

FS 521: *Natural Resources Research Planning*

Course Syllabus: Winter 2008

Instructors: Glenn Howe; 334 Richardson Hall; 737-9001; Glenn.Howe@oregonstate.edu
Lisa Ganio; 201J Richardson Hall; 737-6577; Lisa.Ganio@oregonstate.edu

Number of credits: 2

Web address: <http://www.cof.orst.edu/cof/teach/fs521/>. You are **required** to read, understand, and complete all of the assignments and responsibilities described on the class web site. Contact Glenn Howe if you have questions about the web site.

Structure: The course will meet twice a week. In-class activities will consist of lectures, classroom discussions of assigned papers, and small group activities.

Schedule: Tuesdays and Thursdays 1:00-1:50 p.m. from January 8 to March 14.

Location: Peavy 104

Course overview: This course provides graduate students with the fundamental research skills needed to successfully complete their graduate degree program and begin their professional career. In this course, you will learn how to plan, write, and critique scientific research proposals. Instruction will focus on direct, hands-on learning by writing a research proposal that could serve as your graduate thesis proposal. You will learn to pose relevant, interesting, and tractable researchable questions; design testable hypotheses; develop research goals and objectives; and apply critical thinking skills to design appropriate research methods. Students will benefit from having taken FS 520, although this is not a prerequisite for enrolling in FS 521.

Course outcomes: Students will be able to:

- Describe the key elements of the scientific method and a good researchable question.
- Describe the key elements of a scientifically rigorous research proposal.
- Recognize high-quality research proposals and provide constructive feedback on the research proposals of colleagues.
- Plan and write coherent and scientifically rigorous research proposals.
- Describe the process of publication submission and peer review.
- Describe the process of proposal submission and peer review.
- Critically evaluate experimental designs and other research methods.
- Describe the key elements of effective scientific publications, oral presentations, and posters.
- Discuss scientific ethics and their role in the scientific process.

Assignments: Each student will:

- Write a research proposal.
- Read and discuss research proposals and other assigned readings.
- Grade the class participation of classmates.
- Critique the research proposals of classmates.

Grading: A/F (A through F), based on scores obtained by completing the assignments (<http://www.cof.orst.edu/cof/teach/fs521/grading.htm>). For information on deductions for tardy work, please refer to the **late assignment policy** (http://www.cof.orst.edu/cof/teach/fs521/Late_policy.htm).

COURSE OBJECTIVES

Understand the scientific process. Students will understand the relationships between the research problem, research question, underlying theory, hypotheses, research objectives, data collection, hypothesis testing, evaluation of the underlying theory, and the formulation of new hypotheses or theories.

Understand the research planning process. Students will understand the elements of research planning and the practical limitations that must be considered in addressing researchable questions. This includes an understanding of how the student's research question relates to a larger research problem.

Understand the components of a research proposal. Students will understand the components of a research proposal, including the abstract, background, hypotheses, goals and objectives, rationale and significance, methods and materials, references, and budget.

Use critical thinking to develop and review research proposals. Students will understand how to provide constructive, critical evaluations of research proposals. Students will understand how to critically evaluate published accounts of study designs. Students will participate in small group discussions and critique the research proposals of their peers.

Understand how to communicate research concepts and methods. Students will understand how to discuss proposals, ask questions, and provide constructive criticism. Their written and oral communication skills will be improved through writing assignments, lectures, peer feedback, and oral presentations.

Understand the importance of objectivity and scientific ethics. Students will understand how objectivity and truth are the cornerstones of science. Equally important, they will learn about intentional and unintentional scientific fraud and ways to avoid unintentional fraud.

Understand the publication process. Students will understand the importance of publishing, how the publication process works, and how to respond to peer reviews.

COURSE LEARNING ACTIVITIES

Research proposal and other written assignments. A written research proposal describing your proposed thesis research is required at the end of the term. This proposal is the culmination of earlier written assignments that focus on the individual elements of the research proposal. Although this course provides structure, broad guidelines, and context for your research proposal, it is not a substitute for the frequent dialogue between you and your major professor that is crucial for developing a successful thesis proposal.

Peer reviews. Students will critique materials prepared by other students. This will provide you with valuable feedback and help you develop your ability to review scientific publications and proposals.

Class presentations. The presentations that will be given by the instructors are described in the course schedule. These presentations will be reinforced by outside readings, course assignments, small group exercises, and classroom discussions.

Discussions. Each class meeting will include some time for classroom discussion, and some meetings will consist almost entirely of discussion-oriented activities. Students are encouraged to ask questions, make suggestions, and discuss relevant issues.

Readings. A list of required readings is found at the *Course schedule* web page (<http://www.cof.orst.edu/cof/teach/fs521/schedule.htm>). A list of required and optional readings is available at the *Readings* web page (<http://www.cof.orst.edu/cof/teach/fs521/readings.htm>). You will need to use a case-sensitive user name (**FS521**) and password (**proposal**) to access the readings.

COURSE SCHEDULE: *Natural Resources Research Planning*

Check the FS521 web site frequently for updates to the topics, readings due, and assignments due.
<http://www.cof.orst.edu/cof/teach/fs521/index.htm>.

Date	Topics	Readings due	Assignments due
Jan 8	Course introduction - Syllabus Researchable questions		
Jan 10	Elements of a proposal	The research proposal Davis, Chapter 5	Course familiarization Class participation overview Critiquing Critique grading
Jan 15	Scientific method and reasoning	Okasha, Chapter 2 Platt (1964)	Critique: NRI proposal abstract
Jan 17	Proposal example: Waring proposal	Waring proposal (2001)	Critique: Waring proposal
Jan 22	Clarity in writing <i>Grammar and style</i> <i>Outlines</i>	Clarity in writing UW style points Thunder (2004) Horn (2001)	Researchable question and hypotheses Outlines
Jan 24	Small group discussions <i>Researchable question/hypotheses</i>	Chamberlain (1890)	Critique: Researchable question and hypotheses
Jan 29	Proposal Introduction <i>Goals and objectives</i> <i>Rationale and significance</i> <i>Background</i>		Proposal format approval
Jan 31	Publishing your research The peer review process	Day, Chapter 17 CJFR author instructions	Outline: Goals and objectives Rationale and significance
Feb 5	Small group discussions <i>Goals and objectives</i> <i>Rationale and significance outline</i>		Critique: Goals and objectives Rationale and significance outline
Feb 7	Scientific ethics <i>Plagiarism</i> <i>Advocacy and science</i>	On being a scientist	Outline: Background Plagiarism
Feb 12	Methods section <i>Scope of inference/Expected results</i> Small group discussions <i>Background outline</i>		Critique: Background outline References

Feb 14	Representation, range of variation, scope of inference, and response variables (Ganio)	Gilovich, Chapter 2 Gilovich, Chapter 3	Draft: Introduction Gilovich, Chapters 2 & 3 study questions Participation grades #1
Feb 19	Sources of variation, replication, and randomization (Ganio)	Gilovich, Chapter 3 Gilovich, Chapter 4, pp. 49-59	Critique: Draft introduction Gilovich, Chapter 4 study questions
Feb 21	Application of design concepts to research (Ganio) <i>In class review of paper</i>	Hayes et al. (2003)	Outline: Methods and expected results
Feb 26	Proposal abstract Small group discussions <i>Methods/expected results outline</i>		Critique: Methods & expected results outline
Feb 28	Synthesis: Study design considerations (Ganio) <i>Small Group discussion</i>	Menzel et al. (2002)	Draft: Methods and expected results Menzel study design analysis
Mar 4	Presentation skills <i>Oral presentations</i> <i>Poster presentations</i>	Davis, Chapter 16 Davis, Appendix 14 Davis, Chapter 17	
Mar 6	Proposal reviews (Dave Harry) <i>Individual reviews</i> <i>Panel reviews</i>	NRI reviews NSF reviews	Final proposal
Mar 11	Panels meet to discuss proposals		Final proposal reviews
Mar 13	Course evaluation and wrap-up		Panel review summary Participation grades #2