Course Syllabus for PA 8706
Interdisciplinary Research Seminar on Science, Technology, and Environmental Policy
Fall 2015

Class Time: Tuesday, 2:30pm – 5:30pm (Room TBD)

Professor Gabe Chan
Email: gabechan@umn.edu, Office: (612) 626-3292
Office Hours: HHH 161, time TBA

Course Description

This course will give students foundational understanding of conducting research on social and policy processes concerning science, technology, and the environment (STEP). STEP is an intensely interdisciplinary area of Public Affairs. As such, this course will lay the foundation for designing an interdisciplinary research program in the STEP field by introducing key concepts, canonical literature, and new and emerging research directions. After examining research approaches within multiple disciplines and at multiple scales of social and political processes, students will create dissertation research strategies, including plans to develop greater domain expertise and to carve out interdisciplinary niches. Significant portions of this course will be student led and the exact topics we cover will vary according to student interest. The assignments for the course will largely be driven by readings. Students taking the course for credit will also prepare a research proposal addressing a novel research question and/or research design.

The target audience for this course is students fulfilling the requirements of the Ph.D. in Public Affairs STEP Sub-Plan, but others are welcome with instructor permission. The course learning objectives, designed with STEP Ph.D. students in mind are:

- To become familiar with a wide range of frameworks and topics of central relevance to STEP, including (but not limited to): policy processes, law/regulation, economics, planning, public engagement, public-private partnerships, and systems science;
- To understand various aspects of the research process by exploring in depth the research of others, including (but not limited to): developing research questions and frameworks, situating research within a broader literature, applying methodologies, and collaborating across disciplines;
- To develop a broad intellectual base, from which students will feel confident to branch out and build depth in subsequent coursework;
- To gain experience “field-testing” an interdisciplinary research project by proposing an original research question that is inspired by the work we survey, and in doing so, gain an understanding of what additional training will be required to effectively answer the research questions that are most exciting and of greatest interest.

Class Structure

This course will meet for a three-hour block once per week on Tuesday afternoons. This will be an informal seminar. For the first half of the semester, I will select a group of papers around a specific topic. We will read them all critically and then meet to discuss them. Preparing for class by doing the readings, bringing a critical eye, and seeking to draw connections across literatures is essential. Some of the papers we read will be outside of your and my own area of specialization – this is inevitable in interdisciplinary
settings. However, in this field, it is also a critical skill to be able to read papers outside of your area and bring your own perspective to the table. In the second half of the semester, instead of me, one student each week will be assigned to choose a set of readings that are of greatest relevance to their own research program.

Students will also be required to present full papers as in a seminar. Details will be discussed in class.

**Expectations**

1. **How to prepare for class**

Readings are an essential part of this class. You should expect around 5-10 academic papers per week of reading. Readings will be posted at least one week prior to each class. This syllabus contains a preliminary set of topics around which readings will be chosen, but this will be revised as we go based on student interest. Students are encouraged to suggest additional readings or literatures missing from the list of assigned readings.

Each week, students should complete the readings and write 1-2 page reflections that synthesize that week’s assigned literature. These reflections should answer the following questions: What new ideas stood out to you? What conceptual issues do authors seem to miss? What would be the key points of disagreement in an imaginary debate between two authors? What research ideas grow out of the readings? What do you want to discuss? Reflections will not be collected or graded; the idea is that writing these pieces will help you prepare to critically discuss the work.

2. **Disability Accommodations**

If you have a documented disability or any other circumstance that you think may affect your ability to meet course expectations, please come see me early in the semester so that arrangements can be made regarding classroom organization, deadlines, or any other features of the class. You can learn more about the broad range of confidential mental health services available on campus via [www.mentalhealth.umn.edu](http://www.mentalhealth.umn.edu). If you have, or think you may have, a disability, please contact Disability Services at (612) 626-1333.

**Evaluation and Assignments**

In addition to (ungraded) weekly reflections, three other assignments will be required of students taking this course for credit. First, students must complete two referee reports over the course of the semester. These referee reports can be chosen for any of the assigned papers, but students should give preference to selecting more contemporary papers for their referee reports. Referee reports should be approximately two pages in length and offer a critical appraisal of the research with a journal editor in mind as the audience.

The third assignment for the course is an approximately 5-page research paper proposal. The proposal should be germane to the topics of the class and describe the research question, the relevant theory (drawing on readings), and the methodological approach that would be taken to answer the question.

Finally, students auditing and taking the course for credit will each be allotted one class session to design the reading list for. One week prior to the assigned week, students should select a list of readings, distribute these to the class, and then come prepared to lead a discussion during class.
Evaluation for this course will be on the basis of satisfactory completion of all assignments and active participation. No letter grades will be assigned (evaluation is pass/fail).

Schedule

Below is a preliminary schedule of topics for the class sessions. We will review this prior to the first week of class for your input. Assigned readings will be announced more than one week prior to the class they will be discussed.

1. **Science and Innovation**

1. **September 8 – The Nature of Ideas, Technology, and Innovation**
   - Seminal work on conceptualizing technology, cumulativeness of technologies and recombination (evolutionary approaches), national innovation systems


2. **September 15 – Incentives for Innovation and Diffusion**
   - Incentives for innovation, induced innovation, the patent system, innovation spillovers


Optional


3. **September 22 – Creative Destruction and Markets for Technology**
   - Implications of markets for technology and licensing, creative destruction, management issues on disruptive innovation, clusters, the geography of innovation


4. September 29 – International Technology Transfer and Transitions
   • Technology diffusion, diffusion in developing countries, technological transitions, IP and international technology transfer

II. Environmental Policy

5. October 6 – Environmental management and governance
   • Management of the commons, behavioral economics and economics of the environment


6. October 13 – Sustainability Systems and Energy Innovation
   • Sustainable development, multi-level governance, technology in innovation systems, knowledge networks, complexity, resilience


7. October 20 – Climate Change
   • Select topics on climate change mitigation and adaptation, policy at multiple levels, the regime complex, the role of models in climate change mitigation

III. Cross-Cutting Issues in STEP

8. **October 27** – Systems Perspective on Innovation and Sustainability; STS
   - Understanding STEP institutions, introduction to science and technology studies (STS), sociological approaches, scientific assessment and expertise, science-policy interface (non-STS)

9. **November 3** – Uncertainty and Risk
   - Risk assessment, risk management, risk perception, expert elicitation and other methods for quantifying and addressing risks, cost-benefit analysis and its critiques

10. **November 10** – Student-led session 1 (topic TBD)

11. **November 17** – Student-led session 2 (topic TBD)

12. **November 24** – NO CLASS (Thanksgiving Week)

13. **December 1** – Student-led session 3 (topic TBD)

14. **December 8** – Student-led session 4 (topic TBD)

15. **December 15** – One-on-one meetings (by appointment)

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**Ideas for student-led sessions**

1. Science and Technology Studies and Assessment
   - Introduction to the field of science and technology studies (STS), sociological approaches, research on scientific assessment bodies and experts

2. Methodological and Analytic Approaches
   - Experiments and RCTs, engineering systems, modelling, quasi-experiments, case studies and comparative case studies, meta-analysis and expert assessment

3. Economics of Science and the Science of Science Policy
   - How incentives shape scientific outcomes, team science, the scientific workforce and immigration policy, creating creativity

4. Water policy

5. Food policy
6. Forestry management and policy

7. International environmental governance

8. Energy technology innovation policy

9. Energy policy

10. Innovation across sectors

11. Cost-benefit analysis

12. Critiques of life cycle assessment