RESEARCH DESIGN
BIOLOGY/WILDLIFE 602
Fall 2004

Tuesday & Thursday 11:30A-1:00P     Irving 208

Instructor
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Objectives
The objective of this course is to provide students with the “nuts and bolts” skills of carrying out scientific research. We will cover defining a research topic, formulating questions and hypotheses, determining an effective experimental plan, carrying out the research itself, and communicating research results. We also will discuss other critical elements of research including science information literacy, obtaining external grant support, scientific ethics, intellectual property rights, data management, getting your research published, and communicating science to both scientists and non-scientists. Students will be required to submit proposal drafts and oral presentations as their proposal develops as well as a complete research proposal by the end of the term.

Instructional Methods
The course will employ a discussion format primarily though I will lecture occasionally.

Text
There is no formal text for the course. However, I will make use of journal articles and readings from several books including Scientific Method for Ecological Research by David Ford. Students should be prepared as assigned to lead discussions of readings.

Grading policy
Final written proposal 100
Final oral presentation 100
Contribution to class discussion 25
Total Points 225

Students also will receive written evaluations of subsections of their proposals and of oral presentations as proposals develop. However, these will not be used for the final grade determination.
Course Schedule

Sept. 2     Introduction
Sept. 7     Advice for graduate students
Sept. 9     Selection of a research topic – ideals and practicalities
Sept. 14    UAF library and software resources
Sept. 16    The scientific method – hypothesis testing; shattering paradigms; forming theories, concepts, and other paradigms
Sept. 21    The Message Box concept – What is your message? Proposed research topics.
Sept. 23    Effective oral presentations
Sept. 28    Use and misuse of PowerPoint (Tuft)
Sept. 30    Structure and elements of a good research proposal - requirements of funding source, literature review, objectives and hypotheses, research plan, broader impacts, schedule, and budget
Oct. 5      Proposal review process
Oct. 7      Student presentations of hypotheses and objectives for proposed research
Oct. 12     Student presentations (cont.)
Oct. 14     Experimental design and use of statistics before formulation of research plan
Oct. 19     Experimental design (cont.)
            Full proposal outline due
            First draft of proposal (Introduction and Rationale & Significance) due
Oct. 21     Effective scientific writing
Oct. 26     Effective scientific writing (cont.)
Oct. 28     Manuscript review process
Nov. 2      Data management – What tools and approaches work?
Nov. 4      Student presentations – research methods and experimental design
Nov. 9      Student presentations (cont.)
Nov. 11     Communicating with the media (mock interviews)
Nov. 16      Finding and securing funding, and  
            How funding affects the nature of research  
            **Second draft of proposal (Introduction, Rationale & Significance, Methods)**  
            *due*  

Nov. 18      Research budgets  

Nov. 23      Scientific ethics  
            **Proposal Budget due**  

Nov. 25      No class (Thanksgiving holiday)  

Nov. 30      Legal issues (intellectual property rights, patents, copyrights, safety, contracts)  

Dec. 2       Skills for success beyond graduate school (Fiebelman)  

Dec. 7       Final proposal presentations (oral)  

Dec. 9       Final proposal presentations (oral)  

Dec. 16      Final proposal presentations (oral)  
            **Final, complete proposal due**  

*The schedule is a guide and is subject to change*