I. Instructor, Course Information & Objectives

Instructor: Dr. Daniel Zachary is Director of the Energy Policy and Climate Program. He can be contacted by e-mail at d.s.zachary@jhu.edu. E-mails received in the morning or early afternoon usually will be answered the same day; ones received later in the day usually will be answered not later than the following morning.

Course Description:

The Capstone Project enables students to apply and synthesize the material learned in other courses, develop expertise on a specific topic related to climate change science or policy, work closely with experts in the field of study, and improve professional writing and presentation skills. In the semester prior to conducting the project, students must identify a proper topic and mentor who is both familiar with the chosen topic and willing to guide and oversee the project. The mentor can be a faculty member teaching in the program, a supervisor from the student’s place of work, or any expert with appropriate credentials. Formal proposals must be submitted at least two weeks prior to the start of the semester in which the project be completed. Prior to the enrollment in the course, the proposal must be reviewed and accepted by the course instructor.

Teaching Style

The course will be delivered through lectures, discussion, and to a large extent, individual attention in a research project of the student’s choice. One of the primary goals of this course is for all students to gain a good grasp of underlying scientific methodology in developing and carrying through a research project including: taking measurements / data collection, validation, analyzing and drawing conclusions. All this will be done in the context of a research project in the domain of energy and climate policy.
Grading

Grades will be based upon class participation, one milestone report (1-page), and of course the final paper. Students are expected to follow appropriate ethics and honor codes. Class assignments that are submitted after deadline will automatically be downgraded by one half grade for each day of lateness. JHU-AAP uses the full range of the lettered grading scale for consistency between courses: 98–100% A+ 94–97% A 90–93% A- 88–89% B+ 84–87% B 80–83% B- 70–79% C <70% F.

<table>
<thead>
<tr>
<th>Subject</th>
<th>% Final Grade</th>
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<tbody>
<tr>
<td>Class Participation &amp; Assignments (blogs are not mandatory, but can be done if you have a topic and would like to publish on the JHU site; see instructor if interested).</td>
<td>15 points</td>
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<tr>
<td>Final Project</td>
<td>85 points</td>
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<tr>
<td>- Introduction / background</td>
<td>- 20 pts</td>
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<tr>
<td>- Literature review &amp; citations</td>
<td>- 15 pts</td>
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<tr>
<td>- Data collection / measurements</td>
<td>- 15 pts</td>
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<tr>
<td>- Methods (Analysis)</td>
<td>- 20 pts</td>
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<tr>
<td>- Discussion, conclusions, summary</td>
<td>- 15 pts</td>
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Further details concerning grading

<table>
<thead>
<tr>
<th>Subject</th>
<th>Satisfactory</th>
<th>Unsatisfactory</th>
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</thead>
<tbody>
<tr>
<td>Introduction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introductory Section: Part 1 (typically one paragraph)</td>
<td>general problem area as reported by authors is identified and its adequacy is evaluated</td>
<td>general problem area (if in article) is not identified or evaluation is insufficient</td>
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<tr>
<td>Introductory Section: Part 2 (typically one paragraph)</td>
<td>lit review and bias indicators considered and appropriately evaluated</td>
<td>lit review or bias not considered and/or not appropriately evaluated</td>
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<tr>
<td>Introductory Section: Part 3 (typically one paragraph)</td>
<td>specific objectives or hypotheses reported in study are identified and evaluated for form/clarity</td>
<td>specific objectives or hypotheses are not identified or are not sufficiently evaluated</td>
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<tr>
<td>Measurement / data collection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data collection (Sampling Procedures) (typically one paragraph)</td>
<td>selection techniques and representativeness considered and appropriately evaluated</td>
<td>selection techniques or representativeness not considered and/or not appropriately evaluated</td>
</tr>
<tr>
<td>Measurement Procedures (typically one paragraph)</td>
<td>tools evaluated for quality/relevance to the study</td>
<td>insufficient evaluation of measurement tools</td>
</tr>
<tr>
<td>Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analysis</td>
<td>Good analysis</td>
<td>Bad analysis</td>
</tr>
<tr>
<td>Research Design (typically one paragraph)</td>
<td>type, relevance, and sufficient detail for replication considered and appropriately evaluated</td>
<td>type, relevance, or detail not considered and/or not appropriately evaluated</td>
</tr>
<tr>
<td>Synthesis and Conclusions (typically one paragraph)</td>
<td>appropriate evaluation of extent to which conclusions supported by results, including appropriate statistical inferences (if relevant)</td>
<td>insufficient evaluation of relationship between results and conclusions</td>
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Participation

This class will include significant discussion; missing class not only detracts from your own experience, but deprives your classmates of your insights into the material. With this in mind, I expect you to attend all class meetings, do all readings, and actively participate in class. If you have trouble thinking of things to say, take notes on the readings – this will often bring you to class with thoughts or questions that can then be used to help jump-start discussion. A blackboard (BB) discussion platform will be available so that online discussions can be hosted.

Course Readings

We will use one required text in the course, Research methods: A Process of Inquiry, by Graziano and Roulin. This text has been written for psychology students, but there is a great deal that we can take away in terms of research. I will follow these topics according to the text and bring in additional material relevant to energy and climate policy whenever possible and appropriate.

Required text.


Other references


Crowther D. , Lancaster G., Research Methods, A concise introduction to research in management and business consultancy. (Available at reader.eblib.com)

Quantitative and Statistical Research Methods: From Hypothesis to Results. Martin William E; Bridgmon Krista D, 2012 | Wiley Series: Research Methods for the Social Sciences, V. 42 (available at jhu.eblib.com)


Purpose of the Course

The purpose of the course is threefold: 1) to provide the student with a relevant research topic that involves a certain level of research and hands-on experience with the data and analysis techniques, 2) to provide student with a set of skills necessary to develop and conduct a short research project (skills that will be transferable to large projects) and 3) to provide the student with ‘soft’ skill necessary in the evaluation, peer review, defense and presentation of research.

Learning Objectives

Students will learn important skills and concepts that enable leadership on energy policy and climate. Apart from the skills acquired in assembling a project (see ‘Purpose of the Course’), other related skills include (adapted from Scott A. Loe, ‘Teachers as Consumers & Producers of Educational Research’, University of Nevada Las Vegas, 2008):

- Identify and evaluate the clarity of the problem statement
- Identify the specific research question under investigation
- Determine the theoretical or logical rationale of the research problem
- Acquire knowledge for methodology
- Understand the risks and data insufficiencies
- Understand the relevant analysis techniques
- Determine whether the research question is stated in terms amenable to investigation
- Provide a project assessment, synthesis, alternative interpretations and conclusion
- Appraise the thoroughness and relevance of the literature review and determining if the literature review establishes the need for conducting the research
- Establish the credibility of the research and assess the theoretical perspectives and/or a priori assumptions of the researchers
- Evaluate the appropriateness of the research methodology for the study
- Assess the clarity and consistency of the results
- Identify the limitations of the study
- Discuss the implications of the study in view of the strengths and weaknesses of the research
- Distinguish between quantitative and qualitative research designs and methods.
- Conduct a peer reviewing analysis of a paper
- Present and argue a research topic with peers.
Feedback from the instructor

As your instructor, I will provide feedback on your work at all stages of the development of your paper. It is essential that the student initiate these conversations. I will make a general announcement that a draft be sent to me one week before the end of the semester so that I may give a thorough review of your paper and provide feedback that will complement your mentor’s feedback.

II. Syllabus and Readings

General Comment
This is a fully online course. Its main focus is to guide the student to develop an excellent research paper. The first part of the course will focus on issues that directly impact the different sections of the paper. The second have will provide individual meeting times to work on specific research points. Blackboard instructional facilities will be available throughout the course to facilitate instruction, discussion and exchange of information.

Class 1 (Module 1): Introduction - Characteristics of research

What is scientific research? We must have a curiosity about us in order to do research. The class provides some insight into the type of thinkers and an overview of scientific research.

Reading: Research Methods, Chapters 1. pp. 1 – 12 (required) and 12 - 17 (optional)

Discussion and presentation: short introduction to research, exploring a research article (part 1)

Class 2 (Module 2): Putting the together a research paper and the process of inquiry

What is scientific research? We must have a curiosity about us in order to do research. The first part of the class provides some insight into the type of thinkers and an overview of scientific research. The second part will cover the process of inquiry. We will build a table of research topic that will serve as discussion anchors for the rest of the semester. Other topics will include devising an investigation, and planning a research project, generating and refining a research question.

Reading: Research Methods, Chapters 2. pp. 30 – 34 (required) and 34 - 36 (optional), 36 – 52 (required).

Discussion and presentation: short introduction to research, exploring a research article (part 1)

Class 3 (Module 3): Developing the research plan – A to Z (Asking the right questions)

What are the right and relevant questions that should be asked in your research project? This must be answer first in your work. We will discuss relevant research question – how to pose them and good strategies.
Reading: Research Methods, Chapters 3. pp. 58 – 69 (required)

Discussion and presentation: short introduction to research, exploring a research article (part 2)

**Class 4 (Module 4): Introduction and Methods (part I) - Measurement / Data collection**

This class provides an overview of the introduction as well as Methods - measurement and data collection as it pertains to the projects of the semester.

Reading: Research Methods, Ch 4
Discussion and presentation: TBA

**Class 5 (Module 5): Methods (part II) - Statistical Analysis and Results**

This class provides an overview of basic statistical and correlation methods as they pertain to the projects of the semester.

In this class we will go into more depth on how to test the validity of your hypothesis in your research project and how to analyze your data.

Reading: Research Methods, Chapters 5. pp. 97 – 114 (required) and 114 - 120 (optional - more for psychology research, but none-the-less useful)

Research Methods, Chapters 8. pp. 168 – 186 (Caution! This chapter is designed for psychology / behavioral students, not energy / climate policy. However, there are concepts that we can take away).

Additional material:
- The National Institute of Standards series of validation notes. [How can I fit my data?](#)

This class provides an overview of basic statistical and correlation methods as they pertain to the projects of the semester.

Discussion and presentation: TBA

**Class 6 (Module 6): Discussion and Conclusions**

In this class we will go into more depth on how wrap up your paper – discussing them and concluding.

Reading: See Mod 6 page.

Discussion and presentation: TBA
Class 7 (Module 7): Writing a research report & other research skills

We will look at ‘soft’ research skill, including collaborative skills, networking, providing research feedback to your peers and how to debate research.

Discussion and presentation: TBA
Reading: Research Methods, Appendix B, Research Methods, pp. 346 – 343
Discussion and presentation: TBA

Class 8 (Modules 8) Individual project work / meet with instructor
Review of the research data. Individual meetings online – see for module for instructions.

Class 9 (Modules 9) Individual project work / meet with instructor
Review of the research data. Individual meetings online – see for module for instructions.

Class 10 (Modules 10) Individual project work / meet with instructor
Review of the research data. Individual meetings online – see for module for instructions.

Class 11 (Modules 11) Individual project work / meet with instructor
Review of the research data. Individual meetings online – see for module for instructions.

Class 12 (Modules 12) Individual project work / meet with instructor
Review of the research data. Individual meetings online – see for module for instructions.

Class 13 (Modules 13) Individual project work / meet with instructor
Review of the research data. Individual meetings online – see for module for instructions.

Class 14: Capstone presentation (online students will send in an audio-ppt file to instructor via BB)

The Capstone presentation will be presented on a designated date near the end of the semester (Normally on the last Thursday of class). Each project will be presented and time will be allowed for questions.

A Capstone Symposium Day will be held in May for all semester to present. We will invite faculty to this event. If you have colleague who would like to attend, please let me know so that we can arrange the room.

Class 15: Reflection
Reflection on what you’ve learned throughout this course.
III. University Policies

General

This course adheres to all University policies described in the academic catalog. Please pay close attention to the following policies:

Students with Disabilities

Johns Hopkins University is committed to providing reasonable and appropriate accommodations to students with disabilities. Students with documented disabilities should contact the coordinator listed on the Disability Accommodations page. Further information and a link to the Student Request for Accommodation form can also be found on the Disability Accommodations page.

Ethics & Plagiarism

JHU Ethics Statement: The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition. Report any violations you witness to the instructor.

Read and adhere to JHU’s Notice on Plagiarism.

Dropping the Course

You are responsible for understanding the university’s policies and procedures regarding withdrawing from courses found in the current catalog. You should be aware of the current deadlines according to the Academic Calendar.

Getting Help

You have a variety of methods to get help on Blackboard. Please consult the resource listed in the "Blackboard Help" link for important information. If you encounter technical difficulty in completing or submitting any online assessment, please immediately contact the designated help desk listed on the AAP online support page. Also, contact your instructor at the email address listed in the syllabus.

Copyright Policy

All course material are the property of JHU and are to be used for the student’s individual academic purpose only. Any dissemination, copying, reproducing, modification, displaying, or transmitting of any course material content
for any other purpose is prohibited, will be considered misconduct under the JHU Copyright Compliance Policy, and may be cause for disciplinary action. In addition, encouraging academic dishonesty or cheating by distributing information about course materials or assignments which would give an unfair advantage to others may violate AAP’s Code of Conduct and the University’s Student Conduct Code. Specifically, recordings, course materials, and lecture notes may not be exchanged or distributed for commercial purposes, for compensation, or for any purpose other than use by students enrolled in the class. Other distributions of such materials by students may be deemed to violate the above University policies and be subject to disciplinary action.

Code of Conduct

To better support all students, the Johns Hopkins University non-academic Student Conduct Code has been integrated and updated to include all divisions of the University. In addition, it is important to note that all AAP students are still accountable for the Code of Conduct for Advanced Academic Programs.

Title IX

Confidentiality and Mandatory Reporting

As an instructor, one of my responsibilities is to help create a safe and inclusive learning environment on our campus. I also have mandatory reporting responsibilities related to my role as a Responsible Employee under the Sexual Misconduct Policy & Procedures (which prohibits sexual harassment, sexual assault, relationship violence and stalking), as well as the General Anti-Harassment Policy (which prohibits all types of protected status based discrimination and harassment). It is my goal that you feel able to share information related to your life experiences in classroom discussions, in your written work, and in our one-on-one meetings. I will seek to keep information you share private to the greatest extent possible. However, I am required to share information that I learn of regarding sexual misconduct, as well as protected status based harassment and discrimination, with the Office of Institutional Equity (OIE). For a list of individuals/offices who can speak with you confidentially, please see Appendix B of the JHU Sexual Misconduct Policies and Laws.

For more information on both policies mentioned above, please see: JHU Relevant Policies, Codes, Statements and Principles. Please also note that certain faculty and other University community members also have a duty as a designated Campus Safety Authority under the Clery Act to notify campus security of certain crimes, as well as a duty under State law and University policy to report suspected child abuse and/or neglect.