

Fall 2019
FES 520 – Posing Researchable Questions Course Syllabus

Course Information

- 3 credits
- M 11:00 am – 12:20 am
W 8:00 am – 9:20 am
- Instructor: Dana Warren

FES 520 was designed to

1. Provide students from biophysical and social science with an overview of the structure of scientific research,
2. Illustrate similarities and differences between biophysical and social science research structure
3. Allow students to understand and develop the structures of their own researchable questions and jump start the research process
4. Introduce students to faculty contacts within the College of Forestry and library
5. Introduce the ideas of responsible conduct of research
6. Provide a scholastic environment in which the new cohort of Forest Ecosystems and Society graduate students can work together, learn about and appreciate each other's research areas.

FES 520 Learning Objectives:

- Understand the philosophy of science and apply basic logic, reasoning, and creativity to scientific research. Specifically, students will be able to apply the scientific method, in various approaches, to research in natural resource disciplines.
- Recognize and develop non-trivial questions and approaches to research. Specifically, students demonstrate this ability by analyzing research questions developed by others, understanding the range of perspectives and approaches to research, and by identifying a high quality, researchable question of their own.
- Understand and explain concepts, assumptions, and reasoning that underlie a research question.
- Apply problem-solving skills to research problems. Specifically, students will demonstrate this skill by developing, justifying, defining and describing a high-quality researchable question in an area of natural resource science.
- Convey technical and non-technical information effectively in both oral and written forms. Specifically, students will demonstrate this ability by describing and justifying the above researchable question to the instructor and to classmates.
- Be exposed to the range of current research in the FES department and to approaches taken by researchers to develop researchable questions. Specifically, students are required to attend in-class presentations by current researchers.

Learning outcomes:

At the end of this course students will be able to:

- Synthesize and integrate existing knowledge to identify a knowledge gap in their area of research.
- Analyze the existing knowledge gap and pose a researchable question that will provide knowledge to fill the gap when it is addressed.
- Describe the context and significance to the field of addressing the research question
- Identify and analyze feasibility of assumptions critical to carrying out their researchable question
- Propose a strategy for obtaining information to address the research question
- Identify a variety of approaches to answering the question, including approaches used in different natural resource disciplines.

Expectations for students

This is primarily a discussion and critical thinking course. The ideas and questions that we discuss come from you and your understanding of the readings and the material in each discussion among ourselves and with guest participants. It will be your job to come prepared with specific, well-defined and well-articulated thoughts to contribute to the discussions.

- Read assignment prior to class and critically review and analyze. That is, think about it. Try to relate the ideas in the readings to your own research and identify similarities and differences. Prepare questions about ideas that weren't clear to you. Come to class prepared to discuss how the readings apply to research and in particular your own work.
- All written assignments will be well-written, in standard English. Please proof-read!
- All interactions in the classroom will be professional, based on mutual respect and adhere to OSU's policies for acceptable conduct and academic integrity.
- If you need special accommodations please contact the instructor.

Grades, Assignments and Class preparation

Your grade will be based on 9 assignments and on class participation. With the exception of the final assignment, which is due on Tuesday of exam week, the assignments below will be due on Thursdays before class

We will be reading and discussing a number of papers in this course; I expect everyone to have read the papers before they come to class.

In addition to the formal assignments noted below in the grading summary, I may also occasionally ask you to prepare something short for a class meeting. This is usually to seed the discussions in the following meeting and also to help you fill in information about your researchable question. These will not be graded but they are an important part of your participation in the class.

The course culminates in the final class with a written research question and a clear articulation of the broader parameters around this question that addresses the relevance of, and strategy for, addressing a specific researchable question. The assignments over the term are designed to

directly contribute to (1) the final project, (2) a reflection on what you have learned, and (3) a framework to explore other aspects of scientific research.

Assignment		Due Date	% of total grade
1	Brief description of what criteria and key points that you think comprise a strong research question	10/3	5%
2	~1 page overview in which you identify your field of study and briefly describe key concepts or ideas that are fundamental to questions people ask in your field (<i>we strongly encourage discussion with your PI in developing this</i>)	10/10	10%
3	A first draft of your research question (can be vague at this point). <i>Again, we strongly encourage you to talk with you PI about this</i>	10/17	5%
4	Describe (a) hypotheses or objectives, (b) expected outcomes, and (c) assumptions of your research question. (keep to 1 to 2 pages)	10/24	10%
5	Second (revised) draft of your research question with supporting material for peer review	10/31	10%
6	Peer review/feedback on a peer's second-draft question	11/7	5%
7	Summary/ reflection of key take-home messages from your interviews (1 to 2 pages)	11/14	10%
8	Final draft of question (with supporting context, hypotheses/objectives, assumptions, etc.)	12/5	10%
9	Final reflection essay	12/10	15%
10	Class participation	throughout	20%
TOTAL			100%

A few notes on class participation:

I understand that situations may arise that may occasionally mean you cannot attend class. So I don't necessarily grade on attendance or even require it. However, 20% of your grade is based on your discussion participation, and excessive tardiness or frequent absences will obviously affect your participation score.

Being present does not necessarily constitute participation. If you are spending class time looking at your phone, reading email on a laptop, etc. you are not participating and you will not get credit for participation, even if you are present.

Statement Regarding Students with Disabilities

" Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.."

Expectations for Student Conduct and academic integrity

You will be expected to conduct yourself in a professional manner. Academic dishonesty such as plagiarism and cheating will not be tolerated. Therefore, students are expected to be honest and ethical in their academic work. Academic dishonesty is defined as an intentional act of deception in one of the following areas:

- * cheating- use or attempted use of unauthorized materials, information or study aids,
- * fabrication- falsification or invention of any information,
- * assisting- helping another commit an act of academic dishonesty,
- * tampering- altering or interfering with evaluation instruments and documents, or
- * plagiarism- representing the words or ideas of another person as one's own.

A plagiarized paper will receive 0 points and a report will be filed with the Student Conduct Office. Two reports at OSU can lead to suspension or expulsion.

Behaviors that are disruptive to learning will not be tolerated and will be referred to the Student Conduct Office for disciplinary action. In keeping with federal law, behaviors that create a hostile, offensive, or intimidating environment based on gender, race, ethnicity, religion, age, disability, marital status or sexual orientation will be referred to the Affirmative Action Office.

For more information about academic integrity and the University's policies and procedures in this area, please refer to the Student Conduct web site at:

<http://studentlife.oregonstate.edu/studentconduct/offenses-0> and the section on Academic Regulations in the OSU Schedule of Classes.

Diversity, Equity, and Inclusion:

This is a course based on discussion and interaction. It is critical that we remain open to the perspectives of others and that we maintain respect for each other and for our occasionally differing viewpoints. While people may disagree in the course of a discussion, an absolute requirement in this course is to treat each other with empathy, dignity and respect. It is important that we create a learning environment in which everyone feels safe and respected (which in-turn increases everyone's potential to learn). I, like many people, am still in the process of learning about diverse perspectives and identities. I will work to be as forthright and respectful as possible in considering a diversity of perspectives and identities, and ask that you do so as well. I may make mistakes and I welcome feedback if I do. We will work together as a class to create an inclusive learning environment. This means holding each other, including the instructor(s), accountable to this commitment. If something is said in class (by anyone) that makes you feel uncomfortable, please feel free to talk to me about it, or if you are more comfortable remaining anonymous, you may provide feedback to any of the following: (1) our department head, Troy Hall, (2) staff at OSU Institutional Diversity office (<http://leadership.oregonstate.edu/diversity>), (3) the OSU Equal Opportunity and Access office (<http://eoa.oregonstate.edu/>), and (4) at the OSU Diversity and Cultural Engagement program (<http://dce.oregonstate.edu/>). I believe the learning environment should honor your identities (including race, gender, class, sexuality, religion, ability, etc.). To help accomplish this, if you have a name and/or set of pronouns that differ from those that appear in your official OSU records, please let me know.

Course Schedule

Week	Date	Topic/Activity	Readings
0	Th - 9/26	TOPICS: <ul style="list-style-type: none"> FES Graduate program and Learning outcomes Overview of class and assignments 	NA
1	M - 9/30	DUE: <ul style="list-style-type: none"> Complete reading 3 TOPICS: <ul style="list-style-type: none"> Collaborative and interdisciplinary research DISCUSSION/ACTIVITY: <ul style="list-style-type: none"> Toolbox dialogue – beginning to think about differences in research approaches GUESTS: NA <ul style="list-style-type: none"> 	(1) Eigenbrode et al. (2007). Employing philosophical dialogue in collaborative science. <i>BioScience</i> , 57(1), 55-64.
	W - 10/2	DUE: <ul style="list-style-type: none"> Complete readings 1 and 2 TOPICS: <ul style="list-style-type: none"> What is Science? Fields of Science. DISCUSSION/ACTIVITY: <ul style="list-style-type: none"> Discuss readings 1 & 2 GUESTS: Batavia <ul style="list-style-type: none"> 	(2) Kerlinger and Lee 2000 – Chapter 1 (3) Osashka – Chapter 3
	Th - 10/3	DUE: <ul style="list-style-type: none"> Assignment 1 – Brief description of what criteria and key points that you think comprise a research question 	
2	M - 10/7	DUE: Complete readings 4 and 5 TOPICS: <ul style="list-style-type: none"> What is interdisciplinary research? (and other dimensions of work teams across disciplines) Value of diversity DISCUSSION/ACTIVITY: <ul style="list-style-type: none"> Discuss readings 4 & 5 	(4) Cheruvelil et al. 2014 (5) Ostrum 2009
	W - 10/9	DUE: <ul style="list-style-type: none"> Complete readings 6, 7, & 8 TOPICS: <ul style="list-style-type: none"> Inductive versus deductive reasoning Hypotheses versus predictions DISCUSSION/ACTIVITY: <ul style="list-style-type: none"> Discuss readings 6, 7 & 8: 	(6) Okasha Ch 2 – Scientific reasoning, (7) Elliott et al (8) Strode 2015
	Th - 10/10	DUE: <ul style="list-style-type: none"> Assignment 2 - ~1 page overview in which you identify your field of study and briefly describe key concepts or ideas that are fundamental to questions people ask in your field (<i>we strongly encourage</i> 	

		discussion with your PI in developing this)	
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3	M – 10/14	<p>DUE:</p> <ul style="list-style-type: none"> Complete readings 9, 10, and 11 <p>TOPICS:</p> <ul style="list-style-type: none"> What is the role of the research question in the research process? Hierarchy of researchable questions. Where do RQs come from? What makes a question interesting in different disciplines? What makes a question researchable? What are features of a researchable question in different disciplines? <p>DISCUSSION/ACTIVITY:</p> <ul style="list-style-type: none"> critique examples of RQs provided by Dana/Troy/other guests Discuss Readings 9, 10, 11 	(9) Sandberg, J., & Alvesson, M. (2011). (10) TBD – example for RQ critique 1 (11) TBD – example for RQ critique 2
	W – 10/16	<p>DUE:</p> <ul style="list-style-type: none"> Bring 3 research questions that you pulled from recent publications in your field for discussion during class. <p>TOPICS:</p> <ul style="list-style-type: none"> Developing research questions Differences between a research program and a graduate student thesis/dissertation <p>DISCUSSION/ACTIVITY:</p> <ul style="list-style-type: none"> Analyze questions harvested from literature in students' areas: Which are good? How could they be improved? Discuss questions to be used in student interviews of faculty/post docs; confirm people to interview. 	Find your papers from your field from which you will pull research questions.
	Th – 10/17	<p>DUE:</p> <ul style="list-style-type: none"> Assignment 3 – A first draft of your research question (can be vague at this point). Again, we <i>strongly</i> encourage you to talk with you PI about this. 	

4	M – 10/21	<p>DUE:</p> <ul style="list-style-type: none"> Bring 3 research questions that you pulled from recent publications in your field for discussion during class. <p>TOPICS:</p> <ul style="list-style-type: none"> Developing research questions Differences between a research program and a graduate student thesis/dissertation. <p>DISCUSSION/ACTIVITY:</p> <ul style="list-style-type: none"> Discuss interview activity Continue analysis of questions harvested from literature in students' areas: Which are good? How could they be 	Same papers as in previous class
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		improved	
	W – 10/23	<p>DUE:</p> <ul style="list-style-type: none"> • Complete readings 12 and 13 <p>TOPICS:</p> <ul style="list-style-type: none"> • Paradigms in science; examples of RQs from different paradigms <p>DISCUSSION/ACTIVITY:</p> <ul style="list-style-type: none"> • Readings 12, and 13 	<p>(12) Creswell Ch2 (13) TBD</p>

5	M – 10/28	<p>DUE: NA</p> <p>TOPICS:</p> <ul style="list-style-type: none"> • Library resources <p>DISCUSSION/ACTIVITY:</p> <ul style="list-style-type: none"> • Visit library and meet research librarians <p>GUEST: OSU Science Librarian – Michael Boock</p>	
	W – 10/30	<p>DUE:</p> <ul style="list-style-type: none"> • Complete readings 14, 15, 16 <p>TOPICS:</p> <ul style="list-style-type: none"> • Study design • Experiments and observational studies • Assumptions, controls, expected outcomes/thought trials <p>DISCUSSION/ACTIVITY:</p> <ul style="list-style-type: none"> • Readings 14, 15, 16 	<p>(14) TBD Study design paper 1 (15) Jaeger et al 1998 (16) Grant & Wall</p>
	Th – 10/31	<p>DUE:</p> <ul style="list-style-type: none"> • Assignment 4 – in 1 to 2 pages, describe (a) hypotheses or objectives, (b) expected outcomes, and (c) assumptions of your research question. 	

6	M – 11/4	<p>DUE:</p> <p>TOPICS:</p> <ul style="list-style-type: none"> • Questions to ask in your interviews • Developing research questions <p>DISCUSSION/ACTIVITY:</p> <ul style="list-style-type: none"> • Review lecture notes from Dr. Ganio on research questions • Discuss interview questions/plans 	NA
	W – 11/6	<p>DUE:</p> <ul style="list-style-type: none"> • Complete readings 17, 18, 19 <p>TOPICS:</p>	<p>(17) Johnson 1999 (18) ASA Statement on p-values</p>

		<ul style="list-style-type: none"> • Statistics and p-values • Advantages • Disadvantages • Are stats necessary for “good” science (hint: no) <p>DISCUSSION/ACTIVITY:</p> <ul style="list-style-type: none"> • Readings 17, 18, 19 <p>GUESTS: Muldoon, Strauss?</p>	(19) Amrhein et al. (20) Moving a to a world beyond $p < 0.05$
	Th - 11/7	<p>DUE (via canvas):</p> <ul style="list-style-type: none"> • Assignment 5 – Second draft of your research question with supporting material for peer review 	
	Fr - 11/8	Dana posts questions on Canvas – assigns 2 questions per person to review (but you are welcome to read and review all questions if you choose)	

7	M - 11/11	No Class - Veterans Day	NA
	W - 11/13	<p>DUE:</p> <ul style="list-style-type: none"> • Assignment 6 – Peer review feedback on two people’s second-draft question from week 6 (can be brought to class or submitted online) 	
	W - 11/13	<p>DUE:</p> <ul style="list-style-type: none"> • Complete Assignment 6 before class <p>DISCUSSION/ACTIVITY:</p> <ul style="list-style-type: none"> • Discuss your research questions in peer reviews 	Classmate’s Research questions

8	M - 11/18	<p>DUE:</p> <ul style="list-style-type: none"> • Read peer’s questions <p>TOPICS:</p> <p>DISCUSSION/ACTIVITY:</p> <p>Peer review of questions</p> <p>GUESTS:</p>	
	W - 11/20	<p>DUE:</p> <ul style="list-style-type: none"> • Complete readings 23, 24, 25 • Have a discussion with your major prof about authorship guidelines and responsible research conduct <p>TOPICS:</p> <ul style="list-style-type: none"> • Responsible conduct • Peer Review • Authorship guidelines (discuss interviews with your major prof.) <p>DISCUSSION/ACTIVITY:</p> <ul style="list-style-type: none"> • Readings • Authorships guidelines from each lab • Discuss other types of scientific papers/discourse: 	(21) Weltzin et al. FEE 2006 (22) USFWS authorship guidelines

		critiques, systematic reviews, meta-analysis, opinion	
		GUESTS:	
	Th - 11/21	DUE: <ul style="list-style-type: none"> Assignment 7 - Summary/ reflection of key take-home messages from your interviews (1 to 2 pages) 	

9	M - 11/25	DUE: Complete Readings 27 and 28 TOPICS: <ul style="list-style-type: none"> Funding science DISCUSSION/ACTIVITY: <ul style="list-style-type: none"> Discuss readings 27 and 28 Discuss different funding sources and models NSF, USDA, DOE, USPS, NGO's, Private, University, etc. Pros and cons of different options, etc. GUESTS: Katy Kavanaugh	(27) TBD
	W - 11/27	No class - Thanksgiving break	

10	M - 12/2 (Dana Gone)	DUE: NA TOPICS: <ul style="list-style-type: none"> Ethics and Advocacy GUESTS: Nelson, Strauss, Ripple,	
	W - 12/4	DUE: TOPIC: <ul style="list-style-type: none"> Review/reflect on student research questions DISCUSSION/ACTIVITY: <ul style="list-style-type: none"> Final discussion of questions GUESTS: Troy Hall,	
	Th - 12/5	DUE: <ul style="list-style-type: none"> Assignment 8 - Final draft of questions 	

Week	Date	Topic	
EXAM WEEK	Tu - 12/10	DUE on 12/10 <ul style="list-style-type: none"> Assignment 9 - Final reflection essay where you revisit your initial description of a researchable question and revise that text 	