Field Station on Andros Island in the Bahamas. Note: This course can count toward residency requirement. Prerequisite: 420.61 Geological Foundations for Environmental Science.

ELECTIVE POLICY COURSES

420.629  Drinking Water, Sanitation, and Health
In this elective course students examine a number of scientific and public policy dilemmas related to the provision of safe drinking water and protection of human health in the US and abroad. Through lectures, discussion, research, writing and exercises, participants in this course will first gain a basic understanding of the fundamentals of water supply, treatment, regulation and sanitation, and will then focus on some unresolved issues that currently confront scientists, resource managers and policymakers. These issues include controlling pathogens from urban and agricultural runoff, managing harmful by-products of the disinfection process, regulating arsenic in ground water, evaluating the risk posed by exposure
to mixtures of contaminants, and confronting the threat of terrorist attacks on water supplies. Students will be expected to recommend pathways that could lead to solutions. Prerequisite: 420.604 Hydrology and Water Resources, equivalent course, or experience.

420.630 Waste Policy
This course addresses all aspects of waste management including waste generation, human health and environmental hazards, waste treatment and disposal methods, recycling, and the regulations that govern transportation and disposal of waste. Solid and hazardous forms of waste are discussed. Students examine laws and agency regulations to determine their effectiveness in reducing waste and in cleaning up and containing waste already generated. Prerequisites: 420.614 Environmental Policymaking and Policy Analysis, equivalent course, or experience.

420.638 Coastal Geology and Policy
The course is designed to provide students with the knowledge to address modern coastal, environmental, geological, 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. Those policies pertinent to the management and use of coastal environments will be studied. One weekend field trip will be required. Prerequisite: 420.601 Geological Foundations for Environmental Sciences, equivalent course, or experience.

420.641 Natural Resource Law and Policy
This course introduces students to federal and state legislation and the policies of critical importance in natural resource management. Students explore such issues as the 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 systems, land use management, and water and air pollution control. Prerequisite: 420.614 Environmental Policymaking and Policy Analysis, equivalent course, or experience.

420.642 Public Lands – Private Interests: The Struggle for Common Ground
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. Prerequisite: 420.614 Environmental Policymaking and Policy Analysis, equivalent course, or experience.

420.643 Environmentalism: History and Literature
This course looks at the human dimension of environmental issues by framing them within a historical perspective. The purpose is to understand the historical interactions among environmental activists, scientists and policymakers in order to explore the significance of these past relationships on current environmental policymaking. The course considers early US environmental history but focuses on the post-World War II era and the various institutions of modern environmentalism. Students will examine the changing ideas and attitudes toward nature and how these changes influence the shape of emerging environmental policies and the institutions that influence environmental policymaking. Materials include primary and secondary historical texts and significant works from the American literature of environmentalism.

420.644 Sustainable Cities
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. Prerequisite: 420.614 Environmental Policymaking and Policy Analysis, equivalent course, or experience.

420.645 Environmental Challenges for Energy Policy
The course examines two major sectors of energy policy, electricity and transportation, and their impacts on air quality and climate change. Students will gain a solid understanding of the economics, technology, and regulatory structure of the electricity and transportation industries, as well as developing the analytical tools for assessing policy alternatives to deal with future domestic and international environmental challenges in air quality and climate policy. A full range of policy alternatives will be considered including traditional command and control-style regulations, emissions trading and other market-based tools, portfolio standards and technology incentive approaches. The use of these mechanisms as well as their broader policy implications will be examined in the context of deregulated and regulated electricity markets at the state and federal levels, as well as in the context of international climate negotiations. Prerequisite: 420.614 Environmental Policymaking and Policy Analysis, equivalent course, or experience.

420.646 Transportation Policy and Smart Growth
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, 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. Prerequisite: 420.614 Environmental Policymaking and Policy Analysis, equivalent course, or experience.

420.649 Strategic Management for Sustainability
This course examines the “greening of industry” trend, its causes and 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 the 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.

20.650 International Environmental Policy
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 non-governmental 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
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
The field of environmental justice (EJ) has conflicted over the scope, measurement, evaluation, nature, and seriousness of environmental problems. This seminar attempts to provide options for resolving some EJ problems by discussing a set of practical and theoretical approaches for communication, understanding and analysis that can bridge interests, reconcile differences, reduce confusions, and improve environmental decision making. In impoverished inner city neighborhoods, community regeneration, community decision making, and ecologically sustainable issues can contribute to the solution of regional as well as local urban and environmental issues. The course will investigate and evaluate the effectiveness and range 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 and 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 the broader components of justice such as living and working conditions, violence, powerlessness, marginalization and the processes producing and reproducing inequities. Prerequisite: 420.614 Environmental Policymaking & Policy Analysis.

420.653 Practicum in Environmental Planning
In this course, students tackle a “real world” environmental planning problem and complete a project for a specific client. The purpose of the course is to enable students to hone their skills in group projects and client-supported work. This semester, students will work with the Army Corps of Engineers and the Baltimore Department of Planning on a wetlands restoration project on the Middle Branch in the Baltimore harbor. Students will be researching the impact of restoration on redevelopment in the adjacent neighborhoods, methods of developing open access to the waterfront, and supporting the redevelopment of brownfield sites in the neighborhood. This project will have a significant impact on making the wetlands restoration efforts successful and on creating a viable community in a distressed area of the city. The course uses a mixed format of lecture and workshop. Prerequisite: 420.614 Environmental Policymaking & Policy Analysis.

420.654 Environmental and Natural Resource Economics
This course presents the fundamental concepts and applications of economic theory related to renewable and nonrenewable resources, and to 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. Prerequisite: 420.614 Environmental Policymaking & Policy Analysis.
420.656 Environmental Impact Assessment and Decision Methods
This course introduces the process of environmental impact assessment and policy decision-making as required under the National Environmental Policy Act (NEPA) and the regulations of the Council of Environmental Quality (CEQ). Topics include the 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 is demonstrated with actual cases. Prerequisite: 420.644 Environmental Policymaking and Policy Analysis, equivalent course, or experience.

420.659 Management for Environmental Results with Performance-based Measurements
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 cost-benefit 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
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 watershed quality management report for a selected watershed. Fieldwork will include documenting land use practices, tributary flow rates and characteristics, and water quality measurements for unit loading estimations, sediment sampling and fish trawls. Some of this work will involve time on an EPA research vessel. Prerequisites: 420.661 Principles and Methods of Ecology, equivalent course, or experience.

420.661 Climate Change: Science and Policy
The course has three goals: to understand the major factors that make climate change a difficult policy issue; to assess how those factors can be weighed in formulating climate change policy; and to review potential responses to the prospect of climate change. Students will look at three factors that make climate a difficult policy issue: uncertainty from the complex climate system, time lags of impacts, and competing priorities, especially among poor countries. Students will compare well-established techniques for incorporating uncertainty and time into policies with new alternatives. An effective response to global future warming has to operate at two levels. At the technical level, the course will focus principally on the generation of electricity. Electricity generation accounts for a large and growing share of CO₂ emissions, and it also offers the greatest technical opportunities for reducing those emissions. At the institutional level, the course will focus principally on actions that directly affect the United States. These include state and municipal actions as well as those undertaken in the private sector. Prerequisite: 420.668 Oceanic and Atmospheric Processes, equivalent course, or experience.

420.680 Special Topics in Environmental Sciences and Policy
Topics related to environmental sciences and policy that are not part of the regular course offerings will be examined with a particular emphasis on the applied and problem-solving aspects of the topics. Possible topics include water management, nuclear safety, climate change, agriculture policy, or environmental justice.

420.700 Hopkins Environmental News: Modern Media of Environmental Communication
Communication drives both environmental science and policy with increasing importance. Modern media have substantially changed the level and focus of messaging and education about environmental issues. This course reviews academic literature on environmental communication, but is centered on actual production of modern tools including a student run blog and podcast series.

420.800 Capstone Project in Environmental Sciences and Policy
A Capstone Project is required for students electing the MS degree with one of the concentrations. It is optional, but strongly recommended, that students who are not electing a concentration complete an independent project. Students must have completed at least eight courses in the program before completing an independent graduate project. The independent project enables students to apply and synthesize the material learned in other courses, develop expertise on a specific environmental topic, work closely with experts in the field of study, and improve their professional writing and presentation 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, a supervisor from the student's place of work or any expert with appropriate credentials. Students have an opportunity to attend proposal-writing workshops prior to the start of the course. Formal proposals must be submitted at least two weeks prior to the start of the semester in which the project is to be completed. The proposal must be reviewed by the program committee prior to enrollment in the course. Permission of instructor is required.
Geographic Information Systems
Post-Baccalaureate Certificate and Master of Science Degree

gis.jhu.edu

Geographic Information Systems (GIS) as a science and technology is a dynamic and versatile method of analysis and visualization that has come to play a key role in understanding a myriad of industries, be they natural resource management, environmental planning, homeland security, defense and intelligence, marketing, telecommunications, economic development, transportation, law enforcement, or public health and other health care industries. It is this dynamism that the Johns Hopkins University GIS programs encompasses in its two program 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, geodatabase administration, spatial data analysis and geodata visualization.

Both programs are designed for students who have little or no knowledge of the GIS field. Students entering the program are introduced to state-of-the-art instruction in which the most widely used commercial software, as well as open-source software, are made available using a cloud computing infrastructure. The program is designed to introduce students to the basic discipline of geographic information as a system and a science. We build on this basic knowledge to delve into the design considerations of web-based GIS applications and data analysis. Students in the program can expect to work on real-world geospatial data issues with real data, and the accompanying issues those data introduce into a spatial analysis.

ADMISSION REQUIREMENTS

In addition to the materials and credentials required for all programs (see Admission Requirements), the Certificate in Geographic Information Systems program requires:

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.
3. Proficiency in writing and data analysis/interpretation.

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; or
3. Pass a math placement test, administered by the admissions staff.

PROGRAM COMMITTEE

John J. Boland
Professor Emeritus, Department of Geography and Environmental Engineering; Program Chair, Environmental Studies

David Elbert
Acting Program Director, Environmental Studies

Regina Ryan
Associate Director, Geographic Information Systems

James Gillespie
Library Services Manager, Government Publications Maps and Law

Seth Guikema
Assistant Professor, Department of Geography and Environmental Engineering

Tom Haine
Professor and Morton K. Blaustein Chair, Department of Earth and Planetary Science

Benjamin Zaitchik
Assistant Professor, Department of Earth and Planetary Science
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

Admission Requirements Exceptions
If you do not meet all the required criteria for admissions, you may still be admitted to the program provisionally and are therefore encouraged to apply. Admission in these cases is determined on a case-by-case basis.

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 do not have the necessary quantitative background may choose to take a mathematics assessment test. If successfully passed, provisional students will place out of the prerequisite. This test is administered on the Baltimore campus and at the Washington, DC Center at the student’s convenience on any working day. After a student is admitted, s/he may make an appointment to take the test and/or to obtain relevant study materials by calling the Admissions Office in Washington at 202.452.1940.

PROGRAM STRUCTURE

Post-Baccalaureate Certificate
Five courses are required to complete the certificate. All courses will be taught online, giving students access to the best geospatial experts, regardless of their location.

The five courses comprising the Post-Baccalaureate Certificate include:

> Geographic Information Systems
> Remote Sensing: Earth Observing Systems and Applications

> Geospatial Data Modeling
> Introduction to Spatial Data Analysis with GIS
> Development and Management of GIS Projects

Master of Science
Five Certificate courses (see above)

One of the following GIS programming courses:

> Programming in GIS
> Cloud Computing and GIS Enterprise Development

One of the following Spatial Data Management courses:

> Spatial Data Management: Quality and Control
> Geodatabase Architecture
> Geospatial Ontologies and Semantics

Two electives from those listed above in GIS Programming or Spatial Data Management, or from the following list:

> Cartographic Design and Web Mapping
> Advanced Topics in Remote Sensing of the Environment
> GIS and Spatial Decision Support Systems
> Facility Management Using GIS

Capstone Project in GIS

COURSE REQUIREMENTS

The certificate requires the following five courses:

430.601 Geographic Information Systems (GIS)
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 cartography, georeferencing, data structures, querying, data classification, 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.

430.602 Remote Sensing: Earth Observing Systems and Applications
This course introduces remote sensing as an important technology to further our understanding of the 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.
430.603 Geospatial Data Modeling (formerly Advanced GIS Modeling)
This course moves beyond the fundamentals of GIS to explore the constraints surrounding data modeling as well as methods to model spatial data. Students review current research in the field, learn relevant modeling techniques and utilize advanced software tools for analysis. The course involves the use and integration of a variety of data sources, including baseline data layers, x-y coordinates and satellite imagery. Specific GIS techniques in spatial analysis are introduced and the course builds on former GIS software experience. Students develop a significant GIS project over the course of the semester and present their findings at the end.

430.604 Introduction to Spatial Analysis with GIS
This course introduces students to using statistical techniques for solving spatial problems. Students will learn to apply the principles of 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, security, public health, transportation and crime analysis. Topics include spatial sampling, measures of dispersion and central tendency in spatial analysis, spatial autocorrelation, regression analysis, hypothesis testing and decision support analysis.

430.605 Development and Management of GIS Projects
This course imparts knowledge and skills for managing GIS projects within an enterprise development environment, including technical, legal, ethical and institutional problems. Cloud computing will be introduced as an Infrastructure-as-a-Service development platform model. Students will examine the institutional role of GIS and technologies, explore key issues in organizational management of GIS projects (planning, staffing, budgeting), and develop skills to design and manage geospatial databases. Ethical and legal issues in data acquisition, sharing and representation will also be explored.

430.606 Programming in GIS
This course introduces students to various customization methods for GIS using Python and Application Programming Interfaces (API). Students will learn how to develop tools and functionalities using Python scripts in the ArcGIS Desktop 10.x interface as well as develop Web-based GIS applications using the ArcGIS Server 10.x. Cloud computing will be introduced as Infrastructure-as-a-Service for a development platform model. Prerequisite: Geographic Information Systems

430.607 Geodatabase Architecture
A well-designed geodatabase is necessary to construct relevant spatial data queries. In this course, students learn the different geodatabase designs for stand-alone geodatabases 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. Prerequisite: Geographic Information Systems, Geospatial Data Modeling

430.608 GIS and Spatial Decision Support Systems
The traditional notion of GIS is that of a data repository and map-making software package. Decision Support Systems are an advanced application of the GIS for systematic policy analysis providing insight into case scenarios, probability outcomes and hypothesis testing. This course looks at the uses of GIS and spatial data in the context of the administrative decision-making process to select the most advantageous of a series of potential site locations or as an agent-base set of rules for complex geospatial systems. Prerequisite: Geographic Information Systems, Introduction to Spatial Analysis with GIS, Geospatial Data Modeling

430.609 Spatial Data Management: Quality and Control
Spatial data quality is a major concern for any GIS. The quality of a data model depends upon the detail of the datasets used; the level of precision one can expect from an analysis is determined by the completeness of the data; and the conclusions one draws from an analysis are all premised on the viability of the data used. This course explores the various data standards for spatial data (FGDC, OGC and ISO), the approaches for data quality management, and the uses of the database to maintain data quality. Prerequisite: Geographic Information Systems

430.610 Cloud Computing and GIS Enterprise Development
Development of GIS applications is a dynamic process involving software lifecycle Best Practices. This course examines the various stages of software development using the cloud computing environment. Students will learn how the cloud can be utilized in each of these unique environments to minimize costs while providing efficient infrastructure support for GIS application development, testing, staging and production. Prerequisite: Geographic Information Systems

430.611 Geospatial Ontologies and Semantics
GIS applications use different terminologies to describe similar spatial features or the means by which those features are associated internal to the GIS. This course looks at the information exchange challenges associated with the use of different GIS applications within the same enterprise. Consideration is given to the semantics of specific terminologies and how ontological structures can implement these specifications. Prerequisite: Programming in GIS or Cloud Computing and GIS Enterprise Development

430.612 Cartographic Design and Web Mapping
Cartographic design focuses on the geo-visualization of spatial data and model outputs using computer-assisted mapping techniques in a GIS. Students learn of required map elements as well as the aesthetic balancing of the map layout. Effective translation of map information from a GIS to a web-based visualization of cartographic information in 2- and 3-dimensions will also be examined. Students will develop GIS applications for the design of web-based interactive maps. Prerequisite: Geographic Information Systems
430.613 Advanced Topics in Remote Sensing of the Environment
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 geo-referencing methods are compared. Topics include hyperspectral imaging, spectral analysis and image filtering. Prerequisite: Geographic Information Systems, Remote Sensing: Earth Observing Systems and Applications

430.614 Facility Management Using GIS
This course introduces students to the real world of facility management, whether the facilities are a single plant with infrastructure mapping requirements to satisfy a regulatory policy, a campus of buildings requiring extensive monitoring, or an emergency response system designed for an entire city. Topics include facility management data models, building sustainability using GIS, network analysis, and internal as well as external infrastructure mapping. Prerequisite: Geographic Information Systems, Geospatial Data Modeling

430.800 Capstone
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 faculty advisor, develops a research project, identifies 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. Prerequisite: core course requirements for MS in GIS, requisite courses for MS in GIS

Alternative Course Options
Students who have completed one GIS course or who have GIS work experience can request a waiver of the introductory course, Geographic Information Systems or Remote Sensing: Earth Observing Systems and Applications (dependent on relevant experience). These students must choose an additional course to complete the certificate requirements. Such students may choose from courses that are offered by the Computer Science Program in the Whiting School’s Engineering for Professionals or GIS courses offered in the Department of Epidemiology in the School of Public Health. Students will need to meet the prerequisites for the specific computer science and epidemiology courses they choose.
The Johns Hopkins University Center for Advanced Governmental Studies (Center) encompasses a broad set of programs and initiatives designed to enhance the understanding of the role, function, and impact of government and the nonprofit sector. At the heart of the Center are four Master of Arts degree programs: MA in Government, MA in Global Security Studies, MA in Public Management, dual MA in Government/MBA, 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 (JHU) Washington, DC Center in Dupont Circle, the Center serves as 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 degree programs and initiatives is to provide a strong foundation of knowledge upon which innovative policy programs and promising leaders can develop.

**GRADUATE DEGREES**

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.

**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 US 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 “Government by Contract:
Considering a Public Service Ethics to Match the Reality of the
‘Blended’ Public Workforce” (governmentbycontract.jhu.edu).

INTERNATIONAL STUDY

The Center for Advanced Governmental Studies at JHU
offers degree-seeking students opportunities for intensive
international study in the summer. The basic format is two
intensive course meetings and readings with JHU professors
before the students leave; spending one or two weeks abroad
with classes about four and a half hours a day and field trips or
other exercises; and a research project or major paper due after
students return.

Study abroad course options to date or
planned are:

Scotland and France: The Birth of Modern Democracy
The purpose of this course is to explore the roots of liberal
democracy, focusing in particular on the development of the
free market and religious toleration. Two distinctive approaches
can be discerned, one represented by the liberal-democratic
movement in Great Britain and the other in France. The British
version of liberal democracy is characterized by its embrace
of reason, but reason tempered by the “moral sentiments”. It
was also more focused on economic questions as with Adam
Smith’s advocacy of the free market. In contrast, the French
Enlightenment represented a more full-throated and radical
embrace of reason leading to the critique of supernatural
religion and the advocacy of secularism as the path to
achieve liberty, progress, and toleration. Together these two
models of democratic development have decisively shaped
modern political culture in Europe, the United States, and
newly emerging democracies. Our course will focus on the
intellectual origins of these foundational ideas. The course will
also meet with French and Scottish policymakers to examine
contemporary political issues impacting Europe, such as the
law of laïcité (secularism) in France, the Scottish separatist
movement in Great Britain, in addition to the impact of the new
immigration on liberal democratic institutions in Europe.

India: Politics, Security and Culture in India
This course provides an overview of India’s domestic politics
and its role in the international system. Through class session
in DC and an intense 9-day schedule of tours, site visits, lectures
and discussions in India, we will explore the politics and culture
of the world’s most populous democracy and South Asia’s
regional hegemon. The class will travel to the Indian capital, New
Delhi, and will also spend two days in Amritsar, a cultural center
of the state of Punjab, and a city close to the Pakistani border.

England and Normandy: Command and Leadership in
Modern War
This study-abroad course brings students to London, England
and Normandy, France for an exploration of leadership at all
levels of war from the strategic to the small-unit tactical. The
course also explores civil-military relations and the role of
civilian leadership in the development and execution of military
plans. Although the course covers command and leadership in
general, its focus is on the Allied invasion of Normandy in June
1944 and the ensuing campaign in France to provide particular
cases in point. Students visit points of interest in London,
and then travel to Portsmouth, a major port of the Royal Navy
which figured heavily in D-Day landings. In Portsmouth, the
class embarks on overnight ferries across the English channel
toward Normandy, just as Allied troops did in 1944. The class
will disembark in Caen, France, a major allied objective and site
of a complicated British-led battle. For the next few days, against
the backdrop of Normandy’s idyllic countryside, the class will
tour the landing beaches and the key sites of the ultimate Allied
breakout, standing on the same ground as the commanders in
1944 and discussing the decisions they made and the influences
acting upon them at the time.

Israel: Politics, Security and Culture in Israel
Concerns over security inform the politics and culture of Israel,
but the politics and culture of Israel have likewise shaped the
way that Israel perceives its security challenges. The purpose
of this course was to familiarize students with these mutually
reinforcing dynamics, and help them understand the complexity
of interacting with Israel and Israelis. In addition to three class
sessions in Washington, DC, students spent one week in Israel.
Through discussions with Palestinians and Israelis, mayors
and average citizens, members of Knesset and taxi drivers, they
gained an understanding of one of the most intractable and
important conflicts of our time. The course pushed students to
analyze Israeli politics in detail, learning about the secular and
religious parties, the multiple cleavages within society, Israel’s
internal security politics and foreign relations, and above all, the
core importance of territory and space.

Belgium/Germany: Environmental Governance, Climate
Change and Energy Security in Europe and America at
the University of Leuven near Brussels, Belgium (with a two-day trip to
Berlin, Germany).
The negotiations leading up to the Copenhagen Accord at the
United Nations Framework Convention on Climate Change
in December 2009, provided a glimpse of what could be a
new structure of world power in which resource scarcity and
energy security play an increasingly central role. This course
compared the European and US approaches to climate change
and international efforts to address it. The evolving nature
of environmental governance in Europe and the US also
was explored from a comparative perspective. How energy
security is defined and being pursued by countries such as
Germany was examined as well. Included field trips to the
European parliament and regional committees to meet with
European Union officials and others involved in environmental
policymaking. The class also traveled to Berlin, Germany to meet
with German environmental policymakers addressing climate
change and energy security.
Italy: The US and the European Union: (EU) Allies, Partners or Rivals? at the SAIS-Bologna Center in Bologna Italy.

This course analyzed, discussed, and debated the importance of the vast business, economic, political, and cultural relations that exist between the United States and the major European nations and between the United States and the EU. The world’s largest trade and investment partnership is between American and European companies. The course looked at the inner workings of the EU and how the European Commission makes trade and foreign policy decisions. Students meet with European commissioners and other high ranking EU officials through field trips to Rome and other European capitals.

Mexico: Policymaking in the US and Latin America: Perceptions and Misconceptions at CIDE University in Mexico City.

This course introduced students to major political trends in Latin America and the state of US relationships with countries in the region. The course provided an overview of the history of countries in the region and the US relationship with each. Classes in Mexico focused on Latin American integration, security, politics and US–Latin American relations. Field trips included visits to embassies, trips to meet with Mexican congressional staff and key government agency staff. Cultural trips included going to the “Bellas Artes,” the pyramids, and the historical downtown of Mexico City.

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, and the Certificate in Nonprofit Management require:

- A grade point average of at least a minimum of 3.0 on a 4.0 scale
- Minimum GPA of 3.0 does not guarantee admission
- Particular interests and work experience will also be considered

Application Documents

- AAP application and fee
- Official undergraduate transcripts and graduate transcripts from all institutions attended, not just the degree granting institution(s)
- A current résumé
- Two letters of recommendation
- GRE is not required but will be considered if submitted
- A statement of purpose (1-2 pages) that explains the applicant’s reasons for seeking admission and includes a plan of study addressing the applicant’s analytical abilities and interest in studying the theory and practice of government and politics.
- A writing sample or a 5-page, double-spaced essay 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 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 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 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
> Symposia (for more information visit advanced.jhu.edu/academic/government/symposia)

For more information about core and elective courses, please see the Course Descriptions below. Please note that not all electives are available each semester.

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 or term begins. Courses are open only to students who meet enrollment requirements. All classes are held at the Johns Hopkins University (JHU) Washington, DC Center at 1717 Massachusetts Avenue, NW, close to Dupont Circle. Select online courses are also offered every semester.

CURRICULUM

The curriculum of the JHU 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. There is an active speaker and symposia calendar of events as well, and students are required to attend two symposia events during each semester that they are enrolled in classes.

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., their third or fourth 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 Legal Studies. The concentration in Political Communication provides students with the opportunity to study with practitioners in the field: reporters, political operatives, journalists, and campaign and news and media professionals. The concentration in Security Studies covers the fundamentals of administering and preserving American security. The concentration in Legal Studies provides students with an opportunity to better understand the interaction between political and governmental institutions in the legal and criminal justice system and related legal and ethical issues. 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 which 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 8-10 pages and a conclusion of similar length which both add res to 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 Introduction to Quantitative Research 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.

**CORE COURSES AND THESIS**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>470.602</td>
<td>Government and Politics in the United States</td>
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<tr>
<td>470.850</td>
<td>Research and Thesis I</td>
</tr>
<tr>
<td>470.852</td>
<td>Research and Thesis II OR</td>
</tr>
<tr>
<td>470.709</td>
<td>Introduction to Quantitative Research Methods (may be substituted, with permission of the instructor)</td>
</tr>
<tr>
<td>470.800</td>
<td>Research and Thesis III</td>
</tr>
<tr>
<td>470.655</td>
<td>Multinationals and Governments in the Age of Globalization</td>
</tr>
<tr>
<td>470.661</td>
<td>Constitutional Law</td>
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<tr>
<td>470.662</td>
<td>Theory and Politics of Terrorism</td>
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<tr>
<td>470.697</td>
<td>Nuclear Weapons and US Foreign Policy</td>
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<tr>
<td>470.711</td>
<td>Intelligence: From Secrets to Policy</td>
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<tr>
<td>470.756</td>
<td>Fanaticism and the Islamic World</td>
</tr>
<tr>
<td>470.762</td>
<td>US-Mexico Relations: Migration, Trade, and Organized Crime</td>
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<tr>
<td>470.768</td>
<td>Nation Building as Security Policy</td>
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<tr>
<td>406.670</td>
<td>Crisis Management</td>
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**Legal Studies Concentration**

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>470.610</td>
<td>American Political Thought</td>
</tr>
<tr>
<td>470.616</td>
<td>Law of Public Institutions</td>
</tr>
<tr>
<td>470.617</td>
<td>The Courts and Public Policy</td>
</tr>
<tr>
<td>470.661</td>
<td>Constitutional Law</td>
</tr>
<tr>
<td>470.674</td>
<td>Administrative Law</td>
</tr>
<tr>
<td>470.705</td>
<td>The Majesty of the Law</td>
</tr>
<tr>
<td>470.712</td>
<td>The American Civil Trial</td>
</tr>
<tr>
<td>470.721</td>
<td>Business Law and Corporations in the Global Economy</td>
</tr>
<tr>
<td>470.727</td>
<td>Equality Law</td>
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<tr>
<td>470.730</td>
<td>Intellectual Property Law</td>
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</table>

**Political Communication Concentration**

Select four.

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>470.609</td>
<td>Leadership Skills in the 21st Century</td>
</tr>
<tr>
<td>470.615</td>
<td>Speechwriting: Theory and Practice</td>
</tr>
<tr>
<td>470.622</td>
<td>Interest Groups, Lobbying, and Policymaking</td>
</tr>
<tr>
<td>480.623</td>
<td>Political Communication: Campaigns</td>
</tr>
<tr>
<td>470.626</td>
<td>Understanding the Media: Old and New</td>
</tr>
<tr>
<td>470.637</td>
<td>Lobbying and Influence</td>
</tr>
<tr>
<td>470.638</td>
<td>Negotiating as a Leadership Skill</td>
</tr>
<tr>
<td>470.649</td>
<td>Behind the Numbers: Polling and American Elections</td>
</tr>
<tr>
<td>470.652</td>
<td>Political Psychology</td>
</tr>
<tr>
<td>470.657</td>
<td>Politics, Media and the Culture Wars</td>
</tr>
<tr>
<td>470.735</td>
<td>Politics and the New Journalism</td>
</tr>
<tr>
<td>470.737</td>
<td>The Media and Presidential Politics</td>
</tr>
<tr>
<td>470.749</td>
<td>Changing News Cycles</td>
</tr>
<tr>
<td>470.757</td>
<td>Nonfiction Writing and Politics</td>
</tr>
<tr>
<td>470.687</td>
<td>The Political and Social Media Revolutions</td>
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</tbody>
</table>

**Security Studies Concentration**

Select four. *Note: Any course offering in the MA in Global Security Studies counts toward this concentration.*

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>470.620</td>
<td>Environmental Policymaking in the Global Economy</td>
</tr>
<tr>
<td>470.654</td>
<td>Global Trade, Policy, and Competition</td>
</tr>
<tr>
<td>470.632</td>
<td>Defense Policy</td>
</tr>
<tr>
<td>470.633</td>
<td>Analyzing Military Policy</td>
</tr>
<tr>
<td>470.644</td>
<td>Democracy and Its Modern Critics</td>
</tr>
</tbody>
</table>

For electives, see page 119.
Master of Arts in Government/MBA
Dual Degree Program with the Carey Business School

government.jhu.edu

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 (JHU) 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 advisor from each school who will oversee their course work. To earn the MA in Government/MBA students must take 10 classes in the Government Program and 20 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.

ADMISSION REQUIREMENTS

Please refer to the Center for Advanced Governmental Studies page for specific admissions requirements for the MA in Government Program.

Application Documents

- AAP application and fee
- GRE or GMAT*
- A current résumé
- Two letters of recommendation that verify professional and/or academic accomplishments. Applicants must use the AAP form.
- A statement of purpose (1-2 pages). The statement of purpose is the most important document the applicant is asked to submit. This statement should address the applicant’s academic and professional goals.
- Official undergraduate transcripts
- International students must submit TOEFL scores and a “course-by-course” credential evaluation of your undergraduate transcript performed by an outside evaluation service.

*Note: Applicants to the dual degree program who meet specific conditions outlined by the Carey Business School may be eligible for a waiver of the GMAT. The GMAT is the desired standardized test for the Carey Business School. Contact Carey directly for terms and conditions, carey.jhu.edu. The MS in Government does not currently require the GRE or GMAT.
CURRICULUM

All dual degree students are required to complete the following:

MA in Government Courses
1. 470.695 Proseminar: Essentials of Public and Private Management
2. 470.602 Government and Politics in the US
3. Eight additional Government courses

Although not required, the following MA in Government courses are recommended electives for students in the dual degree program:
> 470.609 Leadership Skills in the 21st Century
> 470.616 Law of Public Institutions
> 470.619 State Politics and Policymaking
> 470.622 Interest Groups, Lobbying, and Policymaking
> 470.630 Government, Banking, and the Financial System
> 470.635 Presidential Policymaking
> 470.638 Negotiating as Leadership Skill
> 470.641 Government by Contracts
> 470.645 The Budgetary Process
> 470.655 Multinationals and Government in the Age of Globalization
> 470.688 Political Institutions and the Policy Process
> 470.721 Business Law and Corporations in the Global Economy
> 470.728 Influence and Impacts of Nonprofits
> 470.730 Intellectual Property Law
> 470.736 Principles of Nonprofit Management
> 470.738 The Global Economic Crisis
> 470.744 Trade and Security
> 470.850 and 470.852 Research and Thesis I, II (this course is required for MA/MBA students who write a master's thesis)
> Thesis (optional for MA in Government/MBA candidates but strongly recommended; MA/MBA students who successfully complete and defend their thesis will be awarded Honors at graduation)

Students wishing to earn a concentration may take a fourth elective. Concentrations are offered in Political Communication, Security Studies, and Legal Studies.

To earn a concentration, students must take four classes in that subject area. For details on these concentrations and a full list of classes and descriptions, see the AAP course catalog or web site: advanced.jhu.edu.

MBA Courses
All dual degree students are required to complete the following MBA courses:
1. 120.601 Business Communication
2. 121.610 Negotiation
3. 131.601 Leadership Ethics Seminar
4. 132.601 Business Law
5. 142.620 Leadership in Organizations
6. 151.620 Global Strategy
8. 220.610 The Firm & the Macroeconomy
9. 220.620 Economics for Decision-Making
10. 231.620 Corporate Finance
11. 232.701 Investments
12. 310.620 Information Systems
13. 410.620 Customer Focused Marketing
14. 510.601 Statistical Analysis
15. 520.601 Decision Models
16. 680.620 Operations Management
17. Elective
18. Elective
19. Elective
20. 151.790 Strategic Management capstone course (16 weeks)

Some of these courses can be waived with replacements if the student passes a waiver exam or has taken an equivalent graduate-level class in the last three years with a B or better.

For information on specific courses see the MBA catalog.

For electives, see page 119.
Master of Arts in Global Security Studies

global-security.jhu.edu

**COURSE REQUIREMENTS***

> Four core courses
> Five elective courses
> Three required thesis module courses
> Symposia (for more information visit advanced.jhu.edu/academic/government/symposia)

For more information about core, thesis module and elective courses, please see the Course Descriptions below. Please note that not all courses are available each semester.

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 or term begins. Courses are open only to students who meet enrollment requirements. All classes are held at the Johns Hopkins University (JHU) Washington, DC Center at 1717 Massachusetts Avenue, NW, close to Dupont Circle.

**CURRICULUM**

The curriculum of the JHU Master of Arts in Global Security Studies (GSS) is designed for working adult students who are looking to expand their expertise in the challenges of security in the 21st century, with an eye to developing the perspective necessary to lead the formation of policy in this important area.

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 enhanced 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 must take the core course, American National Security in the 21st Century (470.606) in their first semester. Students should take Research and Thesis I early in the program (i.e. in their second or third semester). Research and Thesis II should follow shortly after. The final required course of the program is Research and Thesis III, which students take after completing all other core courses and electives. The other cores and elective courses may be taken in any order.

In addition to American National Security, there are three other core classes. Each reflects a key dimension of global security: strategic studies, economic security, and energy and environmental security. Students must also take five elective courses from the list below.

Students may (but are not required to) 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 area of concentration courses also count as general electives for students not pursuing an area of concentration.

**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 8-10 pages which elaborates on the contribution that these papers make to the existing literature and further addresses the way in which the three papers are interrelated.

During Research and Thesis I, students will study research and writing methods and write the first paper of their thesis portfolio as well as develop a written prospectus for the portfolio as a whole. 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. 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 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.
CORE COURSES

470.606  American National Security in the 21st Century
470.605  Global Political Economy
470.692  Military Strategy and National Policy
470.773  Energy and Environmental Security OR
470.734  Energy, Vulnerability and War

THESIS COURSES

470.851  Research and Thesis I: Global Security Studies
470.853  Research and Thesis II: Global Security Studies OR
470.709  Introduction to Quantitative Research Methods
(with permission from instructor)
470.804  Research and Thesis III: Global Security Studies

SAMPLE CONCENTRATION COURSES

Students may (but are not required to) pursue an area of concentration in one of the fields listed below. A complete list of concentration courses is available on our website.

Strategic Studies Concentration

470.704  Strategies in Insurgent and Asymmetric Warfare
470.711  Intelligence: From Secrets to Policy
470.731  Terrorism and Counter-terrorism in Theory and Practice
470.733  US Security Policy in the Middle East
470.740  Conflict and Security in Cyberspace
470.743  Nuclear Deterrence, Arms Control & Non-Proliferation in a Changing World
470.764  From Information Warfare to Information Power
470.785  The American Way of War
470.797  Special Operations in a Strategic Context

Economic Security Concentration

440.636  Economics of Defense
470.630  Government, Banking and the Financial System
470.655  Multinationals and Governments in the Age of Globalization
470.738  The Global Economic Crisis
470.744  Trade and Security
470.761  Ruling the 21st Century: Economic Success, Military Strength, and the Rise and Fall of Powers
470.765  The Tools of Economic Diplomacy
470.766  Economic Growth: The Politics of Development in Asia, Africa and Beyond
470.771  Climate Change Economics

Energy and Environmental Security Concentration

420.614  Environmental Policymaking and Policy Analysis
420.657  Environmental Issues and Congressional Policymaking
470.734  Energy, Vulnerability and War
470.755  Environmental Governance, Climate Change and Energy Security in Europe and America

SAMPLE ELECTIVES

These courses count toward the degree but not to any area of concentration. This is not a comprehensive list of electives; rather a sampling. All 470 courses count for the GSS elective requirement.

470.607  Understanding US-Pakistan Security Relations
470.653  Contemporary Russian Politics
470.663  Administering Homeland Security
470.666  Aristotle in the Atomic Age: Classic Political Thinkers & Contemporary International Relations
470.676  Understanding Islamist Terrorism
470.678  Governing in Mexico and America: Trade, Migration and Security
470.700  Islamic Fundamentalism
470.708  Public Diplomacy and Arab Public Opinion
470.709  Introduction to Quantitative Research Methods
470.725  China and America: Governance Alternatives for the 21st Century
470.739  Communications and Emergency Management
470.741  Democracy, Elections and US Foreign Policy
470.746  Understanding Contemporary Iran
470.762  US-Mexico Relations: Migration, Trade, & Organized Crime
470.768  Nation-building as Security Policy
470.779  Political and Security Issues in the Middle East
470.784  Politics, Culture, and Security in Israel
470.794  US Foreign Policy in Asia: The Rise of China

COURSE DESCRIPTIONS

Core Courses

The four core courses provide an overview of the themes addressed by the GSS degree and the thesis module courses teach the methodology of social scientific inquiry. As noted above, students are required to take American National Security in the 21st Century (470.606) in their first semester. Research and Thesis I: Global Security Studies should be taken in the second semester of study.

Other cores and electives may be distributed as fits with the student’s schedule.

470.606  American National Security in the 21st Century
This class explores the complex, global, political environment in which the United States pursues its interests. The purpose of the class is to provide an overview of the political, economic,
social and environmental challenges which shape and constrain the policy options available to decision makers. Topics explored include terrorism, WMD, conventional threats, civil war, economic stability and more.

**470.605 Global Political Economy**
This class provides students with the tools to understand the international political economy (IPE). In the introductory sessions, students will become familiar with the ideas of the principal theorists who have shaped IPE, from Adam Smith through to the present day. Next, students will apply this theoretical background and explore the most pressing issues in the contemporary global economy, including international monetary economics, financial markets, world trade and development. This course has no prerequisites.

**470.692 Military Strategy and National Policy**
“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.

**470.773 Energy and Environmental Security**
This course surveys the multiple and overlapping aspects of energy security and environmental security. The main emphasis is on how increased competition for environmental and energy resources threaten international security and how these threats should be mitigated. Throughout the course neoliberal and geopolitical approaches to energy and environmental security are used to better understand the risks and opportunities involved in an era of increasing scarcity.

**Thesis Courses**

**470.851 Research and Thesis I: Global Security Studies**
The goal of this class is to provide an introduction to research methods in the security studies and international relations fields. Students will work closely with the instructor to refine their thesis topic, develop their research design and methodology, and compile their research. By the end of the course, students will have completed the first paper of their thesis portfolio.

**470.853 Research and Thesis II: Global Security Studies**
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 as well. 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.

**470.804 Research and Thesis III: Global Security Studies**
The purpose of this class is for students to complete their thesis portfolio, revise all papers to final form and craft the introduction and conclusion to their thesis. The class also prepares students for the public defense of their thesis.

**Elective Courses**
Electives need to be chosen in consultation with the student’s advisor and should accommodate professional and/or personal goals. Students may also consider and take up to two of the relevant offerings of the School of Public Health, the School of Advanced International Studies, and of other programs in the School of Arts and Sciences.

For electives, see page 119.
Master of Arts in Public Management

http://publicmanagement.jhu.edu

**COURSE REQUIREMENTS**

- Four core courses
- Seven elective courses
- Capstone
- Symposia (for more information visit advanced.jhu.edu/academic/government/symposia)

For more information about core and elective courses, please visit publicmanagement.jhu.edu. Please note that not all courses are available each semester.

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 or term begins. Courses are open only to students who meet enrollment requirements. All classes are held at the Johns Hopkins University (JHU) Washington, DC Center at 1717 Massachusetts Avenue, NW, close to Dupont Circle. Some courses are offered online.

Please see the website for a comprehensive list of approved elective courses.

**CURRICULUM**

The MA in Public Management combines rigorous academics and strategic skills to meet the challenges of government and policymaking in the 21st Century.

While empowering students to be strategic, the program also educates them in the fundamentals of public management: financial management, policy analysis, economics, tax and budget policy, 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 government-related sector, and nonprofits. Courses may be taken at a full- or part-time pace. At a time when governments and nonprofits at all levels are expected to do more with less, good management is essential. This innovative degree recognizes the interdependence of governmental and nonprofit sectors and their common ground in mission-driven performance.

The program prepares emerging leaders 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 course Public Policy and the Policy Process in their first semester. Students are strongly encouraged to complete the other core course requirement as early in their program of study as possible. The final required course of the program is the Capstone for Public Management, which students can only take in their final semester.

**Capstone**

The Capstone project enables students to apply and synthesize their knowledge, develop expertise on a topic related to public management, work closely with experts in the field, and improve professional writing and presentation skills.

In the semester prior to taking the Capstone course and conducting the project, students identify a project topic and mentor. The mentor may be a faculty member teaching in the program, a supervisor from the student’s place of work, or an expert with appropriate credentials.

**CORE COURSES AND CAPSTONE**

All students must take one of the following courses:

- 470.695 Proseminar: Essentials of Public and Private Management OR
- 470.709 Introduction to Quantitative Research Methods OR
- 470.736 Principles of Nonprofit Management

All students must take the following four courses:

- 470.608 Public Policy Analysis and the Policy Process (formerly Public Policy and the Policy Process)
- 470.627 Financial Management and Analysis in the Public Sector
- 470.631 Economics for Public Decision-Making
- 470.860 Capstone for Public Management

**PROGRAM ADVISING**

Paul Weinstein Jr.
202.663.5923
pweinst3@jhu.edu
ELECTIVES

Electives need to be chosen in consultation with the student’s advisor and should accommodate professional and/or personal goals. Students may also consider and take up to two of the relevant offerings of the School of Public Health, the School of Advanced International Studies, and of other programs in the School of Arts and Sciences.

Sample Electives

470.612 Bureaucratic Politics
470.613 Political Theory and Social Policy
470.616 Law of Public Institutions
470.618 Congressional Policymaking
470.619 State Politics and Policymaking
470.620 Environmental Policymaking in the Global Economy
470.621 Public Policy and Participatory Government
470.629 The Politics of Health Care Policy
470.630 Government, Banking, and the Financial System
470.632 Defense Policy
470.634 Foreign Policy in the Age of Global Terrorism
470.635 Presidential Policymaking
470.638 Negotiating as a Leadership Skill
470.645 The Budgetary Process
470.646 Social Welfare Policy
470.663 Administering Homeland Security
470.667 The Administrative State: How Washington Regulates
470.673 Seminar in Criminal Justice Administration
470.674 Administrative Law
470.684 Legislative Language and Policymaking
470.688 Political Institutions and the Policy Process
470.706 Federalism: The Dynamic Interplay Between the States and Capitol Hill
470.709 Introduction to Quantitative Research Methods
470.726 Education Policy and Federalism
470.727 Equality Law
470.728 Influence and Impact of Nonprofits
470.729 The Presidency and Congress
470.730 Intellectual Property Law
470.736 Principles of Nonprofit Management
470.738 Negotiating as a Leadership Skill
470.740 Problems in State and Local Government: Can They Be Fixed?
470.741 Global Climate Change and US Energy Security
470.744 Nonprofit Governance and Executive Leadership
470.747 Federal Contracting Law
470.749 Medicine, Society, and the Transformation of Health Care in America

Core Courses

Students must take four core courses plus the Capstone

All students must complete one of the following three courses:

470.695 Proseminar: Essentials of Public and Private Management

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.

470.709 Introduction to Quantitative Research Methods

Solutions to both political and policy problems increasingly require an understanding of how to analyze data. Campaigns collect data to identify potential supporters and donors. Government agencies analyze data to evaluate programs. Research organizations use data to support their policy positions. This course will provide you with the knowledge and skills needed to perform a cutting-edge statistical analysis. You will learn how to design and test regression models using Stata, an incredibly powerful and widely-used statistical software package. The focus of the course will be on using statistical methods in an applied manner. We will concentrate on using statistics to answer political and policy questions, and not the underlying mathematical theories themselves. There is no prerequisite; only an interest in and commitment to learning quantitative methods are required.

470.736 Principles of Nonprofit Management

Successful nonprofits need to have strong management systems in place in order to assure quality programs for service and impact. The systems include management of finances, human resources (including volunteers), physical plant and equipment, 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. Many of the principles we recommend as “best practice” can be applied to nongovernmental organizations in other countries that have to adjust to changing donor interests and requirements, or deal with public attitudes toward non-state actors.
All Students must complete each of the following four courses:

470.608  Public Policy Analysis and the Policy Process  
*Formerly Public Policy and the Policy Process*

This course is designed to introduce students to the public policy making 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 the 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.

470.627  Financial Management and Analysis in the Public Sector

The basic tools for financial management and analysis are covered in this course with a focus on those aspects that will: 1) provide the necessary 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 covered include legal and audit requirements for financial reporting including FASB, GASB and disclosure laws and other legal requirements related to nonprofit finance, including intermediate sanctions legislation, and state and federal registration requirements. The course will also address reading and interpreting financial statements and assessing financial health through such measures as ratio analysis. The students will learn about basic management tools such as policies for internal controls, investments, purchasing and procurement, and basic analytical tools such as cash flow projections, overhead and indirect costs, budgeted deficits, depreciation and valuation of property.

470.631  Economics for Public Decision-making

This course provides a basic understanding of macro and microeconomics. Students will be given a survey of conventional economic theory and asked to think critically about when markets function properly versus when government interventions are necessary to achieve desired outcomes. Students will also learn how to apply economic thinking to a number of public policy areas including taxation, entitlement spending, environmental/energy policy, monetary policy and economic stimulus.

470.860  Capstone for Public Management

The Capstone seminar is the culmination of the M.A. in Public Management and is where students will integrate and build on their previous coursework in the program to apply it to “real world” public policy and management problems. Students will identify and analyze a management or policy issue or problem and propose a solution during this semester long seminar. This original work can be for the organization or agency for which the student works or for a hypothetical organization, but is an opportunity to apply tools to the particular needs of an organization and implement project planning. The Capstone can be a case study of a management issue or another piece of analytical work such as a strategic plan.

For electives, see page 119.
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 coursework 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 US 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 at the forefront of their field.

COURSE REQUIREMENTS

Six online courses are necessary to complete the certificate, which students may complete on its own or in addition to any advanced degree program at Johns Hopkins University. The courses are:

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

Students pursuing the formal certificate should complete “Influence and Impact of Nonprofits” and “Principles of Nonprofit Management” before enrolling in the four remaining courses. These two courses are offered each fall and spring semester.

PROGRAM ADVISING

Char Mollison
nonprofit@jhu.edu
202.663.5875

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.

An orientation course introduces the students to the online learning tools and is required before taking the first online class.
Elective Courses
Government, Global Security Studies, and Public Management

470.607 Understanding US-Pakistan Security Relations
The United States has provided over $20 billion in aid to Pakistan since 2002, but US-Pakistan relations are at their most precarious point in a decade. The relationship is characterized by contradictions and dilemmas, and the stakes are high, as Pakistan is home to the world's most insecure nuclear arsenal. It is also a hideout for Al-Qaeda and other extremist groups that seek to attack the United States and derail US efforts in Afghanistan. This course will assess the future of US-Pakistan relations by analyzing the opportunities and constraints that shape them. It provides an in-depth tour of Pakistan's domestic and international politics. On the domestic side, we will examine its political institutions, civil-military relations, ethnic and regional conflicts, and the role of religion in government. On the international side, we will consider Pakistan's relations with India, the conflict in Kashmir, the role of Afghanistan in its security considerations, and regional balances of power between Pakistan, India and China. Throughout, we will pay particular attention to the implications of these complex dynamics for US foreign policy in the region.

470.608 Public Policy Analysis and the Policy Process
Formerly Public Policy and the Policy Process
This course is designed to introduce students to the public policy making 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.

470.609 Leadership Skills in the 21st Century
This course will assist leaders in identifying their personal approach to leadership; provide tips on motivating staff 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.

470.610 American Political Thought
America is, as one political scientist famously termed it, the first new nation, one dedicated to the principles of natural right and equality. 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. The course 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. These primary readings are organized using categories from classic political philosophy to cast light on the ideals of American democracy: we will begin with the vision of the lawmakers, then move on to the philosophic perspective of an early student of American democracy, Alexis de Tocqueville. We will spend several classes analyzing the speeches of the statesman, Lincoln, before concluding with the views of America’s poet, Mark Twain.

470.611 American Conservative Political Thought
This course examines the different strands of American conservative political thought. Readings from Edmund Burke, Leo Strauss, Michael Oakeshott, Russell Kirk, T.S. Eliot, Friedrich Hayek and others help students to delineate the intellectual foundations of modern conservative thought. Students focus on the trajectory of American conservative political thought from the founding to the present and compare Southern conservative, neoconservative, religious conservative and libertarian writers.

470.612 Bureaucratic Politics
Formerly Politics Inside the Administrative State
This course investigates the politics of organizational management in the federal executive establishment. Topics include administrative history, public law, the co-management of the President and Congress, the role of central managerial agencies, the world view of agency chiefs, government corporations and enterprises, third-party management, quasi-governmental institutions, and current issues of concern to the management of the federal bureaucracy.

470.613 Political Theory and Social Policy
Formerly Social Justice and Social Policy
This course examines the long-standing controversies in political theory—such as need, equality, fairness, personal responsibility, the family, and the role of government, the market, and voluntary organizations—and their expression in contemporary American social policy. Thinkers explored include Max Weber, Milton Friedman, John Rawls, Sheldon Wolin and Lawrence Mead. Policy areas examined include welfare reform, “compassionate conservatism,” “faith-based initiatives,” and “living-wage” campaigns. The course provides students with an intellectual framework for understanding the theoretical and political dimensions of contemporary social policy.

470.614 American Liberal Political Thought
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 Speech writing: Theory and Practice
The theory and practice of speech writing 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 Law of Public Institutions
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 as Agents of Change
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 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 areas include public policy regarding civil rights, family and domestic law, environmental and safety regulation, and the regulation of business and commerce. At the end of the course, students are asked to evaluate the implications of the courts’ involvement in important current policy issues such as the regulation of the tobacco and computer industries.

470.618 Congressional Policymaking
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.

470.619 State Politics and Policymaking
This course provides an introduction to the form and function of state governments around the United States and the issues they are currently facing. During the semester, the course explores the interplay between the US Congress and state legislatures, the ways in which policies enacted by state government impact our daily lives, and the intricacies of the political process at the state level. Special emphasis will be placed on key issues currently being debated in many state capitals pertaining to gay marriage, gambling, health care, higher education, transportation infrastructure and the environment. A trip to the Maryland General Assembly to meet with the governor and legislative leaders might be arranged.

470.620 Environmental Policymaking in the Global Economy
Formerly Environmental Law and Politics
Governments and companies around the world are changing the ways in which they address environmental protection. In the United States, the costly and burdensome implementation of the command-and-control system of environmental regulation devised in the 1970s, continues to spur innovative alternatives. These alternatives rely on “beyond compliance” incentives for businesses and mechanisms to conserve government resources while reaping measurable environmental benefits. Students in this course examine the different policy approaches being taken domestically and internationally and determine if they are sufficient to address the environmental issues posing the greatest challenges to the planet. Problems investigated include climate change and chemical risks in our food, water and workplace. Pollution prevention and sustainable development programs, such as the voluntary ISO 14000 environmental management standards, are examined. The impact of the “greening” of the global economy on general business practices and public policy responses is also assessed.

470.621 Public Policy and Participatory Government
The drive toward greater participation in our democracy continues. More openness in the administrative process has resulted in more openness in the policymaking system. Citizen suits, increased use of referenda, and right-to-know legislation have had consequences in each of the branches of government. Students in this course are introduced to the historical background of participatory democracy. They then explore the specific kinds of participation possible in the modern technological age. Case studies of policy areas such as health care and environmental protection help to assess what more participation and more public access mean for the policy process and our system of representative democracy.

470.622 Interest Groups, Lobbying, and Policymaking
This course examines the role of interest groups in American politics and how they seek to influence public policymaking. The media and many Washington observers believe interest groups and lobbyists exert too much influence; many political scientists take an opposite view. This course weighs each position. Other topics include the role of Political Action Committees and grassroots programs; the tactics and techniques employed by Washington lobbyists; the influence of foreign interests; recent lobbying reforms and the need, if any, for further reform.

470.623 Program Development and Evaluation
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 four major types of programs: those serving individuals, those serving communities, those serving networks or systems, and those serving other organizations. We will explore the role of culture and context in choosing particular approaches to evaluation and also the 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. 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.

470.624 Business and Human Rights in the Global Economy
Corporations operating around the world today are finding their overseas business practices subject to greater scrutiny from human rights and other civil society groups and, at times, national governments and international organizations as well. An understanding of, and strategy for addressing, the implications of this changing business environment is critical to those making policy decisions within corporations, nongovernmental groups, and many parts of government. This course will examine the different facets of the evolving relationship between business, civil society, and government with an eye towards identifying ways to respond effectively to new policy challenges.

470.625 Resource Development and Marketing
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.

470.626 Understanding the Media
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 and Analysis in the Public Sector
The basic tools for financial management and analysis are covered in this course with a focus on those aspects that will: 1) provide the necessary 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 covered include legal and audit requirements for financial reporting including FASB, GASB and disclosure laws and other legal requirements related to nonprofit finance, including intermediate sanctions legislation, and state and federal registration requirements. The course will also address reading and interpreting financial statements and assessing financial health through such measures as ratio analysis. The students will learn about basic management tools such as policies for internal controls, investments, purchasing and procurement, and basic analytical tools such as cash flow projections, overhead and indirect costs, budgeted deficits, depreciation and valuation of property.

670.628 Primaries, Caucuses, and Conventions and the General Election: The 2008 Road to the White House
Students in this course gain a practical understanding of the election process. Logistical issues to be explored include the campaign structure, hierarchy, field operations, precinct organization, scheduling, advance, voter targeting and budgets. Students come to appreciate the importance of campaign financing, contemporary advertising techniques, the manipulation of the press, and the increasing power of campaign consultants. Course materials distinguish between local and national campaigns and discuss the impact of trends, issues and ideology, as well as the relationship between campaigning and public policy. The complexity of the process is demonstrated by dissecting a number of recent campaigns.

470.629 The Politics of Health Care Policy
This course introduces students to the political actors and influences that determine the nature of health care policy. Particular emphasis is placed upon the following areas: the debate over public versus private provision of health care; the availability of health insurance; health promotion; harm reduction; the role of alternative and complementary medicine; and proposed reforms to the current system, from adoption of a so-called “single payer” system to medical and health savings accounts. The obesity epidemic is featured as a real time case study in the interaction between science and politics. To improve their ability to perform comparative analysis, students are introduced to other nations’ health care systems. Particular emphasis is placed upon Canada’s Medicare system and the United Kingdom’s National Health Service.

470.630 Government, Banking, and the Financial System
Formerly Government and the Credit Markets
Support for credit markets is one of the government’s most important responsibilities, yet few appreciate the scale of the government’s involvement. This course examines the policy tools the federal government uses to improve the performance of financial markets and enhance the flow of credit to serve public purposes. Students focus on the commercial banking system, federal deposit insurance, the Federal Reserve System and monetary policy; specialized lenders such as thrift institutions and government-sponsored enterprises; and federal loan and loan guarantee programs for housing, education, agriculture and business. Topics also include the balance between the public sector and private financial institutions and the appropriate role of government in today’s fluid economy.
470.631 Economics for Public Decision-Making
This course provides a basic understanding of macro and microeconomics. Students will be given a survey of conventional economic theory and asked to think critically about when markets function properly versus when government interventions are necessary to achieve desired outcomes. Students will also learn how to apply economic thinking to a number of public policy areas including taxation, entitlement spending, environmental/energy policy, monetary policy and economic stimulus.

470.632 Defense Policy
Today's military is undergoing dramatic transitions from its Cold War force structure to one suited to an interwar period with respect to great power conflict. This course provides students with an understanding of defense policymaking in a period characterized by strategic uncertainty. It poses the question of whether the United States is producing a smaller Cold War military or a different force aligned with present needs. The course pays particular attention to the character, organization, and equipment of the uniformed services, the civilian leadership in the Office of the Secretary of Defense, the senior uniformed leadership in the Joint Chiefs of Staff, and congressional and executive office participation in the budget process. Course materials respond to current events.

470.633 Analyzing Military Policy
This course will cover several approaches for evaluating military issues. Methodologies range from simple quantitative tools for understanding combat to structured use of military history to defense budget calculations to simple assessments of military technology. The course will address four main subjects, spending roughly comparable time on each: the defense budget and decisions on defense resource allocations; modeling and simulating combat; understanding issues in military technology such as missile defense and the hypothesis that a revolution in military affairs is underway; military transport, supply, and logistics including airlift, sealift and ground transport.

470.634 Foreign Policy in the Age of Global Terrorism
Formerly Foreign Policy
This course examines the key challenges facing US foreign policy in the new international security environment of the 21st century. Foremost among these challenges are the threats of global terrorism and the proliferation of weapons of mass destruction and the increasing prospects for terrorist groups to acquire such weapons. The various strategies and policies of the US for coping with these threats are evaluated, including consideration of the constraints that act to impede realization of US objectives. Case studies of coercive diplomacy are given special attention as are US efforts to build international security regimes and regional security structures. The rise of radical Islamic fundamentalism is given sustained attention. Other topics considered in the course include the increasing role of the US in the politics of Central Asia; the emergence of serious rifts in the transatlantic alliance; the growing concerns of the US regarding the nuclear ambitions of North Korea and Iran; and the US role in promoting democracy abroad.

470.635 Presidential Policymaking
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. In the final part of the course, students will participate in a simulation that will offer them the opportunity to see firsthand how the policymaking process operates in the executive branch.

470.636 Policy and Communications: The International Stage
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
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 wish to get involved.

470.638 Negotiating as a Leadership Skill
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 to 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 is part of the process of becoming an accomplished negotiator. Students practice their negotiating skills by getting involved in hypothetical cases.

470.640 Media and Politics
Will the media rule the next presidential campaign? With firsthand testimony from veteran reporters and political operatives, this course will illuminate the interaction of journalism and politics that has transformed the way Americans choose their presidents. The lectures and readings will demonstrate that practitioners of both professions bear responsibility for the flaws of the modern system. From the seminal year of 1968 to the Bush-Gore cliffhanger of 2000, students will analyze the lessons of past struggles for the White House and use them as a prism for viewing the early skirmishes of the incipient campaign of 2004 and, more broadly, as a guide to a fuller understanding of national politics.

Formerly Government by Contractors and Other Third Parties
In the global transformation from government to governance—the performance of public purposes by a mix of state, market, and civil society actors—the US has pioneered in the deployment of private contractors and grantees to perform the basic work of government. Since World War II the federal budget has grown dramatically, and federal programs have multiplied. But there has not been an increase in the size of the civil service workforce. How is the government’s work done? This course explores growing official reliance on contractors, grantees, and other third parties in the performance of the basic work of government. The course will investigate the historical, philosophical, and legal underpinnings of the rapid 20th century growth of third party use; consider the current roles of third parties in critical government activities including nation building, homeland security and health care; and place American developments in the context of the ongoing global transformation from government to governance.

470.643 Learning to Win: Military Adaptation in Peace and War
A military organization’s ability to innovate often determines its success or failure in war. This course will utilize military innovation theory to examine why military organizations initiate certain changes and dismiss others. The process by which organizations adapt, either through bottom-up or top-down reforms, will be explored through the use of several case studies. These include the development and evolution of land forces; precision-guided munitions; surface ships and submarines; strategic and tactical air power; nuclear weapons; unmanned aerial vehicles; and counterinsurgency doctrine. Students will investigate the role that domestic politics, military service culture, and resource constraints play in influencing how the national security establishment prepares for and reacts to internal and external threats.

470.644 Democracy and Its Modern Critics
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, National Socialism and Communism. We will also examine the question of Islam and democracy looking at both its proponents and radical critics in the Islamic world. Through this study we will gain insight into the doctrines and appeal of ideologies that have provided the dominant challenges of American foreign policy. Among those whose writings we will examine are Karl Marx, V.I. Lenin, Benito Mussolini, Carl Schmitt, Charles Maurras, Syed Qubb, Ali Shariati, Mukhtar Khan and Ruhollah Khomeini.

470.645 The Budgetary Process
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.

470.646 Social Welfare Policy
American social welfare policy has changed significantly in recent years. This course explores these developments in the context of the nation’s history and political institutions. The course details programs for low-income families, in particular cash assistance and work support programs, tax expenditures, initiatives for children, Medicaid and food stamps, and with attention also to housing, Social Security and health policy more broadly. Students examine the role of national and state political institutions, federalism, race relations, and Americans’ traditional preference for private solutions to social problems.

470.647 International Security and America’s Role in a Troubled World
This course examines the changing requirements for global security and considers the response of the US to meet new kinds of threats. Using domestic policy debates as a backdrop, students explore US security objectives that include strategic and military dimensions but also economic and environmental concerns. In a world that is becoming increasingly interdependent, ethnic nationalism, international migration, and environmental and economic mismanagement pose new challenges to the world community in general, and to the only remaining superpower in particular. This course focuses on the various kinds of international and regional organizations required to meet the global community’s need for security. Students also consider how American foreign policy and diplomacy can make an effective contribution.
470.649 Behind the Numbers: Polling and American Elections
Every entity involved in government and politics, including campaigns, the media, political consulting firms, lobbying firms and federal agencies, uses surveys to measure what the public thinks about various issues. This course provides a hands-on exploration of how public opinion polls are constructed and the role they play in American elections. The first half of the course will focus on survey methodology. In addition to covering topics such as question wording, response psychology and nonresponse bias, students will design their own questions which will be administered on an actual survey (via Mechanical Turk). This original public opinion data may be particularly useful for students whose theses are relevant to public opinion. The second half of the course will examine the influence of public opinion on the election. We will discuss forecasting models, whether campaigns change election outcomes, exit polling and how social media compare to traditional surveys as a means of measuring electoral preferences.

470.650 The American Experience Post-9/11
Formerly American by Experiment and Design
From the Founding Fathers to the denizens of today’s think tanks, a central question for American government has been whether “good government” can be established by “reflection and choice” or whether societies are destined to depend on “accident and force.” Beginning with the drafters of the Constitution, a document that was to initiate a “great experiment,” and continuing through the Progressive Era, the New Deal, and the Great Society, lay and professional experts—including prominent Johns Hopkins University graduates and faculty such as Woodrow Wilson and John Dewey—have sought to provide intelligence, purpose, and method to the course of government. The end of the Cold War and 9/11 may again bring America into a new age of great experimentation.

470.651 Corruption and Other Pathologies of Government
A disturbing number of governments in the world are bad; they are corrupt, tyrannical, incompetent or destructive. Authoritarian, self-serving leaders mis-allocate national resources, steal elections, terrorize citizens, and line their own pockets. Social programs are neglected and the will of the people ignored. Corruption becomes a way of life. Democracy and the rule of law are frustrated, and pathological policies and practices are made legal. Regulations, instead of protecting the public, become instruments of tyranny and petty bureaucracy. How do these things happen? How do we tell them when and why governments become “pathological”? The nature of such pathologies will be examined and frameworks for evaluation presented, drawing on theoretical work, as well as real life international examples and case studies from the US and around the world. Most important, the course will analyze how government pathologies can be prevented, mitigated or resisted. Various practical means for the detection and reduction of corruption will be examined.

470.652 International Comparative Government
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 governments in China, India and Russia. This course deals with the crucial problems of public management, including economic development, social services delivery, public regulation and the performance of governments themselves. Students compare US practices with those in other countries, and discuss the practical problems of delivering public services in environments far more difficult than in the US. 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 Contemporary Russian Politics
This course examines the collapse of Communism, focusing on the pivotal role of the loss of faith in the Soviet ideology. It examines the moral vacuum bequeathed to Russia by Communism and the failure of the post-Soviet reformers to establish a state based on law. Finally, it will consider the rise of a business criminal elite in Russia and its takeover of the machinery of the state, leading to the impoverishment and demoralization of the great majority of the population.

470.654 Global Trade, Policy and Competition
“Global Trade, Policy, and Competition” will explore several topical and complex issues underpinning the Washington-based trade regime. After introducing students to the key Washington, DC actors and agencies that shape and implement trade policy, this course will cover subjects such as how the US defines “fair competition” in the trade context; what remedies can the US Government or the courts provide for “unfair” competition; and how US trade relations with certain partners have changed the context of trade debates over time. Through concrete examples and case studies, students will critically analyze the Government’s role in the creation and execution of trade law and policy, and explore the promises and pitfalls of the trade system when viewed through the lens of businesses of all kinds (big, small, foreign, domestic, producers, importers).

470.655 Democracy, Development, and Globalization
In this course, the main themes 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 concept of development and investigates such issues as whether we can think about political development in the same way that 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
This course examines the historical and institutional development of the American presidency. We will pay particular attention to the growth in executive powers, institutional
capacities, and public expectations associated with the “modern” presidency. In addition, we will consider how shifting partisan alignments and political contexts have shaped presidential leadership from George Washington to George W. Bush.

470.657 Politics, Media, and the Culture Wars
This course examines the political impact of cultural conflict and the prominent role played by the press, television, and the newer forms of media in fanning the flames of cultural conflict. The Culture War has simmered and seethed since the birth of the nation, pitting traditionalists, unrelenting defenders of the social orthodoxy, against modernists agitating for social change. In the turbulent decade of the 1960s, the Culture War erupted in the political arena where it thunders on today, escalated by the mass media. Students will first look at cultural conflict in the early 20th century when the KKK was riding high and evolution, Prohibition, and Al Smith’s Catholicism bitterly divided the nation. Then students will focus on how cultural passions were ignited by the Vietnam War and the Civil Rights revolution and the impact of the public witnessing this turmoil on television. The role of the Culture War in the Clinton impeachment, the 2000 election campaign, the nation’s response to the terrorist assaults of 9/11 and its dramatic impact on the election of 2004 will also be explored.

470.658 Religion and American Political Culture
The relationship between religion and politics in the American context is one of peculiar complexity. 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.

470.660 Foundations of Law and Justice
This is a survey course that examines the conflicting demands, roles, and choices that face law enforcement in a democratic society. This critical analysis explores the challenges confronting the senior practitioner, as well as those that policymakers in the area of law enforcement must consider. It examines such areas as recruitment, training, socialization, the police subculture, management and organization, ethics, police deviance, minorities in law enforcement, and the use of force.

470.661 Constitutional Law
This survey course is designed to introduce students to the foundations of our constitutional system and constitutional analysis. Discussions will focus on the law as well as the related policy, political and societal implications of constitutional interpretation. The course will explore such areas as the roles and powers of the branches of federal government, separation of powers, federalism, and the commerce clause. It will also cover individual rights, due process, equal protection, church and state, and economic liberties.

470.662 Theory and Practice of Terrorism
This course is designed to allow the criminal justice professional, policymakers, and others to understand better the impact of terrorism on political and governmental institutions. Terrorism is a tool used by some groups to achieve social change. This causes consternation for government and society as a whole because it disrupts the basic social contract. Acts of terrorism have two sets of victims: those immediately affected by the act and the entire society which loses a sense of security and confidence that governmental institutions can maintain social order. The emphasis of the course is both a descriptive and an analytical approach to terrorism. This course will examine areas such as terrorism as a crime, the history of terrorism, the rise of modern terrorism, weapons of mass destruction, cyber-terrorism, terrorism and the media, and the impact of terrorism on national security policy.

470.663 Administering Homeland Security
Working with other agencies, the new Department of Homeland Security must protect the country from a broad range of potential threats. High performance is essential. How should the government carry out its responsibilities? How should the federal government coordinate with healthcare providers and state and local public health departments? What are the trade-offs between citizen rights and homeland security? How can the federal government work with private organizations to protect important national infrastructure and systems? This course will take a “tools of government” approach to these and other questions of administering homeland security.

470.664 War, Humane Behavior, and Morality
This course examines the nature of war and its relationship to morality. It is not a course in either philosophy or theology; rather it assesses case studies drawn from history and literature to address issues that penetrate to the heart of war and its relationships to humane behavior and morality (if any). Assigned books include The Western Way of War; War and Peace; We Were Soldiers Once…and Young; A War to Be Won, Fighting the Second World War; The Peloponnesian War; The Trojan Women; Dereliction of Duty; and Downfall. This course is part of the Aitchison Public Service Undergraduate Fellowship in Government program offered by Johns Hopkins University in Washington, DC.

470.667 The Administrative State: How Washington Regulates
The regulatory process is neither simple nor straightforward. Congress writes the laws, which authorize or require the federal agencies to act (or prohibit them from acting). This course will explore why Congress delegates to the agencies, how much it may delegate, and how it influences the use of the power it has delegated. Most of the federal agencies are in the executive branch of the government, headed by the President; the rest are so-called independent regulatory agencies. How much authority does the President have in appointments and removal and in policy guidance, and what means does he use to exercise that power? What are the procedural requirements the agencies must follow in developing regulations? What are the substantive requirements (e.g. the role of science and economics)? What influence does the public have, including the
Studies within a bureaucratic framework. The course explores the institutions and the criminal justice system. Students examine the interaction between governmental and constitutional law. This course will focus on the interpretation and constitutional law. Through the use of doctrine, the courts, which ultimately must decide questions of statutory interpretation and constitutional law.

470.669 Seminar in Homeland Security Administration
The US faces a broad range of threats. Major homeland security efforts include border security, immigration control, protection of infrastructure, biodefense, and incident response. This course explores these and other selected topics in-depth. Students are expected to produce an advanced research paper on an approved topic relating to homeland security. By the end of the class, students will have a good picture of the process of administering homeland security—our progress and shortcomings in critical areas. Prerequisite: Completion of a course on administering homeland security or instructor approval.

470.670 Government and Strategic Communications
The federal response to Hurricane Katrina was the largest, fastest, and most effective in our nation's history. Yet, because responding agencies failed to execute a strategic communications plan, almost every American believes that Katrina is synonymous with government failure. This class will examine each of the four realms of strategic communications: public affairs, information operations, public diplomacy, and psychological operations. It will address how they are integrated into government policy and make use of detailed case studies of the use or misuse of strategic communications during the war in Iraq, the Global War on Terrorism and Hurricane Katrina. Students will develop a thorough understanding of the government's strategic communications infrastructure as well as how communications plans are designed and executed. In addition, students will explore how the structure of the current media environment can enhance or ruin even the best laid plans.

470.671 Criminal Law and the Constitution
This course will survey major themes related to substantive criminal law and to constitutional criminal procedure. The first portion of the course will consider the government's constitutional and political authority to control undesirable behavior by defining criminal law. Through the use of doctrine, case law, and illustrative crimes such as homicide, rape, and theft, the course will examine the criminal act, intent, causation, attempts and inchoate offenses, justification and excuse, and competing rationales for and theories of criminal punishment and sentencing. The second portion of the course will examine the Constitution's procedural limits on the government's ability to investigate and detect crime. This will include a study of searches and seizures, confessions and interrogations, and provisions for the right to counsel, as expressed in the Bill of Rights and Fourteenth Amendment and articulated in the opinions of the US Supreme Court.

470.673 Seminar in Criminal Justice Administration
This course focuses on the interaction between governmental institutions and the criminal justice system. Students examine both the classical and contemporary thought and principles of management. The emphasis is on an analytical rather than a descriptive approach to the role of criminal justice systems within a bureaucratic framework. The course explores the development and management and organizational theory, group influence on the organization, leadership and management, external and internal influences, control and accountability, organizational change and development, planning and decision-making, and related topics.

470.674 Regulations: Law of Federal Agencies
This course will cover the laws governing the operation of the federal executive branch of government. It will explore the legal basis for the ever-expanding role of federal agencies in society and the ramifications of continuing or limiting the growth of executive branch authority. The course will emphasize practical, on-the-ground challenges faced by federal agency leaders attempting to shape policies within the confines of laws adopted by Congress. The course will focus on: 1) The sources of basic legal authority of agencies – found in the US Constitution, federal laws and executive orders; 2) landmark cases testing the boundaries of authority of the executive branch and unique authority, and roles of some regulatory agencies; 3) the roles of federal agencies in rulemaking, enforcement, and adjudication of disputes, and their relationship with Congress and the courts. Class discussion will center around the cases that have shaped the development of federal administrative law, and consider the hurdles and controversies currently faced by federal agencies in administering laws adopted by Congress. For their final paper, students will select a current topic or controversy regarding federal agency action and explore its legal underpinnings, short and long-term implications for society, and assess whether the law should permit/prohibit/limit the federal action being considered. The paper will be developed in several stages over the course of the semester.

470.675 Politics, Language, and Culture of the Arab World
An introduction to Arabic politics, language, and culture as a foundation for understanding today's Arab world. This course provides students with an introduction to Arabic language and an appreciation of Arab political and economic structures, literature and art in the light of recent political, economic and social changes.

470.676 Understanding Islamist Terrorism
This course looks at Al Qaeda and its associated community of “Salafi jihadists” through the lens of military thought. The course will consider the influence of Islamic theology and history, Western political thought, and important theories of revolutionary warfare on the evolution of Salafi jihadist revolutionary thought. It will examine competing theories of warfare within the jihadist community and ask to what extent the jihadists are able to implement these theories. It will conclude by considering the implications of these ideas for American strategy and policy.

470.677 Governing in China and America: Comparisons and Bridges
Every day Americans open newspapers and other media to find articles about China's remarkable accomplishments and the problems that it still faces. Every day the Chinese learn about developments in the US from television or through other media. Yet, China remains a mystery to most Americans and America remains a land of dreams for most Chinese. In the globalizing world, Chinese and Americans increasingly use the same words...
to discuss issues of the day, but the meanings of the words may differ. This course will bring together students and scholars from two leading universities to provide an introduction to one another of China and American domestic politics and government, of Sino-American relations, and of the way in which scholars and students in China and America see their own countries and one another's countries. The course features interactive teleconferences with a graduate class at Fudan University's Center for American Studies in Shanghai, China. In addition to the teleconferencing, the course will be taught online, but will feature a number of guest speakers.

470.678 Governing in Mexico and America: Trade, Migration, and Security

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, environmental and energy issues. This course will explore and compare the government and politics of each country, and important cultural differences impacting their governing styles and attempts at cooperation to address critical policy areas. The course will include at least six video-conference sessions with faculty 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.

470.680 21st Century Conflict

This class will examine the origin and course of currently raging conflicts and try to make some reasoned predictions on the likelihood and direction of armed conflict in the future. Students will start with a survey of the true nature of war and the morality of conflict. From that basis, the class will move on to a brief overview of wars in the 21st century and how they set the conditions for current conflicts. An in-depth study of current conflicts includes but is not limited to the global war on terrorism, ethnic/tribal war in Africa, narco-wars in South America, and an analysis of the war and insurgency in Iraq. The course will also examine current international stressors that could potentially spark future armed conflicts. Finally, the course will examine the policy choices that could forestall these conflicts along with what can be done to help post-conflict nations and failing states from falling back into the conflict-trap.

470.684 Legislative Language and Policymaking

There is always some gap between what a law intends and what an agency actually achieves when implementing it. How large the "implementation gap" is may in large part have to do with the statutory language itself. Some political scientists argue that the type of policy (e.g. regulatory, redistributive, etc.) adopted will largely determine the nature of the politics surrounding the implementation of the policy whatever the subject area (e.g. health, economic, environmental, etc.). Could it be that if there was more understanding of the importance of legislative language and policy approach on the actual implementation of a law, that more careful legislative drafting would occur and could improve implementation outcomes? This course examines the process of drafting legislation and the consequences of legislative language in the implementation and adjudication of federal policies.

470.686 Contemporary Congressional Politics

What are the political forces that shape the contemporary Congress and how does Congress, in turn, reshape American politics? This course considers how political, social and technological changes outside the institution help to explain contemporary congressional politics. Topics include Congress' 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 course will also discuss the 2006 congressional election outcomes and the resulting changes in Congress.

470.687 Political Psychology

The field of political psychology applies psychological theories and methods to the study of political behavior. This course will survey psychological approaches to politics by applying psychological research on attitudes, personality, emotion, group processes, memory, cognition, and decision-making to the study of political behavior. Specific course topics include attitude formation, attitude change, decision heuristics and biases, personality, political leadership, voting behavior, public opinion, political communication, groupthink, intergroup conflict and stereotypes. All course topics will be approached from both theory-driven and applied perspectives.

470.688 Political Institutions and the Policy Process

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 Growing Apart? America and Europe in the 21st Century

The tension between the US and Europe over the war in Iraq, as well as the casting of an "Old Europe," a "New Europe," and a "go-it-alone" America, has brought into sharp relief that the two major high-income centers of the world economy may be following very different paths of development, politically, economically, and culturally. This course surveys how America and Europe are both similar and different, and how, despite the supposed homogenizing effects of globalization, those differences are actually becoming more, rather than less, pronounced over time. The class will examine how the US and Europe have developed politically, economically, and
culturally, sometimes along similar lines and sometimes along quite different lines. This course traces these developments and surveys why this historical moment seems to be one of “growing apart” and what still holds them together despite such differences.

470.690 Political Campaigns and the Media
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. Students in the class will be allowed to attend the “press-only” conferences and will have an opportunity to write profiles of the candidates in that forum that will be published on the Transatlantic magazine website. Guest speakers will include political campaign directors, consultants and political journalists. Students will look inside political campaigns and learn how they operate from beginning to end and look inside media newsrooms to see how they decide to cover campaigns. The class also examines how campaigns and the media often use one another and at the same time can be adversaries.

470.691 Digital Citizenship
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 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 and National Policy
“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.

470.693 National Security
Since the Second World War, the United States military instrument has grown increasingly isolated from the other instruments of national power. The needs of the post–Cold War era are, however, for the more sophisticated orchestration of all instruments of national power. Students will be presented with the relevant concepts of international relations theory, national security strategy, legislation, and the executive branch organizations that wield the instruments of national power. The course pays particular attention to the National Security Council, established by 1947 legislation to integrate the domestic, foreign, and military policies of the US as they relate to national security.

470.694 White Collar Crime
This course explores the internal workings of the individuals, corporations, and government agencies that abuse their fiscal responsibilities and societal privileges. The definition(s) of white collar crime, other issues such as victimization, enforcement, and the sanctioning of organizations and individuals will be addressed. Students will examine and discuss important issues concerning punishment for those who commit white collar crime and the debate between corruption and accepted business activity.

470.695 Proseminar: Essentials of Public and Private Management
This is the core course for the MA in Government/MBA Program. 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 the 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.

470.696 Western Military Thought
One of the things that makes inter-agency cooperation difficult and often contentious in the Global War on Terrorism, is that the military culture is so distinct and separate from other government institutions that they often fail to understand each other. At a time, when we are making Herculean efforts to understand our potential enemies, it is just as critical to examine the warrior culture that is such a big part of all governmental interactions today. This course will examine how the military culture of the West developed in the 2,500 years since the Greeks defeated an invader from the East, and how these ideas and traditions continue to manifest themselves in current Western military institutions. As Victor Hanson has pointed out, in numerous books, the way the West fights wars means the only thing a Western army has to fear is another Western army. Students will be able to appraise the correctness of that belief and whether it still applies in the context of the 21st century.

470.697 Nuclear Weapons and US Foreign Policy
This course examines the foreign policy of the United States in the nuclear age. Consideration is given to the closing days of WWII when nuclear weapons were used against Japan; the decades of the Cold War, the Cuban missile crisis, the Vietnam War; and the contemporary era in which US foreign policy is driven by concerns about nuclear weapons in the hands of rogue states and militant jihadists. Various theories and models of foreign policy decision-making are tested against the reality of empirical cases.
470.698 The Politics of Food
This course examines the politics of food at the local, national, and global level. The production and consumption of food offers a unique lens into a range of political phenomena including interest group politics, the role of science in policymaking, and the dynamics of regulatory policy in the US and abroad. Course topics include the politics of agricultural subsidies, struggles over genetically modified foods, government efforts at improving food safety, and issues surrounding obesity and nutrition policy. This course can count toward the Homeland Security Concentration.

470.699 The Seen and Unseen
This course will cover the traditional history of Washington—the city as a symbol and capital. Its founding, the federal and monumental core, the several wartime expansions, and its evolution into a world center will be explored. Additionally, the course will focus on the unusual qualities of the living cities such as the curious relationship between its citizens and the government over time, as a crucible of social struggles reflecting the realities of the nation. Through readings, guest speakers and field trips, from Pierre L’Enfant to Marion Barry and beyond, the course will take a broad look at the history, politics, and culture of this unique entity. There is no Wednesday symposium requirement for this class.

470.700 Islamic Fundamentalism
A survey of the history and diversity of fundamentalist and radical Islamic movements in the Arab World. We will examine the history of the major movements, their theology and their radicalization, as well as key differences between Sunni and Shia groups. Some of the issues we will examine in the seminar: What role will these movements play in the political future of the region? How do they negotiate with the diaspora in the West? What are the prospects for at least some of these groups to evolve into legitimate political players in the Arab World? What are the West’s perceptions of Islamic Fundamentalism?

470.701 The Death Penalty and American Criminal Justice
This course examines the use, legitimacy, and legality of the death penalty in the American criminal justice system. Students will consider the moral, political and penological justifications for the death penalty as criminal punishment, as well as the arguments against its employment. In addition, the course will involve a study of the constitutional law that has developed to regulate capital punishment, including the constitutional requirements of individualized sentencing and guided jury discretion; proportionality and the evolution of categorical prohibitions for certain classes of criminal offenders, such as rapists, the mentally retarded and mentally ill, and offenders under the age of 18; and challenges to the method of execution. Finally, the course examines the prospects for legislative reform or abolition, and the adequacy of alternatives to capital punishment.

470.702 Introduction to Law and Legal Methodology
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
This class examines the phenomenon of irregular warfare—of insurgencies and counterinsurgencies in particular—through a historical lens. The course will give you 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: The Judicial Process in America
This course considers the philosophical underpinnings of the judiciary, including its origins in Article III of the US Constitution and its reliance on the foundational principles of the rule of law and the independence of the judiciary. The class will examine the placement of the judiciary within the American policy, focusing heavily on the concepts of the separation of powers and federalism. In this context, we will consider the relationships between the US courts and the other branches of government, as well as the various levels of court jurisdiction from the local county court to the US 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 Dynamic Interplay Between the States and Capitol Hill
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, then 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 the state legislatures, in order to facilitate a comparison and critical examination of the public policy debate at the federal and state levels. A trip to the Maryland General Assembly for a visit with the governor and legislative leaders is planned.
470.707 Asian Politics: Challenges and Opportunities

As the 20th century came to a close, many scholars and commentators predicted that the new century would become the Asian century. The prediction was based on economic expansion, political maturation and population growth in Asia that walked in step with a perceived decline in the West, particularly Europe. This course will provide a comprehensive examination of the issues involved in Asia’s emerging prominence in the world. Central to the study will be consideration of the institutional, cultural, and political obstacles that stand in the way of regional progress. These issues include concrete problems such as ingrained poverty and corruption, as well as intangible subjects such as the difficulty of creating independent, functioning governing institutions after centuries of colonialism. Security threats posed by Islamic fundamentalism and military imbalance of power are of increasing importance. Asia’s challenges and opportunities carry major implications for the US, the pre-eminent power in the Pacific. It is thus necessary to define US interests and examine various policy directions regarding Asia. By the end of the semester, students will understand where Asia stands today, how it got there, where it is going, and what all of this means for America.

470.708 Public Diplomacy and Arab Public Opinion

What are the factors shaping public opinion in the Arab world and how can the US best communicate with a growing and diverse population increasingly perceived as hostile to it? This course will examine various public diplomacy efforts by the US government in the Middle East, such as radio and television broadcasts and cultural exchange programs, and their reception by the Arab public as measured by public opinion and the reaction of the Arab press. How much US public diplomacy efforts differ from the current views in the Arab press and how the impact or influence of these diplomatic efforts can be measured, will be examined and assessed in the course as well.

470.709 Introduction to Quantitative Research Methods

Solutions to both political and policy problems increasingly require an understanding of how to analyze data. Campaigns collect data to identify potential supporters and donors. Government agencies analyze data to evaluate programs. Research organizations use data to support their policy positions. This course will provide you with the knowledge and skills needed to perform a cutting-edge statistical analysis. You will learn how to design and test regression models using Stata, an incredibly powerful and widely-used statistical software package. The focus of the course will be on using statistical methods in an applied manner. We will concentrate on using statistics to answer political and policy questions, and not the underlying mathematical theories themselves. There is no prerequisite; only an interest in and commitment to learning quantitative methods are required.

470.710 The Politics of Foreign Policy

Former Secretary of State James Baker titled his memoir The Politics of Diplomacy, which is an indication of his views of how foreign policy is made. Foreign policy in the US has its origins not only in the nation’s vital interests and national security, but also in politics. This course will examine how campaign issues often formulated by political advisors become the foreign policy of the country, and will study how future foreign policies of the winning candidate for the White House are based on what many only view as campaign rhetoric. It will explore the history of American foreign policy from John F. Kennedy to George W. Bush and to the presidential candidates in 2008, to determine how politics plays a role in foreign policy. The course will also look at the phenomenon of Americans electing former governors without much foreign policy experience to the White House, and study how these new presidents get up to speed on international relations. The 2008 presidential campaign will serve as an example of how the candidates try to win the approval of various voting blocs and how this can translate into foreign policy in the future.

470.711 Intelligence: From Secrets to Policy

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 US 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 US today will be discussed as well.

470.712 The American Civil Trial

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 pre-trial 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.

470.714 Policymaking in the US and Latin America: Perceptions and Misconceptions

The course will introduce students to major political trends in Latin America and the state of US relationships with countries in the region. The design of the course is four class sessions to be held in Washington before a week long seminar at CIDE University in Mexico City. CIDE University is a world-class research and teaching institution and is home to an MA degree program similar to our MA in Government Program in its emphasis on combining the study of theory with a focus on the development of practical professional skills. In addition to guest lectures by CIDE professors, public figures based in Mexico City will address the class, and there will be visits to the Mexican Congress and government agencies, Latin American embassies, and major cultural and historical sites. After returning to DC, students will meet for a final session and complete a final paper to fulfill the course requirements for this class.

470.716 The Road to the White House: The General Election

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 and consultants and key outside advisors from the worlds of politics, business and entertainment. A key ingredient of the class will be the SAIS Center on Politics & Foreign Relations, the Financial Times and JHU Graduate School of Government breakfasts in the fall that students will be able to attend. The class will also watch and analyze the presidential debates. On election night, the class will hold a reception looking at the returns. After the new president is elected, the class will focus on how the country's new Chief Executive puts together his new Cabinet and team of advisors.

470.717 Risk, Politics, and Public Policy
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 misfortunes. 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 analyze 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.

470.718 Dissidents in American Foreign Policy
In the 1970s, Washington intervened twice to save the life of opposition leader Kim Dae-jung who went on to be elected president after a democratic transition in South Korea. Support for refuseniks and other dissidents were central to American policy toward the Soviet Union and other communist regimes. After the Cold War, a common assumption took hold that the great ideological battles were over. However, in a short period of time, the US has been challenged by new threats of Islamist extremism, invigorated authoritarian regimes, and a backlash against the Bush administration’s “democracy agenda”. These developments are an occasion to consider the role support for individuals has played in the past and should play in the future. Has the US been opportunistic or principled in its support for dissidents? How does support for dissidents and human rights activists relate to American ideals in foreign policy? This course will consider not only the role of dissidents in American foreign policy, but also the ways dissent under repressive regimes has changed.

470.719 The Psychology of Terror
This course addresses social and psychological approaches to the emergent field of terrorism studies. Students explore topics such as: radicalization of individuals and groups, group formation, motivation of terrorist groups, stereotypes and impact of stereotypes on behavior, obedience to authority, communication and persuasion, psychological impacts of terror and fear, and terrorism response and preparedness. All course topics will be approached from both theory-driven and applied perspectives.

470.720 Science and Government
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. 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 Business Law and Corporations in the Global Economy
This course will introduce students of government and business to federal and state corporate law, and business law concepts that impact our daily existence. What is a partnership, joint venture, close corporate or public corporation? What does limited liability mean? What are the duties and roles of corporate directors, officers and shareholders? How do the securities laws, anti-trust laws, anti-bribery, merger and consumer protection laws affect business? Given these statutory and regulatory requirements, the course will address questions such as what is a contract, negligence, agency, and the rights of parties. The course will conclude with a brief view of the increasingly global reach of corporations and the international treaties that impact business choices.

470.722 Intelligence, War and Political Conflict
Intelligence exists as a function in order to provide a competitive advantage. This class will consider the intelligence requirements inherent in various forms of struggle, both violent and otherwise, and to consider how intelligence organizations have adapted to meet those requirements. Using primarily an historical approach, the class will consider a range of military conflicts, as well as domestic political struggles and intelligence for peacekeeping and humanitarian purposes.

470.723 Western Political Thought
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? 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.
470.725 China and America: Governance Alternatives for the 21st Century

As the fall 2008 economic crisis underscores, we live in a world where there is an emerging global focus on governance—the ways in which government, market, and civil society can be used to address public problems—both domestic and global. As the 21st century begins, China and the US present comparative governance models for the world. This course will study China’s governance in the context of America’s own governance system. We will consider how to compare American and Chinese governance systems, and whether and how concepts can be translated between them—so that the countries, and their citizens can learn from, and cooperate with one another. In the process, we hope to learn about China, but also to reflect—in the light of 9/11 and Iraq and the 2008 economic crisis—more deeply on our own understanding of how American governance works, and how it is seen by the world.

470.726 Education Policy and Federalism

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 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 non-governmental organizations like Teach for America and national charter school networks in public education, 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.

470.727 Equality Law

This course will consider how the 14th Amendment and related statutory innovations have promoted equality among citizens. Students will read US Supreme Court opinions that established or modified precedents governing the constitutional meaning and enforcement of equality. Students also will 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 Influence and Impact of Nonprofits

The goal is to convey the history, size and impact of the nonprofit and philanthropic sector in the US and to offer a comparative, global perspective. In the US, the nonprofit initiative grew out of our earliest colonial history, along with the ideals and habits of self-government. The flourishing of nonprofit initiative is intertwined with our country’s legal and tax systems, the needs of the nation in wartime, interest groups addressing social and economic inequities, the federal role in social service delivery and foreign aid, rising wealth, and perceived threats to internal security. 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.

470.729 The Presidency and Congress

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.

470.730 Intellectual Property Law

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 but students will be required to write a paper.

470.731 Terrorism and Counter-terrorism in Theory and Practice

In this course, we will critically examine the most important contemporary empirical and theoretical debates on terrorism, with a view toward formulating maximally effective counter-terrorism responses. The course is divided into two inter-related sections. In the first section, we will investigate core questions in terrorism studies, such as: the definition of terrorism; its evolution since the 1990s; the root causes of terrorism; its purpose, effectiveness, and consequences; and the threat of suicide and nuclear terrorism. In the second section, we will investigate core questions in counter-terrorism, such as: the relationship between regime type and terrorism; how terrorist groups end; and the most effective and ineffective counter-terrorism strategies. This course counts towards the Security Studies Concentration.

470.732 Communications and Congress

This course will examine how Congress goes about the business of translating the public’s concerns into legislation and shapes national policy. It will examine how the two chambers interact in this process; how the legislative branch complements and competes with the executive; what role the media, the public, and other institutions of government play in shaping Congress’ agenda and vice versa; and what impact the advent of 24-hour news, C-SPAN, and the internet have had on congressional deliberations. A 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.

470.733 US Security Policy in the Middle East

This course examines the major security challenges facing the US in the contemporary Middle East and its responses to meeting those challenges. The key issues examined are the Arab-Israeli conflict and the US role in the “peace process”; militant Islam, jihad and terrorism; the threat of regional nuclear proliferation; and Islam, democratization and nation-
building. Theoretical and methodological issues associated with “interpreting” the Middle East and constructing meaningful paradigms for analysis are also given consideration.

470.739 Communications and Emergency Management
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 benefit from effective tools. This has caused the public, private, and nonprofit sectors to invest more resources on 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, guests, 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 Conflict and Security in Cyberspace
Cyber conflict is a new and complicated strategic problem that will engage the international community at many different levels. The cyber environment challenges traditional strategic thinking, and work on policies and strategies to manage and benefit from cyber conflict is at an early stage. Traditional security concepts will need to be re-examined and adjusted for the cyber environment. This class will look at both the national and international dimensions of cyber conflict in the larger international security context.

470.741 Democracy and Elections
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.

470.742 Race, Pop Culture, and the Media
This class examines how racial perceptions and themes lie at the root of American popular culture which, in turn, often serves as the foundation for public policies. For most of our history, Americans have reacted with little understanding to their shared racial fears and biases. Often gross stereotypes played key roles in the formation of public policy. Evidence of this can be seen in the founding documents of the colonies, debates over the rationale for the Civil War, and continuing debates involving civil rights, welfare policy, criminal justice issues and, more recently, health care reform. In each of these cases, battle lines have been bounded by race and amplified by the media and popular culture. Two of the key questions of this class will be:
how did this come to be? And how can US citizens avoid cultural manipulation on the most critical issues of civil life? The class will attempt to answer these challenging questions by focusing on the influence that race, pop culture and media cast on the development of public policy.

470.743 Nuclear Deterrence, Arms Control & Non-Proliferation in a Changing World
This seminar examines key challenges and policy issues for US decision makers in the areas of nuclear deterrence, arms control and non-proliferation in the 21st Century. Issues covered include: deterring states and deterring terrorists, extended deterrence and reassurance, sustaining the nuclear weapons complex, arms reductions after the New START agreement, renewed interest in nuclear abolition, the future of the Non-Proliferation Treaty regime, and new paths in bilateral and multilateral counter proliferation.

470.744 Trade and Security
Since the Second World War, 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 the Second World War, 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 World Trade Organization, and examine the ways the US government 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 mid-term 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.

470.745 Assessing Military Power
This course provides an introduction to net assessment as practiced by the Department of Defense since 1973. Net assessment aims at providing top decision makers with objective assessments of where the United States currently stands relative to prospective opponents in key areas of long-term military competition, and builds upon major trends and asymmetries to identify emerging problems and opportunities that could affect the US position in the future. Net assessments take into account the strategic goals, doctrines, operational concepts, and fundamental military capabilities (especially strengths and weaknesses) of competing countries, alliances and other international actors. Since diagnostic net assessment is fundamentally a practical endeavor, several historical and recent cases will be examined, including: the problems of measuring military power, the US-Soviet strategic-nuclear and NATO-Warsaw Pact balances during the Cold War, emerging “revolutions in military affairs”, US military effectiveness in the 1991 Gulf War, and military competition in space.

470.746 Understanding Contemporary Iran
This course provides an introduction to historical, religious, economic, and cultural patterns in Iran. Students will trace the philosophies that gave rise to the Islamic Revolution and analyze the balance between Iranian nationalism and Shi‘ism inherent in the Islamic Republic today. The course will cover oil politics, pre- and post-revolutionary foreign relations, and the organization and operation of the Islamic Republic.

470.747 The Ethics of War
The course will address questions such as what is a just cause for war? Should there be constraints on the means used to wage war? And if so what are those limits? Can preventive war be justified? And if so on what grounds? This course will explore the answers prominent thinkers have given to these questions as we explore contemporary cases and challenges.

470.748 The Politics of Conflict and Security in South Asia
This course explores the contemporary domestic and foreign politics of India and Pakistan. It provides students with an overview of the political and socioeconomic landscape of each country and the major issues that frame their bilateral relationship. Themes include political institutions, democracy and authoritarianism, ethnic and regional conflicts, religious nationalism, secularism and poverty. Throughout the course, we will pay particular attention to the implications of these topics for US foreign policy and security considerations.

470.749 Changing News Cycles
A news cycle was once measured in the number of hours between each issue of a newspaper. Today the architecture of news cycles is changing even more dramatically. Building on the coverage of the 2008 campaign, real time competition among cable news channels and online media is creating news cycles of sometimes 15 or 20 minutes. This quickening is often accompanied by the demand for ever more information nearly simultaneous with developments and minute-by-minute evaluations. This course will look at why the tempo of news stories is accelerating; how the changing structure of media is influencing and being influenced by it; and how the increasing velocity of news is affecting policy, politics and public discourse. Guest speakers will include journalists and political professionals who will share their insights and experiences adapting to this new dynamic of changing news cycles.

470.750 Constitutionalism and Constitutional Design
This seminar examines the basic purposes and principles of democratic constitutions and some of the principal institutional design choices (including presidentialism vs. parliamentaryism; federalism; judicial review; and electoral and party systems). Roughly one-third of the course is devoted to constitutional and institutional theory; another third, to the US Constitution; the remainder, to comparative questions, including constitutional design for divided societies.

470.752 The United Nations and International Diplomacy
This online interdisciplinary course covers many facets of the United Nations (UN), acquainting students with its structure, its operations, and its involvement in international events, past and present. It merges politics, economics issues, and the history of the UN in an effort to understand more fully the UN's role in international diplomacy. Current issues in international relations will be discussed and the course schedule will be interrupted to deal with current events.
470.753 Problems in State and Local Government: Can They Be Fixed?
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 US Energy Security
While the world negotiates a new climate change treaty, the US 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 US 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 US. The economic and social issues associated with these policies will be examined as well.

470.756 Fanaticism and the Islam World
This course examines the nature of fanaticism and the three forms of political extremism that have dominated the last century—Communism, Nazism and radical Islam. The course will examine the psychological roots of fanaticism and consider instances of fanaticism in history. Students will read the essential texts of the Nazi, Communist and Islamist movements and study the history of these movements and the effect of ideological extremism on the personalities of their leaders. It will identify the similarities as well as the differences between these three types of fanaticism and consider lessons from the fall of Nazism and Communism for dealing with the new threat posed by fanatic political Islam.

470.757 Nonfiction Writing and Politics
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 will read and critique each others’ 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.

470.759 American Political Development
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 National Intelligence Systems: A Comparative Study
Which country has the best intelligence system? Can that question even be answered in a meaningful way? This class will consider theoretical ways of understanding and assessing national intelligence systems. It will consider political, historical and cultural factors which 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 US, the United Kingdom, Russia, Germany, China, Israel, and Iraq, among others.

470.761 Ruling the 21st Century: Economic Success, Military Strength, and the Rise and Fall of Powers
Today, we are witnessing a period of even greater American economic travails, much larger fiscal deficits, and the concern that less friendly powers—China, Soviet Union, perhaps India and others—may be poised to benefit from the relative decline of the United States in specific and the West in general. Is this true? Even more to the point for this course, what do these shifting economic realities bode for the future of American power and ultimately the security of this country and its allies? This course, informed by both historical and technical perspectives, will wrestle with such broad questions about the architecture of the international power system. It will consider the relative decline of the United States that many consider to be underway already, and only likely to accelerate—asking not only if it is indeed a reality, but also what its likely magnitude and scope will be. It will examine the promise of the rising powers, together with the structural constraints and other impediments that they will have to face themselves as they seek greater stature, clout and prosperity in the 21st century.

470.762 US-Mexico Relations: Migration, Trade and Organized Crime
This course looks at one of the US’ most important relations, with its neighbor Mexico, and how the two countries manage economic integration, security threats and migration, among
other issues. The course will be taught in conjunction with CIDE University in Mexico and include weekly videoconferences with students from CIDE (in English) to discuss these issues in a cross-border setting.

470.763 Keeping Secrets: Cryptography and Intelligence
This course will explore the various aspects of Cryptography from a historical, functional and technological perspective. Students will be presented with a recap of the major Cryptographic (Code Making) and Cryptanalysis (Code Breaking) events from ancient to modern times. A comprehensive overview of the fundamentals, objectives, techniques, weaknesses and attacks on cryptography will be presented in a low-tech, non-computer science/engineering, and minimal mathematics approach. Modern day Crypto systems and technologies will be discussed and analyzed to understand the intricacies and complexities of secure enterprises, protecting secrecy and integrity, and understanding both the macro and micro risks associated to critical military, government, industrial and corporate infrastructures. No extensive pre-existing technical or mathematics knowledge is assumed nor required; students should be comfortable with basic mathematics and limited understanding of typical IT systems.

470.764 From Information Warfare to Information Power
This course explores the evolution of Information Warfare (IW) from its early concepts two decades ago, to its current front-page status and congressional debates. The course will examine some of the critical strategic issues that have been and remain at the heart of IW. Some of these are the role of Cyberspace on future warfare; the dependence of national infrastructures on the underlying information infrastructure and its vulnerability to computer attack; the role of Strategic Communication and Public Diplomacy in the “war of ideas”; the relationships between Electronic Warfare, Information Warfare, and Computer Warfare; and a comparison of US and non-US doctrines and concepts. One of the course’s key themes will be the exploration of both the “myths” and the “realities”, to discern how IW has been used in past conflicts and how it could be used in the future. Along with several small projects, the course has one major deliverable, an exploration of the role information power should play in national security strategy.

470.765 The Tools of Economic Diplomacy
This course will look at the ways the US and other governments use economic policy to defend their perceived interests and achieve their diplomatic goals. Topics will include the use of international financial and trade institutions to pursue visions of world order; trade sanctions and agreements as ways to develop relationships and alliances, promote domestic and international economic policy goals, or coerce unfriendly governments; aid programs and their goals; and economic policy as a tool in response to crisis.

470.766 Economic Growth: The Politics of Development in Asia, Africa and Beyond
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.

470.768 Nation Building as Security Policy
Nation building is nothing new, but it has recently become a prominent way to achieve US national security. Nation building has a long history, including imperial attempts, the anti-colonial attempts that followed, and the creation of new states. The US also has a history of nation building in Central America and the Caribbean following the Second World War, and in Vietnam. The history of nation building is reviewed systematically for lessons learned. Particular attention is paid to recent efforts in Iraq and Afghanistan. Attention is paid to specific policy statements and organizational capacities for nation building. The course concludes by examining nation building as a way in the ends, ways, and means of linking to national security strategy. Students are expected to leave the course with an understanding of the challenges of nation building as a way to achieve US national security and the ability to enter into an informed debate on the role that nation building plays in US national security strategy.

470.770 Transatlantic Learning: Lessons from European Energy and Environmental Policy
This course offers a new perspective about environmental, climate, energy and urban development policies and cooperation with Europe, and reviews and analyzes these policies, their development, their performance and assesses their potential applications to the US 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 US. 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, DC, 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 US cities can learn from them.

470.771 Climate Change Economics
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 sub-national 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.

**470.772 Islam and Politics in the Middle East**
The Islamic Republic of Iran has become an increasingly important player on the international stage and remains a challenging issue for US policymakers. This course examines Iran's rise as a regional power in the Middle East from the 1979 revolution through the contemporary period. It will explore four major topics: 1) the role of Islam and Islamist ideologies in the Iranian state; 2) Iranian political dynamics; 3) the Revolutionary Guards and their influence on Iranian policies; 4) Iran's foreign involvement, particularly in Lebanon and Iraq. Through readings, lectures and class discussions this course will address several important questions: To what extent do Islamist ideologies impact Iranian policies and decision-making? What are the major issues driving current Iranian politics? What factors have led to the Revolutionary Guards ascendency and what are the prospects of a military takeover of the regime? What are the roots and limits of Iran's foreign involvement and how do organizations like Lebanon's Hizballah support Iran's interests abroad? Is Iran a rational or ideological international actor? By the end of the course, students will be able to effectively address these questions and have a firm understanding of the key events, ideas, and issues impacting contemporary affairs in Iran and the broader Middle East.

**470.773 Energy and Environmental Security**
This course surveys the multiple and overlapping aspects of energy security and environmental security. The main emphasis is on how increased competition for environmental and energy resources threaten international security and how these threats should be mitigated. Throughout the course neoliberal and geopolitical approaches to energy and environmental security are used to better understand the risks and opportunities involved in an era of increasing scarcity.

**470.774 Nonprofit Governance and Executive Leadership**
This course covers the basic responsibilities of nonprofit boards according to law and custom and 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. There will be opportunities to compare the role of boards in US nonprofit groups with those in other countries, with a special emphasis on countries whose legal systems provide for significant state control of nongovernmental initiative.

**470.775 Women and Gender in Law and Policy**
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. Statues 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 diversely. 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.

**470.771 China and America: An Introduction to Comparative and Global Environmental Governance**
This course will be taught jointly with Chinese faculty and students at Nanjing University in China, by teleconference, web and live lectures. As the 21st century began, pundits debated whether, like the 20th, it would also be “America’s century”, whether China’s remarkable economic rise would make it “China’s century” or perhaps, one seeing the development of “Chimerica”. At the same time, it was also said, that the primary shaper of countries and their fortunes will be the environmental limits to human development—with China (and India), with its huge population and rapid development, and the US, with its high per capita consumption, both facing most difficult challenges. This course will study China’s environmental challenges and governance in the context of America’s own environmental changes and governance system, and in the context of the challenges to the two countries as the primary sources of the world’s greenhouse gas emissions. We will consider how to compare American and Chinese governance systems, and whether and how concepts can be translated between them—so that the countries and their citizens can learn from, and cooperate with one another.

**470.778 Federal Contracting Law**
This course is designed to provide students with an understanding of the nuts and bolts of the formation and performance of federal 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.

**470.779 Political and Security Issues in the Middle East**
The Middle East is an important region to examine given its historical significance, the various strategic issues that it raises and, perhaps most relevant for the participants of this course, the challenges that often spill over and become American foreign policy considerations. Building on a historical study of critical junctures in the region, this course aims to provide students with a framework for understanding the state of the region's core political and security issues. In particular, this course will focus on policy-relevant dilemmas surrounding Middle East affairs. After participating in this course, students
will be more familiar with the key challenges presented by the Middle East and will have begun to consider the dilemmas that exist in this critical region. By the end of this seminar, participants will be more cognizant of the region's complexity and tensions. They will be able to more capably understand and evaluate US interests in the region, and the ways in which American officials might prioritize policy interventions.

470.781 Development of Climate, Energy & Security Plans
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 sub national, 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 issue and skill areas to enable learning and performance in a highly integrative environment.

470.782 The Practice of Public Diplomacy and Statecraft
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 publics 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
The national media play a pivotal role in the early days of presidential campaigns. We will look at the role the media e.g. cable television channels, newspapers and magazines, bloggers and the Internet -- play in promoting or demoting presidential candidates as they gear up to run for the Oval Office. 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 court the candidates. We will compare the 2012 presidential campaign with other presidential contests in American history.

470.785 The American Way of War
This course is an overview of US 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”.

470.786 Contemporary African Politics
With 25% of US oil coming from Africa, and the region’s importance as a staging ground for armed action in the Middle East, Africa is more important than ever before to US strategic interests and to that of other great powers too. This seminar will attempt to uncover the implications of an enduring western dominance over African ideas, politics, economics and society. We will explore the manner in which both policymakers and intellectuals have facilitated this process, and try to locate voices of resistance while also understanding the US policy response to Africa’s emergent and enduring importance.

470.789 Communicating Policy Ideas in the Public Sphere
This workshop is designed to hone the communications skills of those engaged in public policy analysis and advocacy. Topics include how to develop effective op ed pieces, memoranda, position papers, essays, speeches, magazine articles, presentations, and the other forms of communications needed to advance policy ideas outside of the academy. The course puts special stress on how to make a clear and persuasive exposition of complex or counter-intuitive arguments in the market place of ideas, including the challenges of placing articles in popular journals and communicating to specific audiences both in and out of government. Students receive intensive individual instruction, including close editing of their work and advice on how to publish or promote it in the public sphere.

470.791 Medicine, Society, and the Transformation of Health Care in America
This seminar examines how medicine and society interact in ways that touch on philosophy, economics, sociology and public policy, but that cannot be understood if studied from any one perspective alone. Medicine’s new prominence in society dictates this approach. In the past, general ideas and popular attitudes shaped medicine; today, medicine shapes general ideas and popular attitudes. Examples of the latter include medicine’s impact on our understanding of freedom and free will, religion, spirituality, adulthood, and happiness. This theme—the interplay between medicine and society—governs the organization of the course, as readings alternate between society’s effect on medicine and medicine’s effect on society. On one level the course moves from the abstract to the concrete, beginning, as it does, with the philosophy of dualism and classical liberalism, and concluding with practical issues of health care reform. Yet each class also serves as a tool for digesting material in subsequent classes; each class adds more ideas to the student’s conceptual framework. Understanding dualism, for example, is needed to understand monism, which is needed to understand the uneasy alliance between religion and medicine, which is needed to understand medicine’s approach to mental health. Thus, the order of classes has a purpose, which is to help students build a multi-layered and highly nuanced understanding of how medicine and society interact.

470.792 Understanding, Adapting and Responding to Climate Change
Climate change is one of the most complex, critical, controversial and poorly understood intersections of economic, energy and environmental security in the US and other nations today, with potentially vast implications for domestic and international policy and market decisions. The ability
of analysts, investors and policy makers to understand the fundamental underpinnings and relationships of science, economics and policy choices to climate change is essential to future security decisions that are increasingly high stakes. This new course in the Center for Advanced Governmental Studies “Understanding, Mitigating and Adapting to Climate Change” is designed to provide comprehensive concepts, factual bases, and choices regarding climate change for students that have not yet been exposed to climate change science or policy. It is designed to prepare them for more advanced, integrative courses and projects at JHU and in the workplace that are multidimensional and innovative. The course will focus on fundamental issues of science and the translation of science to human choices regarding policy action or inaction. It will include current case studies and situations for review and discussion, in addition to systematic review of information in the field.

470.793 Influence of Public Opinion on Public Policy and American Democracy
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.

470.794 US Foreign Policy in Asia: The Rise of China
This course chronicles US-China relations from the collapse of the Qing Dynasty to the present, examining China's rise and its implications for US interests in East Asia and the world. Are the US and China destined to be friends, enemies, or “frenemies”? Are relations likely to be “zero-sum”, or can the world's most powerfully developed nation and largest developing nation forge an affirmative agenda based on common interests and mutual benefit? Classes will be a blend of lecture and group discussion and analysis. We will also hold one simulation exercise, with students playing the roles of the President and his senior advisers as he prepares for a summit meeting with the President of China.

470.796 News Media and Presidential Nominations
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 cover 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 G.O.P. 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 v. Obama in 2008 and Bush v. McCain in 2000, as well as pivotal earlier contests including RFK v. Humphrey in 1968, Reagan v. Ford in 1976, and Mondale v. 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 rules changes. We will also look at the impact of the “invisible primary” on the party’s eventual choice of a nominee.

470.797 Special Operations in a Strategic Context
Over the last ten years, special operations forces have become a core element in America’s response to transnational terrorism. These units have trained and advised foreign military and paramilitary forces; captured or killed thousands of Al Qaeda and Taliban commanders and foot soldiers; and conducted a variety of operations around the globe. This course will focus on the ways in which special operations forces have been incorporated into national security strategy and policy. Topics will include how special operations forces are organized, recruited, trained, resourced and utilized. Through the use of a series of case studies, participants will investigate the differences between special operations forces and other elite units; scrutinize the roles and missions of these organizations; consider the influence of popular culture; and probe the impact of bureaucratic politics and organizational culture between the special operations community and international allies, Congress, the interagency community, and conventional military forces.

470.798 Financial Management and Analysis in Nonprofits
The basic tools for financial management and analysis are covered in this course with a focus on those aspects that will: 1) provide the necessary skills to students planning careers in public and nonprofit organizations and 2) provide those working for government with the 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.

470.830 Practicum in Government and Politics
One of the great strengths of the Government Program is that it brings theory and practice together, but it may be those attending on a full-time basis or those new to the DC area may not yet have employment experience in Washington. This course is designed to help new students to the program explore career options and/or locate employment opportunities (paid or unpaid) that will enrich their experience here.
Established in 1962 and now celebrating its 50th anniversary, the MLA Program is recognized nationally for the quality of its teaching and the breadth of its course offerings. The 10-course program enables students to continue their intellectual growth and further their professional goals. The program features small, interactive seminars led by distinguished Johns Hopkins University (JHU) faculty and leading experts from cultural, artistic, government and academic institutions in the region, including The Walters Art Museum, The Peabody Institute, the State Department and the Maryland State Archives. Students study with and learn from other adults of diverse backgrounds, perspectives and interests, and the seminars provide a challenging and nurturing environment. Students can focus on specific areas of learning or explore a wide range of engaging subjects in political science, art history, world religions and philosophy, history, music, literature and science and technology.

A key element of the Center for Liberal Arts, the Master of Liberal Arts Program places inter-disciplinary study at its core, and through this approach fosters greater understanding of the philosophical, historical, scientific and aesthetic dimensions of the world's great 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; particular interests and work experience are also considered.

Application Documents
> AAP application and fee
> A current résumé
> A 2- to 3-page essay that allows assessment of the applicant’s academic, professional and personal goals
> Official undergraduate and graduate transcripts
> Letters of recommendation are optional

Admission Interview
After application materials have been evaluated, an admissions interview is scheduled with the MLA program director.

Admission Status
Please see descriptions and criteria of the different categories of student status. Applicants who have questions regarding their admissibility should contact the MLA program director.

ADVISORY BOARD

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Gary Vikan
Director, The Walters Art Museum

Ronald G. Walters
Professor of History

Susan Weiss
Professor of Musicology, The Peabody Institute

EX OFFICIO

D. Melissa Hilbish
Program Director

Dianne Scheper
Program Coordinator
FELLOWSHIPS AVAILABLE FOR MLA STUDENTS

Limited private, campus-based fellowships are available to cover tuition for individual courses taken by fully admitted MLA students. Application forms are available from the MLA program director.

COURSE REQUIREMENTS

> **One Interdisciplinary Core (IC)**
  The IC should be taken within the first three courses. One to three IC courses are offered every semester.

> **Eight electives**
  Eight for Graduate Project or Internship option; nine for Portfolio option. See Capstone Requirement.

The MLA is tailored to students’ needs and priorities. Courses described in this catalog are representative of the broad range of MLA offerings. The same courses are rarely offered two years in a row. For descriptions of the courses listed in Course Schedules that do not appear in this catalog, please contact the MLA program director. For information on exact dates, times, locations, fees and instructors, students should consult the Course Schedule available at advanced.jhu.edu.

UNIVERSITY OF CAMBRIDGE SUMMER COURSE

Since 1992, MLA students 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, please contact the MLA program director.

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 standard application, though JHU MLA graduates need not send any additional materials beyond the application or pay an application fee.

INTERDISCIPLINARY CORES

Recent examples of Interdisciplinary courses have included: “The Self in Question: Readings in Psychology and Literature,” “Monstrosity and Metamorphosis: Imagining Animals in Early Art and Literature,” “Poetry and the Visual Arts,” “The American Southwest: Crossroads of Culture,” and “Science Fiction Film in the 20th Century.”

ELECTIVE COURSES

450.510  **Leadership and the Classics**
This course explores constants and changes in leadership over time through a selection of readings that ranges from ancient philosophy to 20th-century fiction, including works by Confucius, Plato, Sophocles, Shakespeare, Machiavelli, Hannah Arendt, Martin Luther King, Jr., Anne Tyler and others. Through directed reading and discussion, students gain valuable insights into how leaders can foster creative initiatives and responses to change. A historical perspective enables students to understand and appreciate the challenge of leadership in the 21st century multicultural world. They can then develop a framework for interpreting and evaluating responses to that challenge.

450.517  **Music and Literature: Opera in the 20th Century**
The vast and varied repertoire of 20th-century opera offers a rewarding context for the study of the always rich and complex relationship between music and text. In this course, we will study a select group of 20th-century operas and the source texts (plays, short stories and poems) upon which they are based. We will consider the changes that occur in translating the texts from one genre to the other, along with ways in which each opera influences our understanding of the source and vice versa. As part of this focused study, we will also gain a broader familiarity with the styles of some of the most important composers of the last century. Works to be studied include *Pelléas et Mélisande* (Maeterlinck & Debussy), *Wozzeck* (Büchner & Berg), *Salome* (Wild & Strauss), *Peter Grimes* (Crabbe & Britten), *Death in Venice* (Mann & Britten) and *The Tempest* (Shakespeare & Adès).

450.527  **Literature and the Healing Arts**
This course focuses on the relationship between people, disease and the practice of medicine. Through a selection of 19th and 20th century literary texts, our readings chronicle the complexities of lives disrupted by illness and offer cross-cultural perspectives on suffering, healing and the human condition. Through readings in medical and social history, students explore the ways in which illness is represented in literatures from different cultures, how the practice of medicine reflects cultural beliefs, and how these beliefs have changed over time. Since illness is a “call for stories,” we pay special attention to the ways in which a story uncovers the personal, familial and social dimensions of illness—and even participates in the rituals of recovery.

450.581  **The American Revolution**
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. Please note that this list is representative of the course offerings in the MLA Program.
450.608 Judaism, Christianity and Islam
Despite over a thousand 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 religion 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-Ghazalli, 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 (IC)
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 Penelopiad; Sophocles’ Antigone and Anouilh’s Antigone; Shakespeare’s The Tempest and Frederick Buechner’s The Storm; Virginia Woolf’s Mrs. Dalloway and Michael Cunningham’s The Hours.

450.625 Bioethics: Philosophy and Biomedicine
This course draws on key concepts in philosophical analysis, particularly ethical theory, to address the myriad of complex moral issues that arise in the biomedical field. Assigned reading includes relevant works in philosophy by Aristotle, Kant and Mill, as well as those by contemporary bioethicists. In this context students discuss such issues as death and dying, in vitro fertilization, human cloning, physician-assisted suicide, and experimentation with humans and animals.

450.626 The Philosophy of the Universe
What was happening before the Big Bang? Does the universe have a bound, and if so, what lies beyond? Objects are made of atoms, which in turn are made of elementary particles, but what exactly is an elementary particle? That is, what is it made of? In this course, which has no textbook, we answer the above questions. For us to arrive at answers that mean anything requires the use of some mathematics—luckily, only high school algebra and geometry. (Don’t worry if you only half remember your high school math, the needed facts will be explained clearly in class.) We will follow the progress of human understanding from Copernicus through Einstein’s theory of relativity to the most important human, intellectual discovery ever—quantum mechanics. Remarkably, we will discover that some ancient Greek philosophers understood the nature of reality better than many professional scientists do today.

450.640 US Political Culture from 1877 to 1929: Inventing Modern America
From the end of Reconstruction (1877) to the beginning of the Great Depression (1929), American society was characterized by major paradoxes like the emergence of a powerful, national identity beset by searing conflicts of race, gender and class. This course explores the development of such cornerstones of modern political culture as industrial corporations, state and federal bureaucracies, overseas imperialism, widespread migration and immigration, and the labor movement, women’s suffrage and civil rights movements. Students review several films (e.g. Birth of a Nation and Hester Street) and discuss both secondary and primary documents, including works by Theodore Roosevelt, Chief Joseph, Booker T. Washington, Julia Ward Howe, John Dewey and George Santayana.

450.650 Cultural Eras: The 1960s
The ‘60s. A collage of events, people, sights, sounds and ideas immediately comes to mind. These powerful visual representations in many ways define the history of the ‘60s. In this course we will consider the images, memories, history, and legacy of the ‘60s through an interdisciplinary exploration using literature, art, history, politics, music and film. Cultural identity is a key issue. Black, white, Vietnamese, astronaut, protestor, journalist, soldier, woman, man, young, old, you. How do people see themselves within the context of larger cultural events and changes that many have labeled revolutionary? How did so-called ordinary Americans live their lives? Topics of study include but are not limited to presidential politics, the continuing Cold War, social movements (black power, civil rights, environmentalism and women’s movement), the Vietnam War, the Space Program and popular culture (music, film, Barbie).

450.654 Film and Culture: Science Fiction Film in the 20th Century
This course provides a survey of Science Fiction Film from the early part of the 20th century and the very beginnings of film, through 2001. We will look at influential filmmakers including George Melies, Fritz Lang, Stanley Kubrick, George Lucas and Steven Spielberg, and will analyze the basic component of the genre through science fiction “classics” like A Trip to the Moon, Metropolis, The Day the Earth Stood Still, A Clockwork Orange, Dr. Strangelove, Star Wars, Close Encounters, Blade Runner and AI, among many others. The goal is to develop critical analytical skills in understanding the role of science fiction within culture. What is the “science” that drives the science fiction and what does it mean to be human? What is the view of the future, of technology? How are cultural and social concerns expressed through genre? The films and filmmakers are placed within a larger historical, cultural, and social context as we explore film as an industry, a technology, a form of communication and as an artifact of culture.
450.680.01 From Jerusalem to Graceland: Elvis and the Idea of the Holy

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 “sacralization” 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 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.

450.701 Theories of Ethics

Are there correct answers to ethical questions about what behavior is right and what is wrong? Or is no one person’s opinion about ethics any more correct than anyone else’s? In other words, are ethical judgments capable of being true, or are we being deceived by an illusion if we suppose so? Here is a basic and vexed problem, which has concerned many thinkers. Philosophers, ancient and modern, such as Plato, Aristotle, Aquinas, Hobbes, Kant, and Nietzsche have put forward treatments of this problem, and theologians, psychologists, anthropologists, and political theorists also have written about it. A variety of these viewpoints will be considered and appraised, in search of a resolution to the problem.

450.705 Art Collectors and Collections

Using the museums of the Washington/Baltimore area as a classroom, this course traces a dual path through the history of art (particularly Renaissance to Modern painting) and the history of art collecting in the United States. The National Gallery will provide an overview of art history, and the Corcoran, Clarke, Phillips, Freer, Hirshhorn, Walters and Cone collections will provide case studies. Issues of taste, who and what influence it, and the impact of private collections and the art museums that became their legacy on the development of American culture will be addressed. Particular attention will be paid to the choices made by individual collectors exploring the meaning and relevance of the works of art they selected to their own lives and also to the larger picture of American history during their lifetimes.

450.713 Shakespeare and the Film: A Cross-Cultural Perspective

This seminar will examine modern adaptations of Shakespearean tragedy in English, American, Russian and Japanese films. Emphasis will be on the film as a medium for performing Shakespeare in our own time, and on the importance of Shakespeare’s plays to the East as well as to the West. In addition to considering the influence of native traditions on the interpretation of Shakespeare (such as that of Kabuki theater on Japanese film), the seminar will analyze the styles and cinematic techniques of individual directors.

450.718 Faulkner’s Fiction: Beneath the Southern Facade

Although Faulkner’s fiction can be viewed as the historical culmination of works about the American South, it should also be placed in the larger artistic context of Shakespeare, Balzac, Melville, Twain, Conrad, Dickens and Joyce. This course explores the development of Faulkner’s psychological themes and innovative techniques in representative short stories — The Sound and the Fury, As I Lay Dying, Sanctuary, Light in August, Absalom, Absalom!, Hamlet and Go Down, Moses. At the conclusion of the course, students have an opportunity to visit Oxford, Mississippi, the source of many characters and places in Faulkner’s fiction.

450.719 The American Short Story

Of all genres in American literature, the short story explores most profoundly and directly the complex issues of culture, gender, class and race. Students examine thematic and technical developments from Irving’s Rip Van Winkle and Hawthorne’s Rappaccini’s Daughter to works as diverse as Wharton’s Roman Fever, Faulkner’s That Evening Sun, and Baldwin’s Sonny’s Blues. Finally they discuss short fiction by Marylanders John Barth, Josephine Jacobsen and Anne Tyler, as well as contemporary examples of the “short-short story.”

450.720 American and British Poets from the Romantics to the Present

This course will examine the development of modernism in Anglo-American poetry while focusing on close readings of individual poems. Students will discuss Romantic concepts of transcendence in Wordsworth and Keats, Victorian skepticism in Arnold and Browning, and 20th century ideas of alienation in selected works from the following group: Yeats, Eliot, Stevens, Millay, Plath, Atwood, Rich, Dove, Soyinka, Ondaatje, Li-Young Lee and Heaney. The class will include both small and large group discussions.

450.729 Maya Worlds: Ancient and Modern

This course will survey the Pre-Columbian Maya cultures of Mexico and Central America, in light of ongoing archaeological excavation work and the current project of glyph decipherment that has now established that the Maya of the Classic era (third to ninth centuries, CE) were a fully literate Native American civilization. Slide lectures on such important sites as Copán, Tikal, Palenque, Uxmal and Chichen Itzá will explore basic urban layout, the design of ceremonial centers, and the symbolism and iconography of Maya art and architecture, and what these can tell us about the social, political and religious life of the ancient Maya. The course moves on to study the period of European contact, of prolonged struggle, and of colonial and national hegemony, along with continued Maya strategies of cultural survival through accommodation and resistance. Topics will include the crises of the Caste Wars in the Yucatan; the neo-liberal “reforms” of the late 19th century that appropriated indigenous communal lands; and the genocidal repression of the 1980s in Guatemala. Special attention will be devoted to the subject of religious “syncretism,” the blending of Maya traditionalism with distinctively Maya forms of Catholicism and other religious practices.
450.732 The Literature of Oppression: Contemporary Latin American and Native American Fiction
This course will study novels dealing with the effects of war, dispossession and social upheaval on Latin American and Native American families. It will focus on works by Gabriel García Márquez (One Hundred Years of Solitude) and Isabel Allende (The House of the Spirits); and by N. Scott Momaday (House Made of Dawn) and Louise Erdrich (Love Medicine, Tracks). We will consider historical and mythological dimensions of these works—for example, the Columbian civil wars in the work of García Márquez, and Indian rituals in that of Momaday; and also stylistic features, such as the “magic realism” of García Márquez and Allende, and the interlocking narratives of Erdrich.

450.740 Film and Public Memory
Both the feature film and the film documentary have the power to shape public perceptions of key historical events and individuals in US history and culture. This course examines the film as a form of public history replacing “real” history with a constructed, mediated version that more often reflects current controversies and cultural dramas through an exploration of the past. We explore the presentation of historical figures like Bonnie and Clyde and the wars (Dr. Strangelove, Platoon), analyze films that depict the nation’s past (John Ford’s West in The Searchers), and examine visions and perceptions of the future embodied in films like Star Wars.

450.745 King Arthur in Legend and Literature
After reviewing early evidence for King Arthur, students discuss “the Matter of Britain,” the stories and legends surrounding Arthurian figures that appear inWelsh tradition and French romance. In addition to reading the romances of Chrétien de Troyes and Malory’s Morte d’Arthur, students investigate the appropriation of the Arthurian story in subsequent literature, including works by Tennyson, T.H. White and more recent writers.

450.753 The Idea of the South in American Literature
The American South continues to cast a powerful mystique, though its meaning can vary considerably. Whose version of the South is recorded? How do we even define “the South”? What racial, sexual and cultural tensions lie behind the fabled magnolia trees, white-pillared mansions and mint juleps? Since literature has always captured the complex realities beneath deceptive appearances, this seminar explores such questions in works by Edgar Allan Poe, Mark Twain, William Faulkner, Lillian Hellman, Katherine Anne Porter, Robert Penn Warren, Toni Morrison and others.

450.756 What Is History?
How do historians evaluate evidence and draw conclusions about the past? How persuasive is the thesis of Simon Schama’s Dead Certainties that “the asking of questions and the relating of narratives need not...be mutually exclusive forms of historical representation,” and that history ultimately must be “a work of the imagination”? After probing these and other issues, and writing their own “histories” based upon the document packets, students focus on Allen Weinstein’s Perjury: The Hiss-Chambers Case to discuss whether historians can ever determine “the truth” no matter how rich the evidence. This course is intended to be an introduction to the resources and tools for history available on the Internet and the World Wide Web, as well as a reflective exercise on the meaning of history.

450.757 Music and Literature: Thomas Mann’s Doctor Faustus
One of the most celebrated and complex works of 20th century fiction, Thomas Mann’s Doctor Faustus might be described most concisely as a novel about music—its expressive power, role in shaping culture, aesthetic values and its potential dangers. In narrating the life of the fictional composer, Adrian Leverkühn, Mann invokes a vast network of musical references that enrich our understanding of Leverkühn’s creative personality and his place in music history. In the shadow of World War II, Leverkühn’s creative struggles run parallel to the disastrous moral collapse of the German nation in the 1930s and 40s. The touchstone work of German exile culture in America, Doctor Faustus provides unique insights into German cultural history while also commenting upon the condition of artists and intellectuals in times of crisis. In this course, we will supplement our study of Mann’s novel through a detailed examination of the many works of music mentioned in the text. In studying pieces of Beethoven, Brahms, Bach, Wagner, Schoenberg and others, we will sketch out a historical and aesthetic context essential to an understanding of the book. The ability to read music, while certainly helpful, is not required. All course readings and discussion will be conducted in English.

450.764 Medicine in the Ancient Near Eastern and Classical Worlds
This seminar examines the practices of medicine in ancient Egypt, Mesopotamia and Israel, as well as classical Greece and Rome. The primary emphasis is on early ideas about health and disease. Students discuss such issues as the practice of surgery, methods of hygiene, knowledge of contagion, definitions of illness and concepts of ritual purity. Readings include primary texts surviving from ancient Near Eastern documents (e.g. Egyptian papyri and Mesopotamian cuneiform tablets), as well as the Hippocratic treatises and other medical literature from the Greco-Roman world.

450.769 The Dead Sea Scrolls: An Ancient Library Recovered
The recovery of a massive, ancient library from caves near Khirbet Qumran in the Judeaean Desert has been described as one of the greatest archaeological discoveries in modern times. Seminar participants read the scrolls themselves in English translation to learn more about the Jewish apocalyptic in the Greco-Roman period. Jewish apocalyptic is important not only as a lost chapter in the history of Judaism, but also as the spiritual and intellectual context out of which Christianity emerged. Topics include the circumstances of the scrolls’ discovery, theories of their origins, their historical context and the ongoing controversy over publication rights.

450.776 The American West: Image and Reality
The American West has always exerted a profound influence on American life and thought. This course examines the importance of the frontier in 19th century history, as well as Americans’ changing perceptions of how the West was
settled. Topics include the conflict between whites and Native Americans, the role of women on the frontier, the development of “civilizing” institutions like churches and schools, law and order justice, and the timeless distinctiveness of the West. Readings include Frederick Jackson Turner’s essay about the importance of the frontier, Julie Jeffrey’s Frontier Women, Owen Wister’s The Virginian, and Walter Van Tilburg Clark’s Ox-Bow Incident.

**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 doing a portfolio, graduate project or internship. The student works with the Program Director to determine the option best suited to the student’s needs and goals.

450.082 Liberal Arts Portfolio

The Liberal Arts Portfolio is a non-credit option within the MLA Capstone. Students who select the Portfolio option will take 10 courses in the program. 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 Program Coordinator serves as the portfolio advisor. The portfolio consists of a sampling of the best papers and projects written over the course of the student’s graduate career. It is not simply a collection of papers but designed to help students see the intellectual point of convergence in their studies. It is also provides a travel log chronicling the student’s journey toward their own “way of knowing.”

450.830 MLA Graduate Project

Most students enrolled in the Master of Liberal Arts program conclude their degree requirements by writing an independent project under the direction of a faculty sponsor. The graduate project is interdisciplinary in scope and reflects an emphasis or interest that the student has discovered in the MLA program. Before registering for the graduate project, a student must receive proposal approval from the faculty sponsor and the MLA Program Director.

**INTERNSHIP**

450.850 MLA Internship


**THE CENTER FOR LIBERAL ARTS IN ADVANCED ACADEMIC PROGRAMS**

The Center for Liberal Arts (Center) provides a lively, intellectual space for students interested in a degree or those who want to learn more about the world and their own location in it. Courses, events and special symposia offer an immersion in the great ideas and thinkers, and a consideration of both the classic and the contemporary. Students of all ages and academic backgrounds come together to explore the social, cultural and humanistic dimensions and context of the world and their own individual lives. The Center includes the Master of Liberal Arts, the Odyssey Program, and the Osher Lifelong Learning Institute.

The Odyssey Program (celebrating 20 years) offers non-credit classes to working adults interested in the richness of the liberal arts. Go inside the palaces of King George IV, or study renowned artists and take a guided tour of their works at a local museum. Compare two of American’s longest wars (Vietnam and Iraq) or take up your pen to begin that novel in a fiction writing class. Find the answer to the age-old question of, “Why does the Leaning Tower of Pisa actually lean?” The Odyssey Program also includes the Certificate on Aging and the Mini-Medical School.

The Osher Lifelong Learning Institute at JHU was created in 1986 to enhance the leisure time of active, semi-retired and retired individuals in the community. The institute builds on the assets of JHU to offer members intellectual growth, lively discussions, rewarding cultural experiences and new friendships. The institute classes explore the worlds of art, history, philosophy, literature, politics and science. Classes are offered in Baltimore, Columbia and Montgomery County, Maryland.
Master of Arts in Museum Studies
An Online Master’s Degree Program
museum-studies.jhu.edu

To prepare current and future museum professionals to be the visionary leaders of museums in contemporary society, Johns Hopkins University (JHU) 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 onsite 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 anytime, 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 (15-17 students) to encourage active engagement and community among fellow students and students and faculty. Students have direct access to faculty in their courses and can arrange one-on-one student/faculty online meetings in real-time.

Onsite Seminar
A two-week intensive period of on-ground museum study in Washington, DC, or in another location organized by the 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 in the Washington area or an equally suitable site, 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. 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, one of which must be 460.601 or 460.602, to register for this class. 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 Washington, DC, or to other seminar locations, 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 onsite component of the degree requirement.

COMMUNITY

Students
Students in the 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 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.

Advisors
All Museum Studies students are assigned an advisor 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, visitor services coordinator, and education program assistant. 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 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 transcript performed by an outside evaluation service.

> All students who earned their post-secondary degree(s) in a country other than the United States must submit a "course-by-course" credential evaluation performed by an outside evaluation service.

CURRICULUM

The Museum Studies Program 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
- Onsite 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 up to two courses in other JHU departments as electives, subject to the approval of the program director.

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 towards 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
Managing today's museum relies upon the coordinated efforts of a wide range of specially-skilled staff. From directors to accountants, curators to educators, exhibit designers to event planners, registrars to conservators, IT to media, marketing to membership, security to facilities—the professionals behind a museum’s walls define the quality of the institution and each visitor’s experience. Through readings and audio interviews with leaders in the museum field, this course examines the core functions of the museum and how the roles and responsibilities of museum professionals assure a museum’s daily operation, growth and sustainability. Current issues facing museums, including financial challenges and the effects of technology will also be explored. 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
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 Onsite Seminar
A two-week intensive period of on-ground museum study in Washington, DC, or in another location organized by the Museum Studies program is a required component of the degree. 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 in the Washington area or an equally suitable site, 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 uses of technology in the museum. 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, one of which must be 460.601 or 460.602, to register for this class. 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 Washington, DC, or to other seminar locations, 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 onsite component of the degree requirement.

CORE COURSES

Choose three out of five

460.604 Introduction to Museum Education
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 intra-museum 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.
460.606  Exhibition Strategies
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.

460.608  The Business of Museums
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.

460.609  Museums in a Global Perspective
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 and we strongly recommend that students have two other core courses before enrolling.

460.666  Collection Management
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

460.601  Exploring Museum Professions
Note: This course may be taken as an elective, if you have taken 460.602 to meet the requirement. Managing today’s museum relies upon the coordinated efforts of a wide range of specially skilled staff. From directors to accountants, curators to educators, exhibit designers to event planners, registrars to conservators, IT to media, marketing to membership, security to facilities—the professionals behind a museum’s walls define the quality of the institution and each visitor’s experience. Through video and audio interviews with leaders in the museum field, this course examines the core functions of the museum and how the roles and responsibilities of museum professionals assure a museum’s daily operation, growth and sustainability. Current issues facing museums including financial challenges and the effects of technology will also be explored.

460.602  Museums in the Digital Age
Note: This course may be taken as an elective, if you have taken 460.601 to meet the requirement. 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.

460.611  History and Philosophy of Museums
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.
460.612 Multimedia History, Theory, and Practice
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 socio-cultural 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.

460.614 Ethnically Specific Museums
This course examines the history, significance, and potential of ethnically specific museums to enliven the debate about who we are as a nation through our shared experiences and heritage. Students look at six diverse museums including the National Museum of the American Indian, the Japanese American National Museum, el MUSEO del barrio, the Arab American National Museum, the Jewish Museum, and the National Museum of African American History and Culture.

460.615 Museums and Community Engagement
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 towards social entrepreneurship. This course includes the theory and skills of community engagement, drawing on both research and practice for examples.

460.616 Legal Issues in Museum Administration
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.

460.617 Ethics, Technology, and the Museum Professional
This course explores the broad range of ethical issues in the 21st-century museum as related to new technologies including how current theories of business ethics can be applied to the museum, how to critically evaluate new technologies before adoption, and how and when to establish ethics policies.

460.618 Museum Controversies: Ethical Issues in Museums
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 Smithsonian’s display of the Elgin Marbles, 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, obscenity, and “edutainment” are among the issues discussed.

460.620 Accessibility in the Museum
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 and Techniques for Museums
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
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-POE (post-occupancy evaluation) of a museum in their community.

460.630 Exhibition Design, Construction, and Documentation
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: Exhibition Strategies (460.606)

460.634 Museums, Libraries, and Archives: Issues of Convergence for Collecting Institutions
“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. Class work 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
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.

460.639 Material Culture and the Modern Museum
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.

460.640 Educational Programming for Museum Audiences
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: Introduction to Museum Education (460.604)

460.641 Digital Media in the Museum
Technology has become a core tool for interpretive and information programming in most museums today. From handheld devices to interactive tables, Imax to object theater, interactive media is being used to market, navigate, interpret, simulate, and above all, stimulate a growing number of museum visitors. Through presentations, interviews, hands-on experience, and even a behind-the-scenes tour, this course explores the wide range of technology options available today and in the near future. Beyond possibilities, the course provides the students with the basic skills to select the best solution and to plan, manage, and assess the production of successful museum media projects. Students will have the opportunity to produce a small media prototype or develop a proposal for a real or imagined production.

460.642 Creating Online Learning Environments for Museums
This course will address how to develop collection materials into effective online learning environments. Through readings, discussion and hands-on experimentation, students learn how low-cost, web-based tools (such as blogs, wikis, and other content creation applications found in public websites like Google) can be used to create informal and formal learning experiences that mirror or expand onsite museum learning experiences. Social networking and media distribution sites (such as Facebook and Flickr) will also be examined for educational potential in a museum context. The class will culminate in a final team project to create an educational website proposal for an actual museum. Note: Students are strongly encouraged to take Introduction to Museum Education (460.604) before enrolling in this course.

460.652 The Practice of Museum Publishing
As content originators, museum curators, educators, conservators, public relations officers, development staff, and
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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, as well as how new technologies have affected both the way museums think about publications and how they get produced.

460.655 Expanding Roles of Museum Marketing and Communications
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.

460.657 Fundamentals of Museum Fundraising
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, ePhilanthropy, prospect research, grant writing, annual and capital campaigns, corporate giving and cause marketing, special events and stewardship.

460.660 Management of Technology in Museums
Every manager is constantly making decisions. To be better informed is to make better decisions. A successful manager of technology staff requires an understanding of the principles that support the various technologies in a museum environment, but does not necessarily have to be a technology professional. This course, tailored to individuals with little or no technology background, presents the principles necessary for any non-technical supervisor to have the tools and confidence to successfully oversee museum technology staff, operations and production.

460.662 Internet Strategies
The Internet has made it increasingly possible for museums to extend their mission by quickly and cost-effectively publishing information to a broad audience, and expanding their reach to those who may never step foot inside their physical walls. At the same time, the Internet provides new tools to help museums attract and cultivate local audiences and enhance on-site visits. In this course, students will survey the many means and methods available to museums on the Internet, including informational web pages, online exhibitions and collections, and newer tools such as blogs, podcasts, RSS feeds and social networking. Consideration will be given to critical issues such as audience research, usability, marketing, legal matters, and strategic planning. Using concepts covered in the course, students will receive hands-on experience planning a web development project.

460.667 Collections Information Management Systems
Collections Information Management Systems, the workhorses of museum information technology, long ago evolved into Collections Information Systems, able to provide staff members and the public with access to collections information for a myriad of purposes. So why is it that despite this vastly increased functionality, so many museums use these complex and costly systems to carry out the same restricted set of tasks they performed in their earliest incarnations? Why is it that, even while these systems can serve as powerful tools for educators, curators and museum visitors, they are frequently neglected or updatable only by the registrar's office? As information about the objects in our collections has become a valuable and widely accessible asset, it is used more widely and intensively than ever before. Yet in many institutions, the effort to produce this information is duplicated among multiple departments, drawing on multiple data management technologies and unsynchronized sets of data. In this course, we examine the purposes for which collection information is used, who takes responsibility for it, and how it is managed. Students will learn to evaluate the object information needs of the museum by examining who uses object information, regardless of where and how it is stored, and to what end. Practical exercises in requirements identification, "corralling" legacy data into consistent formats for import to standards-based systems, selecting appropriate standards, and developing criteria for selecting not only the right system but the right kind of system (or systems) will prepare students for the real world of messy, inconsistent, and often "siloloid" information.

460.668 Cataloging Museum Collections: History, Standards, and Applications
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. Recordkeeping 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
The digital revolution that began in the late 20th century is now affecting all organizations that conduct business, interact with the public, and maintain records of their activities. Museums face particular challenges as they begin to acquire permanent collections on digital media and create digital products for exhibition and online presentation. Even museums that don’t include original digital media in their permanent collections need to manage internal documentation about their holdings, such as photograpic images of the physical objects in their collections, acquisition and donor registers, and conservation and treatment records. Today these records are typically created in digital formats and stored in databases. In addition, many museums own fragile materials such as older audio recordings and newspapers that should be digitized to ensure preservation of the information recorded on them, and museums are also...
creating digital surrogates of physical originals to increase access to collections and engage audiences through online exhibits and social media activities. How should all of these digital assets be managed? How can preservation priorities be determined and long-term preservation of critical assets be ensured? This course introduces students to the current state of digital preservation (a moving target), to the big issues and challenges to be resolved, and to basic concepts for designing an effective digital preservation plan. Topics covered include: the relevance of digital preservation for museums; the importance of standards and policies; considerations involved in preservation strategies such as migration and emulation; issues relating to formats, repositories, and processes; and emerging preservation solutions. Note: Students must have completed two courses in the program to register for this course and we strongly recommend that students have two core courses before enrolling.

460.671 – Foundations of Digital Curation
This course introduces students to the emerging field of digital curation, which is defined as the active and ongoing management of digital assets throughout their lifetime. Students will examine the practical issues, policies and tools involved in managing digital collections in accordance with current standards and best practices. Topics include: appraisal and selection of resources; principles of repository management; management of research data and digital media art; legal considerations; and user perspectives. This course complements the course on Digital Preservation (460.670) by focusing on the beginning of the lifecycle and by identifying specific actions that museums can take to meet users’ needs and maximize use of their valued digital resources. It also explores the relationship between individual institutions that create and acquire digital content, and organizations known as aggregators that bring together digital resources from numerous institutions to increase public access. Note: Students must have completed two courses in the program to register for this course.

460.675 – Leadership of Museums
This course is for students who either are or aspire to become the executive director of a museum. This need not be an immediate goal, but students should have a strong sense that this is what they want to do eventually. This course is not simply about museum leadership. Rather it is designed to help students understand their respective leadership strengths and potential, and to identify skills and practices that they can use to become a successful museum director. There are many kinds of museums, and many types of leadership, and no single type fits all situations. We will explore the complexities of leadership in general, the specific challenges of leading a museum, and best practices among effective leaders. Students will reflect on and write about themselves as leaders, analyze and discuss cases of vexing leadership challenges, lead class discussions, interview museum directors about challenges they have faced, and describe their own plans for preparing to take on the job of museum executive director. Prerequisite: Students must have completed ONE of the following courses to register for this course: History & Philosophy of Museums (460.61); Museums, Finance and the Economy (460.684); or Fundamentals of Museum Fundraising (460.655).

460.682 – Museum Procurement and Contracting
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.

460.684 – Museums, Finance, and the Economy
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.

460.750 – Museum Internship
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 onsite 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 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 two courses in the program to register for this course.

460.755 – Museum Projects
This course expands opportunities for practical experiences beyond the onsite 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 Project team in tandem with the project requirements and deadlines.

Students must submit a Museum Project application form two weeks before registration begins to be approved for enrollment in the Museum Project course. On this form, students will describe their interest in the specific Museum Project 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.

### DUAL MA IN MUSEUM STUDIES/GRADUATE CERTIFICATE IN NONPROFIT MANAGEMENT

Students pursuing an MA in Museum Studies, who are interested in furthering their management education, may enroll in the dual degree program offered with the Graduate Certificate in Nonprofit Management of Advanced Academic Programs. 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 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 4 in Nonprofit Management. Those interested, including current students, apply to the dual MA in Museum Studies/Graduate Certificate Nonprofit Management through Advanced Academic Programs.

MA in Museum Studies students pursuing the Nonprofit Certificate must meet the following course requirements:

#### Courses from the MA in Museum Studies

**Required**

- 460.608 Business of Museums

**Additionally, at least one of the following**

- 460.621 Evaluation Theory and Techniques for Museums
- 460.655 Expanding Roles of Museum Marketing and Communications
- 460.657 Fundamentals of Museum Fundraising
- 460.660 Management of Technology in Museums
- 460.675 Leadership of Museums
- 460.682 Museum Procurement and Contracting
- 460.684 Museums, Finance, and the Economy

#### Courses from the Nonprofit Management Certificate

**Choose four of the following**

- 470.623 Program Development and Evaluation
- 470.625 Resource Development and Marketing
- 470.728 Influence and Impact of Nonprofits
- 470.736 Principles of Nonprofit Management
- 470.774 Nonprofit Governance and Executive Leadership
- 470.798 Financial Management and Analysis in Nonprofits
Certificate in National Security Studies

The Certificate in National Security Studies is the perfect vehicle for students looking to expand their expertise and understanding of the broad range of threats facing the US in our new century. The Certificate in National Security Studies draws on experts in government, international relations, bioscience and military affairs in order to provide students with the tools to analyze threats that challenge US security, both in the realm of homeland security and to American interests worldwide.

Professionally, the Certificate in National Security Studies is the ideal credential for those who want to capitalize on this vital and growing field.

For those who want more, pairing the Certificate in National Security Studies with other Johns Hopkins University (JHU) programs, including the MA in Government, or the various programs in Biotechnology, or the MA in Applied Economics or Energy Policy and Climate, provides a comprehensive package for ambitious students to advance their career goals.

ADMISSION REQUIREMENTS

Application Documents
Submit to Advanced Academic Programs (AAP) Admissions Office (aapadmission@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 how studying at JHU will help you realize your ambitions.

COURSE REQUIREMENTS

Students take two core courses, one from each area below:
> Foreign Policy
> Science

National Security courses are designated by 406, and the course descriptions follow this list. Government designation is 470, and the course descriptions can be found in the catalog under the Government Program section. Communications course designation is 480, and course descriptions are in the catalog under the Communication Program section. Biotechnology course designation is 410, and course descriptions can be found in the catalog in the Advanced Biotechnology Studies Program section.

In addition, students select three electives for a total of five courses.

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

Two required—one from each area. The other courses listed can be taken as electives.

Foreign Policy
470.606 American National Security in the 21st Century
406.666 Contemporary Terrorism and the American Response

Science
406.678 Science and Biodefense
406.681 The Technology of Weapons of Mass Destruction
406.682 Technology and Security
406.683 Weapons of War: The Technology and Uses of Weapons
470.763 Keeping Secrets: Cryptography and Intelligence

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
ELECTIVE COURSES

Select three. These courses are samples. You may take other classes than these with the written permission of the program director for Global Security Studies.

National Security Studies
- 406.665 The Art and Practice of Intelligence
- 406.669 Homeland Security: Threats, Challenges, and Solutions
- 406.670 Crisis Management
- 406.671 Congress and Homeland Security
- 406.693 Constitutional Issues in National Security

Government
- 470.632 Defense Policy I
- 470.633 Analyzing Military Policy
- 470.635 Executive Politics and Policymaking
- 470.647 International Security and America’s Role in a Troubled World
- 470.648 The US and the European Union: Allies, Partners, or Rivals
- 470.653 Contemporary Russian Politics
- 470.658 American Democracy in Wartime
- 470.661 Constitutional Law
- 470.663 Administered Homeland Security
- 470.664 War, Humane Behavior and Morality
- 470.665 Bioterrorism and the Law
- 470.669 Seminar in Homeland Security Administration
- 470.679 America and the Globe: Critical Policy Issues
- 470.680 21st-Century Conflict
- 470.689 Growing Apart? America and Europe in the 21st Century
- 470.692 Military Strategy and National Policy
- 470.696 Western Military Thought
- 470.697 Nuclear Weapons and US Foreign Policy
- 470.700 Islamic Fundamentalism
- 470.704 Strategy in Insurgent and Asymmetric Warfare
- 470.707 Asian Politics: Challenges and Opportunities
- 470.708 Public Diplomacy and Arab Public Opinion
- 470.710 The Politics of Foreign Policy
- 470.711 Intelligence: From Secrets to Policy
- 470.731 Terrorism and Counter-terrorism in Theory and Practice
- 470.733 Political and Security Issues in the Middle East
- 470.740 Conflict and Security in Cyberspace
- 470.745 Assessing Military Power
- 470.746 Understanding Contemporary Iran
- 470.748 The Politics of Conflict and Security in South Asia
- 470.773 Energy and Environmental Security
- 470.781 Development of Climate, Energy and Security Plans
- 470.782 The Practice of Public Diplomacy and Statecraft Communication

Advanced Biotechnology Studies
- 410.692 Biothreat Response and Microbial Forensics
- 410.693 Science, Medicine & Policy in Biodefense
- 410.694 Microbial Pathogens and the Impact on National Security

For those interested in earning a master’s degree, the Government program offers an MA in Global Security Studies.

CERTIFICATE IN NATIONAL SECURITY STUDY PAIRINGS (OPTIONAL)

MS in Applied Economics/
Certificate in National Security Studies
The Certificate in National Security Studies may also be taken concurrently with the MS in Applied Economics. Those with an interest in both programs should apply to each and reference the concurrent program in the personal statement.

MS in Energy Policy and Climate/
Certificate in National Security Studies
The Certificate in National Security Studies may also be taken concurrently with the MS in Energy Policy and Climate. Those with an interest in both programs should apply to each and reference the concurrent program in their personal statement.

Students choosing this option must meet the following course of study:
1. 470.606 American National Security in the 21st Century
2. Elective from NSS
3. Elective from NSS
4. 420.701 Energy Production Technology
5. 420.702 Science of Climate Change and its Impact

MS in Biotechnology/
Certificate in National Security Studies
The Certificate in National Security Studies may also be taken jointly with the MS in Biotechnology. Applicants interested in pursuing both degrees simultaneously should apply to the joint program. Current students enrolled in either the MS in Biotechnology or the NSS Certificate may apply for the joint program at any time (prior to the completion of the initial degree or certificate).

Students already accepted and/or enrolled in Advanced Biotechnology Studies who wish to add the NSS Certificate as part of their program, may do so by completing the application to the joint MS in Biotechnology/NSS Certificate (fee and letter of recommendation waived).

Students already accepted and/or enrolled in the NSS Certificate who wish to add the MS in Biotechnology to their program of study, may do so by completing the application to the joint MS in Biotechnology/NSS Certificate (fee waived).
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 requirements of the MS in Biotechnology with a concentration in biodefense, and take the following courses to receive the NSS certificate:

Students will take
2. 410.692 Biological & Chemical Response and Forensics
3. 410.693 Science, Medicine and Policy in Biodefense
4. NSS Elective from list below
5. NSS Elective from list below

406.661 Preserving American Security in a Dangerous World
This course presents an overview of the key security issues facing the US. These issues include the causes of war, peace, terrorism, the spread of weapons of mass destruction, the challenge from the developing world, and responses to security threats in the wake of 9/11. The format of the course is mostly lecture, but will include ample time for discussion.

406.665 Art and Practice of Intelligence
This course is designed to give students an understanding of the history and fundamental concepts of intelligence gathering and analysis. In addition to tracing the development of intelligence organizations, it examines both the disciplines of intelligence (signals intelligence and espionage, for example) and its products. It focuses on the effects of intelligence exercises on decision-making particularly, but not exclusively, in the realm of national security and military policy. It uses case studies to illustrate enduring issues or problems in the study of intelligence.

406.666 Contemporary Terrorism and the American Response
September 11, 2001, was a watershed event in the history of terrorism. This course seeks to understand modern-day terrorism as a phenomenon and to examine the options and constraints inherent in counterterrorism efforts. Can terrorism be defined? Why does terrorism occur? What are the environmental factors and motivations that drive terrorists? How do terrorists operate? How do they support, facilitate and fund their activities? How is terrorism fought? How should governments respond to terrorism domestically? How can open societies fight terrorism? The course also addresses such issues as linkages between terrorist groups; state sponsorship of terrorism; terrorist financing; logistical support networks; terror tactics and strategies; terror and globalization; and counterterrorism methodologies.

406.670 Crisis Management
This course provides students with a fundamental understanding of crisis management, risk communications, media relations, and public opinion research techniques in the context of the worldwide controversy over biotechnology. Students will be introduced to crisis management principles, strategies, tactics and communications methods that will enable them to predict, manage and control real-world controversies they may confront. Course participants will work as a team to develop a biotechnology-specific crisis management plan for analysis and discussion, and will also have the opportunity to hone their communications skills by participating in practice media interviews during in-class sessions.

406.671 Congress and Homeland Security
This course explores the partnership of the legislative branch with the Department of Homeland Security (DHS). Students will explore the Hill’s critical role in helping create DHS and examine the evolving relationship of congressional oversight and legislative mandates. Issues to be covered include jurisdiction of committees, the budget, authorization and appropriation processes, committee interactions and more. The course will explore these topics against the backdrop of real world cases and issues.

406.681 Technology of Weapons of Mass Destruction
Students gain the foundational knowledge behind WMD (both weapons of mass destruction and weapons of mass disruption) and about how these weapons threaten US 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.
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 three concentrations: Fiction, Nonfiction and Science-Medical Writing. Experienced faculty members, all practicing writers or editors, provide expert direction and constructive criticism to help students craft successful short stories, articles, poems, essays 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 Writing Program learn primarily through the practice of writing; literature is studied to clarify approaches to craft. Classes are kept small, especially the writing workshops required of all participants. Depending on student goals, the program offers a broad foundation in fine arts 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 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. The nine required courses include core courses, workshops, electives and a final thesis course.

The full degree program in Fiction and Nonfiction is available onsite classes at Dupont Circle in Washington, DC, and at the main Homewood campus in Baltimore. Students in the onsite Fiction and Nonfiction program may take courses at either or both campuses. Our Washington / Baltimore courses are taught on weekday evenings or Saturdays. A fully online degree in Fiction and Nonfiction is not available. However, the program offers online components of courses and uses innovative video technologies to combine students from both campuses into a single course. Onsite students also are sometimes combined in courses that alternate between DC and Baltimore each week, and/or they meet on Saturdays to ease commuting.
Effective January 2013, the Science-Medical Writing concentration can be completed mostly online; only a brief onsite residency is required. Science-Medical Writing students who want more face-to-face interaction can replace an online course with an extra residency. See our website for more information about the Online / Low-Residency format for Science-Medical Writing, or email sciencewriting@jhu.edu.

Some applicants to the Writing Program may be granted provisional status, with permission to take one or two courses, if the admissions committee believes they will develop enough for degree candidacy. Applicants not interested in a degree may seek permission to take individual courses as a special student, but such applicants must follow the usual application process and must obtain advisor approval for any course desired.

The Writing Program sponsors readings, seminars and conferences and is home to the national literary and arts journal, The Doctor T.J. Eckleburg Review. The Writing Program's acclaimed summer experience, The Hopkins Conference on Craft, offers students full-course credit in an intensive, concentrated format at an off-site location. Recent conferences were held in Florence, Italy, and Bar Harbor, Maine. The 2013 conference in Baltimore will include a special Medicine In Action course at the world-famous Johns Hopkins Hospital. Writing Program alumni may attend the conference at discount rates, and applications are accepted for a limited number of slots reserved for writers from outside Johns Hopkins University. For details, see writing.jhu.edu/craftconference or email craftconference@jhu.edu.

At the publication time of this catalog, the program was considering new concentrations and degrees. For updates and more information about the Master of Arts in Writing Program, visit us online at writing.jhu.edu or email writingprogram@jhu.edu.

Special Note: The MA in Writing Program is the part-time alternative to The Writing Seminars, the nationally ranked, full-time graduate writing program at Johns Hopkins University. The Writing Seminars offers courses only in Baltimore and has a separate curriculum and application process. The Seminars offers a two-year, full-time Master of Fine Arts degree in fiction and poetry and a one-year, full-time MA degree in science writing. For more information about the full-time program, call 410-516-6286 or visit online at writingseminars.jhu.edu. Prospective applicants should carefully review the admission requirements, curriculum and expectations for the desired program.

APPLICATION AND ADMISSION REQUIREMENTS

In addition to the credentials and materials required for applications to all programs (see Application and Admissions in the front section of this catalog), the Master of Arts in Writing requires:

**Credentials and Experience**

Applicants are expected to have some familiarity with writing in their chosen concentration before beginning graduate-level courses, 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 and Science-Medical writers should have read in their field and been exposed to some journalistic fundamentals. 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.)

All graduate writing students are expected to be proficient in grammar, punctuation, spelling and usage. Applications lacking this proficiency will be rejected. For science-medical writing, a background in science or technology is helpful but not required. The program does not require a graduate entrance examination or proficiency in a foreign language. The 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 (AAP) standard application materials (including an application, application fee, recent transcripts) and the following 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)
- Recent writing samples in the chosen concentration, demonstrating the applicant's current development as a writer in that field (required)
- Official undergraduate and graduate transcripts (required)
- Up to three recommendation letters directly relating to the applicant's experience or promise as a writer (optional)

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 writing. The statement also must describe the applicant's recent reading. The statement should not exceed three typewritten pages (single- or double-spaced) and may be supplemented with a brief additional biographical sketch or résumé from the applicant. 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 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. 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 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, but they should label any incomplete work.

Applicants should not submit the only copy of their work as 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, or any combination of the two forms, demonstrating literary content or themes.

**Nonfiction:** Up to five separate works of modern 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.

**Science-Medical Writing:** Up to five articles, essays or book chapters about any aspect of science, medicine, nature, technology or the environment written for a general audience. Peer-reviewed scientific papers, technical research reports, academic or internal business reports, term papers, scholarly papers or government technical writing generally are not acceptable. The Science-Medical Writing concentration does not focus on technical writing or the creation of peer-reviewed scientific papers. Rather, students develop skills to communicate, explain or comment on issues and topics in science, medicine, nature or technology to a sophisticated or lay audience. For guidance, applicants should consult mass-market or specialized online or print magazines or books in science, medicine, nature or technology.

**Dual-Concentration Applicants**
In rare cases, applicants may seek degree candidacy in more than one concentration by submitting full writing samples in each proposed area. Students applying in more than one concentration should explain their multiple interest and reading in a single Statement of Purpose. The program makes individual admission decisions for each concentration. 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. For more information about the Seminars, call 410-516-6286 in Baltimore or link online to writingseminars.jhu.edu. The MA in Writing Program accepts applications year-round; the Seminars accepts 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.

**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.) Earning provisional status is determined by the revised standards of the desired course will determine the admissions review—not by the provisional course instructor or grade. Provisional students should consult the program website at writing.jhu.edu for more information. (2) Special students in the Writing Program must get advisor permission for every course they take. (3) Unlike other AAP graduate programs, the Writing 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; some courses require greater writing experience than others. Courses completed as a provisional or special student will count toward an 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 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 advisor (at least one elective must be exclusively in the student's concentration)
- The thesis course (all eight earlier courses must be completed before starting the thesis course)

To earn a Master of Arts in Writing in Science-Medical Writing, students complete the following nine courses online, with a brief residency as noted:

- Techniques of Science-Medical Writing (online)
- A second core course to be announced (online)
- Two Science-Medical Writing Workshops (online)
- Two Science-Medical Writing electives (online)
- A Residency of 7-10 days (may count as elective or workshop credit; student chooses onsite location in Baltimore, Washington, etc.)
- Student Choice of another workshop, elective, or residency
- Thesis & Publication (online, with possible optional residency of three to five days)

For the 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.

CORE COURSES

Core courses provide foundation skills and theory in each concentration. Fiction, Nonfiction and Science-Medical Writing 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. Science-Medical Writing students take 490.658 Techniques of Science-Medical Writing and a second core course to be announced. To improve foundation skills, Nonfiction and Science-Medical Writing students should consider 490.703 Principles of Journalism as an additional core course or elective. (In some cases, Fiction, Nonfiction, or Science-Medical Writing students may be allowed to register for a workshop before completing both core courses if a core course is not offered frequently enough in the course schedule. Advisor approval is required.)

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

NON-GRADUATE COURSES

This course cannot count toward the degree

490.010 Graduate Writing Techniques

This course is designed for students in the AAP or others who want to improve their general academic and workplace writing skills. The 20-hour 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 for Speakers of Other Languages.

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-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 Writing Program courses.
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 or Science-Medical Writing. Waiver requests should be submitted at least a month before the term starts, if possible.

490.652 Contemporary American Writers
This 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 may hear from guest lecturers. 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 course also explores elements of literary writing, compared to other approaches. Contemporary American Writers is required for all incoming Fiction and Nonfiction students and usually must be completed before students in those concentrations enroll in a writing workshop. This course replaces Contemporary Nonfiction as one of two Nonfiction core courses.

490.654 Fiction Techniques
Students examine the elements of fiction, including point of view, plot, character, setting and the forms of short story 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 may 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. Others may take it as an elective, although the program may limit the number of registrants from outside Fiction.

490.655 Poetry Techniques
This course offers an introduction to prosody and the technical elements of poetry with an emphasis on structural principles, metrical and syntactical rhythm, sound and rhyme, formal and stanzaic organization, and the use of figurative language. Students read and write poems exploring lyrical, narrative and dramatic subjects. Writing assignments include exercises, imitations, responses and original work. Students develop critical reading skills and familiarity with the workshop process.

490.656 Nonfiction Techniques
The intensive reading and writing exercises of this course help students gather information and transform it into clear, creative prose—whether in literary essay and memoir or journalistic forms such as articles, reviews or opinion. Reporting techniques include interviewing, personal observation and examining documents. Writing techniques include structure, quotation, detail, word choice, transition, revision and editing. This core course is required for all incoming Nonfiction students prior to enrolling in a workshop. Students in Fiction may consider this course as an elective.

490.658 Techniques of Science-Medical Writing
This core course develops and hones the reporting, creative and explanatory skills demonstrated by the best science-medical writers. In addition to writing assignments and exercises in journalistic and literary writing, students will complete field trips and other real-world experiences. The course covers 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 technical or scientific issues. Science-Medical Writing students should complete this course before enrolling in a writing workshop. Enrollment is encouraged by other students interested in this growing professional and creative field.

490.703 Principles of Journalism
Optional core course for Nonfiction and Science-Medical Writing students. 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 news writing, interviewing, journalism history, objectivity, deadlines, professional standards and competition. Students in Nonfiction and Science-Medical Writing without a background in journalism are strongly urged to consider this course as an additional foundation for their broader creative writing goals. The course includes frequent short to moderate length writing assignments, lectures from practitioners, and exercises in class and off-site, with analysis of online and print newspapers and news-magazines, plus news broadcasts, blogs and other forms. Some Nonfiction and Science-Medical Writing 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. Fiction writers may consider this course as an elective.

WORKSHOPS
As the most important courses in the curriculum, workshops 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. 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. A general workshop includes the word “workshop” in its title: Fiction Workshop, Nonfiction Workshop, etc. Other workshops are specialized, meaning students must submit writing in a certain form or style within the concentration. Specialized workshops include Writing the Novel Workshop, Writing the Memoir & Personal Essay Workshop, Experimental Fiction Workshop, Profile & Biography Workshop, etc. Any workshop counts toward the requirement of three workshops for a degree. Students may take a general workshop multiple times, or they may take only specialized workshops—or any combination.
Unless a core course waiver has been granted or special permission is received, students in Fiction, Nonfiction and Science-Medical Writing must complete the appropriate core courses before enrolling in any writing workshop—general or specialized. Students are encouraged but not required to take each of their three required 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 student’s 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.

At printing time for this catalog, the Writing Program was developing special courses that offer either workshop or reading elective credit to students enrolled in a single, combined course. These combined workshops and reading electives will be offered in Fiction, Nonfiction, and Science-Medical Writing, as required by enrollment. See 490.667 & 668 below.

**490.660-661-662 Fiction Workshop**
Fiction workshops concentrate 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 to their peers for regular critiques. Typically, two or three stories or chapters are submitted during a semester; revisions are required. Workshop participants also must submit detailed critiques of their fellow students’ writing. In most cases, students need to submit short stories in at least one general workshop before progressing to novel chapters in a later course. See Writing the Novel Workshop below.

**490.663-664-665 Poetry Workshop**
These general workshops provide an intensive writing experience in conjunction with appropriate reading. As members of a workshop, students submit poems to their instructor and to their peers for weekly critique sessions. Students are expected to spend their time generating new poems and revising others.

**490.667 Combined Workshop and Readings in Fiction**
This innovative new course allows students to earn either Fiction Workshop credit or a Fiction reading elective credit in a single, combined course; students may enroll in this course if they need either workshop or elective credit. 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 provide Fiction elective students with workshop experience as they earn reading course credit, while workshop students will enjoy the full writing critique process and complete helpful readings along the way. Students must complete Fiction Techniques before enrolling in this course.

**490.668 Combined Workshop and Readings in Nonfiction**
This innovative new course is the factual writing version of 490.667. The course 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 as they earn reading course credit, while workshop students will enjoy the full writing critique process and complete helpful readings along the way. Students must complete Nonfiction Techniques before enrolling in this course. Nonfiction students may enroll in this course if they need either workshop or elective credit.

**490.669 Combined Workshop in Nonfiction and Science-Medical Writing**
This course allows students in Nonfiction and Science-Medical Writing to earn a workshop credit in the same course. Students in both concentrations are urged to enroll. With the instructor’s permission, students in one concentration may submit writing in the other concentration. For more information about the type of writing required for this course, see the descriptions below for 490.670 Nonfiction Workshop and 490.673 Science-Medical Writing Workshop. This is NOT a workshop for writing only about science or medicine.

**490.670-671-672 Nonfiction Workshop**
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 are required. Reading and writing exercises also may be required.

**490.673-674-675 Science-Medical Writing Workshop**
In these general workshops, students receive professional guidance in translating complex scientific or medical knowledge and research into graceful, lucid prose. Directed to the general reader, science writing emphasizes clear, accurate writing about a broad range of scientific or technical subjects. Students may 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. To offer diverse writing opportunities, science-medical writing workshops may be
combined with nonfiction workshops; see 490.669 above. This course also counts toward the workshop requirements for Nonfiction students.

490.679 Experimental Fiction Workshop
This specialized workshop introduces students to innovative forms by comparing and analyzing two directions for American fiction in recent decades—traditional and experimental. Assignments challenge students to experiment with styles that differ from their previous work; extensive reading assignments come from the latest collections. The course follows a format similar to that of 490.660 Fiction Workshop above. The course is open to Fiction students who have completed their core courses.

490.682 Writing the Novel Workshop
This specialized workshop is designed for students who are writing a novel. Students must submit a total of 40-75 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 advisor. (Enrollees also must have completed the Fiction core courses.)

490.690 Travel Writing Workshop
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 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. In addition to literary travel writing, this course also covers consumer travel and other commercial forms. This workshop is intended for Nonfiction and Science-Medical Writing students and counts as a writing workshop. (Enrollees must have completed nonfiction core courses.) Fiction students may enroll with the permission of the program director or assistant director.

490.692 Profile & Biography Workshop
Articles or books about people are a central component of contemporary nonfiction and science-medical writing. In this specialized workshop, students examine methods used for 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 is open to Nonfiction and Science-Medical Writing students who have completed core courses in their concentrations.

490.693 Writing the Memoir & Personal Essay Workshop
Writers have long enjoyed a major impact on contemporary thought by producing compelling essays about personal experiences, feelings or ideas. 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 nonfiction. This workshop is open to Nonfiction and Science-Medical Writing students who have completed core courses in their concentrations.

490.694 Government & Political Writing Workshop
As the center of American government, Washington also is the capital of writing about government and politics. Students in this specialized workshop are introduced to the substantive topics and technical specifics necessary to report and write on government and politics. Students are asked to analyze, explain and write about events as they occur in Congress, the White House and elsewhere in the capital. Guest lecturers provide insights into their craft. This course is open to Nonfiction and Science-Medical Writing students who have completed core courses in their concentrations.

490.695 Viewpoint Journalism Workshop
This specialized workshop in Nonfiction and Science-Medical Writing combines extensive reading and writing in the area of opinion. Students explore the conventions governing effective editorials, personal columns, blogs, first-person writing and other kinds of commentary. Specialists from different areas discuss their craft in guest lectures. This workshop is open to students who have completed the Nonfiction and Science-Medical Writing core courses.

490.698 Writing the Review Workshop
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 and 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. It is designed for Nonfiction and Science-Medical Writing students who have completed core requirements; Fiction or Poetry students may enroll with the permission of the program director or assistant director.

Note: In 2014, the Writing Program may combine the two courses above into a single workshop called Review and Viewpoint Writing Workshop, to expose students to review writing and viewpoint journalism in one course.

490.701 Advanced Workshop
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 advisor or the program’s director or assistant director. 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.
ELECTIVE COURSES

The program offers three types of elective courses: 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 or structure, and may involve extensive reading plus some writing exercises and assignments. Cross-concentration electives are courses that are open to students of several or all 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 core courses as soon as possible, so they have the option of taking a workshop or elective in subsequent terms.

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 must be specifically within the student’s concentration. Students should consult the course descriptions below for information on electives designed for their chosen concentration. Generally, electives numbered 490.678, 490.680, 490.684, 490.687-88, 490.713, 490.721, and 490.731 are designed for Fiction students. Electives 490.689 through 490.700, and 490.703 through 490.710 are meant for Nonfiction or Science-Medical writers. Other electives (490.676-677, 490.685, 490.702, 490.711-12, 490.714, 490.719-20, and 490.800 & 805) are designed for students from any concentration. With an advisor’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 once 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.

490.676 Sentence Power: From Craft to Art
This craft elective is open to students of all concentrations. 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 paragraphs or stanzas from their own work. Authors to be studied may include Updike, Munro and Welty in fiction; Dillard, Maclean and Mitchell in nonfiction; Brodsky, Hecht and Bishop in poetry; and Thomas, McPhee and Quammen in science and nature.

490.677 Shakespeare: Art and Audience
This reading elective is designed primarily for Fiction students, although any student may enroll with an advisor’s permission. The course 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.

490.678 Novel Form, Style and Structure
This craft elective is meant primarily for Fiction writers, especially those writing or wishing to write a novel. Others, however, might find it of interest. 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 20th-Century World Literature
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. (Also see 490.702 Readings in Global Fact & Fiction.)

490.681 The Craft of Poetry: A Reading & Writing Workshop
This new course offers intensive study in poetry techniques, readings and workshop. Poetry students who enroll earn full course credit for a core course, elective or workshop, as needed. The content of this course will be targeted to the needs of students who enroll and to the strengths of differing instructors. Fiction & Nonfiction students may take this course as an elective, focusing on technique and reading. (This course was formerly Development of Poetry & Poetics I.)

490.683 Voice in Modern Fiction
In this craft elective, students examine aspects of voice in contemporary novels and short stories, considering how style, point of view, tone, structure and culture all contribute to an author’s or narrator’s individual voice. To understand how authors use these elements, students complete exercises to strengthen their own fictional voices. Readings include novels, short stories and articles on craft. Class assignments may include response writings and original fiction as well as oral presentations. (In 2014, this course will be expanded to: 490.683 – Voice in Modern Fiction and Nonfiction, which will combine Voice in Modern Fiction and 490.705 Crafting a Nonfiction Voice. The new course will allow Fiction and Nonfiction students to work together to examine aspects of voice in contemporary novels and short stories, and in essays, articles and nonfiction books.)
490.684 The Heritage of Fiction I & II
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-21st Centuries. Either section may be taken, and neither has to be taken in order.

490.686 Identity in Contemporary Writing
This cross-concentration reading elective explores how personal identity is transformed into fiction, poetry and 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, creative pieces, craft analyses or essays for discussion by the class. This course should be of interest to students of any concentration.

490.687 The Short Story: Past and Present
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 Fictional Forms
This reading/craft elective examines the formative genres of fiction. Students will read examples of romance, confession, anatomy and novel, and they will consider contemporary fiction in terms of these historical trends. The readings will range from ancient Egyptian tales and Greek romances to typically misplaced 19th-century works such as Flaubert’s “The Legend of St. Julian the Hospitalier” 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
This reading elective allows students to analyze and discuss contemporary nonfiction and science-medical writing without the additional requirement of extensive writing assignments. While students write brief reports and make a class presentation, the course largely involves reading and discussing such masters of the genre as McPhee, Mitchell, Didion, Talese, Kidder and others. Extensive reading is required, and students should be prepared for significant class participation. This course is designed primarily for students in Nonfiction and Science-Medical Writing; Fiction writers and poets also may find it of interest.

490.691 Science Policy & Politics
This course explores how science, medicine and technology can be affected by politics and practices within government, the private sector and within the fields themselves. Students use the evolution of science policy as context for discussion, research and writing about contemporary issues. Science-Medical Writers are encouraged to take this course, which requires class presentations and an essay on science policy and politics. This course is open to students in other AAP graduate programs, including those in Government, Communication, Biotechnology, Environmental Sciences and Policy, and to those in other graduate programs at Johns Hopkins University.

490.696 The Nature of Nature
This reading course focuses on writing about Mother Nature, human nature and the nature of the beast. The course is recommended for Science-Medical and Nonfiction writers, although others may find it of interest. 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, Amy Bloom, Reynolds Price and John McPhee.

490.697 The Literature of Science
In this reading elective, Science-Medical Writing and Nonfiction 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 and factual literature. Craft topics include structure, pace, sources, content, and using language to explain complex subjects or to create lyrical writing. Assignments may include brief reviews and a team presentation of one of the books read for the course, which may include the work of such writers as Erik Larson, Atul Gawande, Rachel Carson, John McPhee, James Gleick, Lewis Thomas, Elizabeth Kolbert and Jonathan Weiner.

490.699 Magazine Style and Substance
This reading and craft elective course is designed for Nonfiction and Science-Medical Writers. To improve as writers and learn about markets, students read, 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 The Atlantic Monthly, Salon, Discover, Harper’s, The New Yorker, Slate, Outside, Vanity Fair, Rolling Stone and Wired, as well as less-prominent digital and print publications. This course generally does not cover literary journals.

490.700 Readings in Creative Nonfiction
This new elective course features intensive readings and discussion of Creative Nonfiction in all of its many 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, while respecting reader expectations for factual accuracy, explores new approaches to narrative, factual expression, the
blending of fact and fiction, and innovations in structure, theme and form. Readings will include short, medium, and book-length works, digital and in print. While some exercises and writing will be required, this elective course is not a workshop and focuses mostly on reading, discussion and team presentations.

490.702 Readings in Global Fact and Fiction
This revised and re-titled 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. Fiction and Nonfiction students earn elective credit in this reading course, which focuses mostly on analysis and discussion but also may involve student and team presentations and a final project of creative or analytical writing. (This course was formerly International Nonfiction; see 490.680 for more information.)

490.703 Principles of Journalism
(Also listed as optional core course in Nonfiction and Science-Medical Writing.) Many of today's finest creative writers have backgrounds in journalism, with its emphasis on research, accuracy, clarity, ethics and public responsibility. This craft course features intensive study and exercises in these and other elements, including news writing, interviewing, journalism history, objectivity, deadlines, competition and professional standards. Students in Nonfiction and Science-Medical Writing without a background in journalism are urged to consider this course as an additional foundation for their broader creative writing goals. The course includes frequent writing assignments, lectures from practitioners, and exercises in-class and off-site, with analysis of online and print newspapers and news-magazines, plus news broadcasts, blogs and other forms. Some nonfiction and science-medical writing 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. Fiction writers may consider this elective with an advisor's permission.

490.704 Readings in Essay and Memoir
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 and Science-Medical Writing students; others may consider it with an advisor's permission. Only minor writing assignments or exercises are included. Students who want to submit their essays and memoir in a writing workshop should consider 490.693 Writing the Memoir and Personal Essay or regular Nonfiction Workshops.

490.705 Crafting a Nonfiction Voice
This craft elective should be of interest to Nonfiction and Science-Medical Writers. Through reading and writing exercises, students become familiar with 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 also is essential to ghostwriters, speechwriters, writing collaborators, feature writers and novelists. This course focuses on the tools such writers use to craft a voice. (In 2014, this course will be expanded to: 490.683 – Voice in Modern Fiction and Nonfiction, which will combine the program's voice courses in Fiction and Nonfiction. The new course will allow students in both concentrations to work together to examine aspects of voice in contemporary novels and short stories, and essays, articles and nonfiction books.)

490.707 Prize Winners: The Best Writing about Science, Technology, Environment, and Health
This new reading elective course for Science-Medical Writers and Nonfiction students spotlights award-winning writers. Whether the prize is a National Magazine Award, a Pulitzer, a Peabody award for electronic media or other honors, the work in this course offers lessons in reporting and writing for any student. A special feature will be class visits by prize-winning authors – to discuss how they created their winning work. Readings and guests for each section of this course will be announced, but they might include Pulitzer-winners Siddhartha Mukherjee or Natalie Angier, Peabody winner Christopher Joyce, or National Book Award finalist Lauren Redniss. Students in this course join in team or individual presentations, with several options for a final writing assignment. Readings may include articles, essays or books.

490.708 Medicine in Action
This special course based at Johns Hopkins Hospital in Baltimore or at other hospitals in the Washington area, allows writing 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 full work shift at the hospital. The course also includes meetings with doctors, nurses and patients, and includes a final writing project. While the course targets science-medical writers, it will be of interest to a range of students, alumni and others, including medical practitioners, scientists and communication specialists. Students should be prepared to attend classes at the main hospital complex in Baltimore, at an assigned hospital in the Washington Metro Area, and at other locations such as the National Institutes of Health in Bethesda, Maryland.

490.709 Science in Action
This new course takes students to the front lines of science, labs and current research, with a focus on developing writing ideas, reporting skills, and the craft of explanatory writing. Depending on individual student interest, this course is designed as a companion or alternative to the Medicine in Action course. Science in Action focuses on fields beyond medicine and health, including space, environment, energy, climate change and other topics. While this course will meet in regular classrooms for much of the term, the course also involves four to six field trips during or outside regular class time and sometimes beyond the student's home campus. This course often uses video conference technology or digital teaching tools to link to out-of-town labs or events, to discuss research with guest scientists, or to combine students from Washington and Baltimore.
490.710 In the Field: Science Writing in the Woods, Coasts and Labs of Mount Desert Island
Mount Desert Island, Maine, home to Bar Harbor and Acadia National Park, is a place of exquisite natural beauty. With several thriving environmental science centers and a world-class genetics laboratory, the island is also a hub of cutting-edge research. This Hopkins Conference on Craft Science-Medical Writing 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. Possible field excursions, where participants can observe and interview researchers on the front lines of science, include: Great Duck Island, where biologists study a diverse population of nesting seabirds; internationally acclaimed Jackson Laboratory, where scientists target the genetic roots of cancer, aging, and heart disease; and, of course, beautiful Acadia, where naturalists work to conserve the park’s plants and wildlife. Course participants engage in writing workshops and craft exercises, discuss nature literature, and have a chance to publish Maine-inspired writing in a regional publication or a Writing Program newsletter. This course can count as a workshop or elective for M.A. in Writing Program students.

490.711 Masterworks: Examining the Boundaries
This cross-concentration reading course, designed for students of any concentration, focuses on a writer’s analysis of masterworks in Fiction, Nonfiction and Science-Medical Writing. The course involves extensive reading and discussion to study matters of technique and to investigate the changing boundaries among the genres.

490.712 Teaching Writing: Theory, Practice & Craft
This elective course, for students in all concentrations who now teach or want to teach writing, combines practical aspects such as creating a syllabus and responding to student writing, with a discussion of the use of technology, the role of teacher as expert or facilitator, and the philosophical consideration of what matters most to you as a teacher. While teaching at different venues will be covered, the focus is the college level. Students will design two courses, one on teaching a specific concentration (fiction, poetry, nonfiction, etc.) and a second on composition or literature. The course concludes with each student teaching part of a class. In the past, students from this course also have offered public seminars on writing topics.

490.713 Fiction for Young Readers
This elective course, covering fiction for children through young adults, combines lectures, reading, discussion, exercises and brief critiques. Besides craft elements such as character, plot, voice and humor, the course will address professional issues, such as markets, agents and reader age groups. This course is not a workshop, but students will submit for critique one short picture book or novel chapter. This course is designed as an elective for Fiction students. Students are urged to complete Fiction Techniques before enrolling. Students from outside the Fiction concentration must have the permission of the program fiction advisor to enroll.

490.714 Essence of Place: Description, Detail, and Setting
This craft elective course, designed for students from any program concentration, focuses on a wide range of writing techniques that add richness, context and depth, including description, detail, setting, observation, metaphor and simile, allusion, contrast and background research. Students will read and analyze travel, short fiction, memoir, science, novels, nature, poetry, creative nonfiction and other forms. Technique will be developed through reading, analyses and writing exercises. This course counts as an elective in any program concentration.

490.719 Multimedia Storytelling and The Doctor T.J. Eckleburg Review
This revised course focuses on multimedia tools that writers use to present their work in digital formats, including online, in social networks, blogs and emerging forms. Students will work with editors at the literary journal, The Doctor T.J. Eckleburg Review, to learn about digital editing and publishing. The course offers broads flexibility for student goals, including creating a writer’s website or a blog, or the intensive study of the administrative and editorial operation of a digital publication. This interactive, collaborative course will be offered partially online and in-person and will require extensive digital work. Students from multiple campuses will be combined through video and digital tools. This course is open to students from any program concentration.

490.720 Literary Journals & The Doctor T.J. Eckleburg Review
This elective course focuses on the editing and production of the national literary and arts journal, The Doctor T.J. Eckleburg Review, housed at the Writing Program. Students will work with Editor-in-Chief Rae Bryant to explore today’s print and digital publishing markets through both writer and editor lenses. Responsibilities will include reading and discussing nationally prominent journals such as The Missouri Review, The New Yorker, The Paris Review, The Hopkins Review, and Tin House; learning Content Management Systems (CMS) as necessary tools for today’s writers and editors; reading regular submissions to Eckleburg for fiction, nonfiction, and poetry; curating artwork; and reading submissions for the Eckleburg award contest. Students may submit staff reviews of prominent works and local events for possible Eckleburg publication. This course counts as an elective for students from any program concentration, and students can enroll from either campus. The course will be at least half online but also will include in-person editorial meetings and opportunities for students to attend local events.

490.721 Drama and Playwriting
Playwriting, with its heritage of portraying events through conflict, remains one of our most active literary forms. 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 students who have completed Fiction Techniques. Fiction students who have not completed that course or other students interested in this course must first get their advisor’s permission and then contact...
the program fiction advisor for permission to enroll. Enrollees should recognize the extensive writing requirements of this course if they decide to pair it with a workshop.

490.731 Film and Screenwriting
Film is a central artistic medium of our age. 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. The craft elective is designed primarily for students who have completed Fiction Techniques. Fiction students who have not completed that course or other students interested in this course must first get their advisor's permission and then contact the program fiction advisor for permission to enroll. Enrollees should recognize the extensive writing requirements of this course if they decide to pair it with a workshop.

490.741 Advanced Poetry Form and Meter
This course offers an intense investigation of meter and form. Students read, write and critique blank verse, ballad stanzas, sonnets, villanelles and other forms, and investigate the ways in which contemporary poets work within the critical and historical traditions of formal verse.

490.742 Readings in Poetry
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 class will focus on extensive reading, analysis and discussion, with occasional opportunities to write. Poets and prose writers are equally welcome to enroll.

490.743 Trends in Narrative Poetry
For much of the past century, lyric poetic forms were favored so much that the reading public almost forgot narrative poems existed. But a close look at poetry from Frost, Robinson and Jeffers reveals the beginnings of modernist narrative that survives richly into the 21st Century. From older poems like Frost's "Maple" or Warren's "Audubon," to today's longer works such as Bricuth's "Just Let Me Say This About That" or Leithauser's "Darlington's Fall," readers find a symbiotic combination of lyric and narrative elements so closely enjoined it is impossible to tease them apart. In this reading course, students focus on a broad selection of styles, forms and subjects to explore narrative arc, character and scene development, dialogue, imagery, metaphor and other elements.

490.744 International Poetry in Translation
This elective reading course features prominent international poetry and poetic forms from a variety of countries, cultures and centuries. Featured poets may include Nobel winners Czeslaw Milosz, Wole Soyinka or Derek Walcott. This course also will explore the theories and practices employed by contemporary writers such as Richard Wilbur, Charles Martin and Rachel Hadas to translate poetry into English. The goal is to provide students inspiring and challenging exposure to new forms, styles and approaches to verse.

490.747 Advanced Revision Techniques in Fiction
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. The course will cover fiction fundamentals such as setting, character, plot and structure in greater depth, and also will expand into advanced techniques such as symbolism, mood and time movement. Students will improve the use of those 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 than a workshop-style evaluation of student writing.

490.784 Reading and Writing New England
From Emerson, Frost, Melville and Wharton, through such contemporary writers as John Updike, Marilynne Robinson, Tracy Kidder, Richard Russo 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, will focus 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 setting and a sense of place, and we'll look at these works both in terms of how they grew out of the New England literary tradition and how they connect to any literature written about, and set within, a particular region or culture. Participants in this course will write both creative and reflective responses to the readings and discussions.

490.800 Writing Independent Study
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 Writing Program involve a student working one-on-one with a faculty member. The project must involve writing or writing-related work equivalent to a full-semester, graduate-level course, and the project must 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 must be submitted in writing to the program's independent study coordinator 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. For more information, see writing.jhu.edu.
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 course credit for internships, they pay tuition levels equal to one graduate course. For more information about Internships, see writing.jhu.edu.

THESIS

Students may enroll in the Writing Program’s final thesis course only after completion of all core courses, workshops and electives required for the M.A. in Writing. All thesis students must submit a Thesis Planning Form at least one month before taking the course. To submit the form or get more thesis information, link online to writing.jhu.edu. A writing program thesis should be based on work created and revised in previous courses.

490.801 Thesis and Publication

This final course is required for all degree candidates and is offered only in the fall and spring terms. The two major goals of the course 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 or science-medical book, or a collection of poems, 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 student’s thesis. Students taking this course are required to submit a full thesis draft by the second week of the course; the author spends the term revising the thesis under the supervision of an approved advisor. To provide extensive time for revision, thesis students meet as a class only for certain weeks during the term. During those class sessions, students contribute to and help edit a class journal project, 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; this course concludes the degree program. Students are not allowed to take any other course at the same time as Thesis & Publication unless the other course is additional to program requirements. Even in such cases, the program director or assistant director must approve the other course.

490.888 Thesis Continuation

This course is only for thesis students who have completed 490.801 Thesis & Publication but who failed to complete an approved thesis during that course and who were not approved for an Incomplete. If both conditions are met, students must register for this course for every term following Thesis & Publication until the Writing Program approves a final thesis. For more information, students should consult their faculty advisor.
Johns Hopkins Post-Baccalaureate Premedical Program

The Johns Hopkins Post-Baccalaureate Premedical Program gives college graduates and professionals the opportunity to take the required courses for admission to leading medical schools. Students enroll in the Krieger School of Arts and Sciences day classes to complete the core premedical curriculum known for its rigor and quality. Designed to meet the needs of diverse and talented individuals, this program is for students who have excellent academic records in undergraduate (and graduate school, if applicable), have never applied to medical school, and have the ultimate goal of entering the medical profession. The basic curriculum includes Biology, General Chemistry, Organic Chemistry, and Physics with labs. Generally, students must not have previously taken more than one-half of the science courses required for entering medical school. The typical program takes 9 to 14 months of full-time study.

This program emphasizes personal attention and numerous elective opportunities. An eight-week lecture series involving Hopkins medical school faculty is the basis of a one-credit seminar course taken exclusively by the post-baccalaureate students. Over intersession students may participate in a three-week hospital internship that includes medical rounds, patient reports, and mentoring by physicians. Students also gain experience in areas of interest related to medicine through classes provided by other university divisions, such as tutorials at the School of Medicine.

Having a fulfilling post-baccalaureate experience is more than just academics. It is also being a part of the Johns Hopkins community of students and faculty. To help build student support and friendship there are planned activities that include speakers and monthly dinners.

For more information please check the Post-Baccalaureate Premedical Program Web site at jhu.edu/postbac, or telephone 410-516-7748.

Johns Hopkins Summer Programs

Hopkins Summer Programs offers credit classes to Hopkins undergraduates, visiting undergraduates, and qualified high school students. The Summer Session includes two five-week terms, which run generally late May through early August. Five-week and two-week credit-bearing programs designed especially for high school students are also offered.

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. The Pre-college Program places academically talented high school students in undergraduate classes, allowing them to earn credit and a Hopkins transcript, useful in the college application process. Discover Hopkins Programs for high school students are topic-based programs that showcase Hopkins faculty and programs. Visiting students earn credit to transfer to their home institutions or to explore subjects of personal or professional interest. This variety of students and course offerings makes the Homewood campus a busy, vital educational center in the summer. Go to jhu.edu/summer.
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1717 Massachusetts Ave NW, Suite 104  
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JOHNS HOPKINS UNIVERSITY

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 US 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.

Pictured: Frank Weiss, program director for the MS in Applied Economics Program, with his International Trade class.