RESEARCH DESIGN
BIOLOGY 602
Fall 2002

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

Instructor
Richard D. Boone, Ph.D.
Associate Professor of Ecosystem Ecology
Institute of Arctic Biology, and Dept. Biology & Wildlife
236 Arctic Health Research Bldg.
474-7682 / r.boone@uaf.edu

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 a research proposal by the end of the term and to make oral presentations as the proposal develops.

Text
There is no formal text for the course. However, I will make use of David Ford’s book Scientific Method for Ecological Research, 2000, Cambridge University Press. Journal articles and other materials will be used otherwise. 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.  5    Introduction

Sept. 10    Selection of a research topic – ideals and practicalities

Sept. 12    Science information literacy – James Anderson, UAF Bioscience Library

Sept. 17    The scientific method – hypothesis testing; shattering paradigms; forming theories, concepts, and other paradigms

Sept. 19    The Message Box concept – What is your message?

Proposed research topics.

Sept. 24    Structure and elements of a good research proposal - requirements of funding source, literature review, objectives and hypotheses, research plan, schedule, and budget

Sept. 26    Elements of good research proposal (cont.)

Oct.  1     Finding and securing funding, and
            How funding affects the nature of research

Oct.  3     Student presentations of hypotheses and objectives for proposed research

Oct.  8     Student presentations (cont.)

Oct. 10     Experimental design and use of statistics before formulation of research plan

Oct. 15     Experimental design (cont)

Oct. 17     Experimental design case studies

Oct. 22    Proposal outline due
            First draft of proposal (Introduction and Rationale & Significance) due

Oct. 24     Proposal and manuscript review process

Oct. 29     Proposal and review process (cont.)

Oct. 31     Data management – What tools and approaches work?

Nov.  5     Case studies of research projects - design strengths and weaknesses

Nov.  7     Student presentations – research methods and experimental design

Nov. 12     Student presentations (cont.)

Nov. 14     Student presentations (cont.)
<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>Nov. 19</td>
<td>Research budgets</td>
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<tr>
<td></td>
<td><strong>Second draft of proposal (Introduction, Rationale &amp; Significance, Methods)</strong> due</td>
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<td>Nov. 21</td>
<td><strong>Proposal Budget due</strong></td>
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<td>Nov. 26</td>
<td>Scientific writing – the revision process, rejection, and resubmission</td>
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<td>Nov. 28</td>
<td>Scientific ethics</td>
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<td>Dec. 3</td>
<td>Intellectual property rights</td>
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<tr>
<td>Dec. 5</td>
<td>Final proposal presentations (oral)</td>
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<td>Dec. 10</td>
<td>Final proposal presentations (oral)</td>
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<tr>
<td>Dec. 12</td>
<td>Final proposal presentations (oral)</td>
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<tr>
<td></td>
<td><strong>Final, complete proposal due</strong></td>
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*The schedule is a guide and is subject to change*