

# REQUEST FOR APPROVAL TO USE W-DESIGNATION

rec'd 9-30-93

LSC # 152  
Action 10-7-93  
*approved*

COVER SHEET: Request for Approval to Use W-Designation

## TYPE I. PROFESSOR COMMITMENT

- Professor Robert P. Gendron Phone 2587  
 Writing Workshop? (If not at IUP, where? when? \_\_\_\_\_)  
 Proposal for one W-course (see instructions below)  
 Agree to forward syllabi for subsequently offered W-courses?

## TYPE II. DEPARTMENT COURSE

- Department Contact Person \_\_\_\_\_ Phone \_\_\_\_\_  
 Course Number/Title \_\_\_\_\_  
 Statement concerning departmental responsibility  
 Proposal for this W-course (see instructions below)

## TYPE III. SPECIFIC COURSE AND SPECIFIC PROFESSOR(S)

- Professor(s) \_\_\_\_\_ Phone \_\_\_\_\_  
 Course Number/Title \_\_\_\_\_  
 Proposal for this W-course (see instructions below)

## SIGNATURES:

Professor(s) Robert P. Gendron  
Department Chairperson [Signature]  
College Dean William J. Cole  
Director of Liberal Studies Marlene Richardson

## COMPONENTS OF A PROPOSAL FOR A WRITING-INTENSIVE COURSE:

- I. "Writing Summary"--one or two pages explaining how writing is used in the course. First, explain any distinctive characteristics of the content or students which would help the Liberal Studies Committee understand your summary. Second, list and explain the types of writing activities; be especially careful to explain (1) what each writing activity is intended to accomplish as well as the (2) amount of writing, (3) frequency and number of assignments, and (4) whether there are opportunities for revision. If the activity is to be graded, indicate (5) evaluation standards and (6) percentage contribution to the student's final grade.
- II. Copy of the course syllabus.
- III. Two or three samples of assignment sheets, instructions, or criteria concerning writing that are given to students. Limit: 4 pages. (Single copies of longer items, if essential to the proposal, may be submitted to be passed among LSC members and returned to you.)

**Please number all pages.** Provide one copy to Liberal Studies Committee.

**Before you submit:** Have you double-checked your proposal against "The Liberal Studies Committee's Most Frequently Asked Questions"?

## WRITING SUMMARY

### 1. Essay Exams

Three exams will consist primarily of essay questions designed to test the students' understanding of concepts introduced in the lecture or readings. Although I expect students to demonstrate a basic mastery of factual material, critical thinking will be emphasized. The three exams will comprise 60% of the course grade.

### 2. Research Proposal

This assignment is one that Dr. Newell and I have used successfully in another writing intensive course, BI362 - Ecology. Students first come up with an original question or hypothesis concerning some topic in animal behavior. They then design an experiment to test the hypothesis. Finally, they write a research proposal following the format used by the National Science Foundation. The proposal will consist of an introduction describing the significance of the proposed research, an extensive literature review, and a description of the proposed research. The literature review ensures that the students become thoroughly familiar with current research in one area of animal behavior. Developing their own research proposal will help students see that science is a way of learning about the natural world and not just a collection of facts to be memorized from a textbook.

During the initial phase of the assignment I will spend a good deal of time consulting with individual students. Students will have the opportunity to revise their proposal as described in the syllabus.

Each draft of the proposal will be 10-15 pages and worth 12 % of the course grade (24% total). Students will be graded on the basis of (1) their ability to understand and summarize the professional literature, (2) the originality and design of the proposed experiment and (3) the clarity of their writing.

### 3. Critiques of the Literature

Students will read papers from the research literature throughout the semester. They will write a 1-2 page critique of 4 of these papers. In this critique students will discuss the importance of the research and evaluate the methodology used by the authors. The goal of this assignment is to familiarize the students with the research methods used in the study of animal behavior and to encourage them to think critically about the characteristics of good and bad research.

The four critiques will be worth 16% of the final grade. This grade will reflect the ability of the students to understand and critically evaluate the primary literature.

## Course Syllabus

### I. Catalog Description

BI 481/581 /W/ Animal Behavior

3 credits  
3 lecture hours  
0 lab hours  
(3c-0l-3sh)

Prerequisites: BI 120 or permission

The biological study of animal behavior. Topics include the mechanisms, development, ecology and evolution of behavior.

### II. Course Objectives

1. Students will become familiar with the historical roots underlying the modern study of animal behavior.
2. Students will learn the neurological and physiological basis of animal behavior.
3. Students will learn the role of behavioral patterns in the interaction of organisms with their physical and biotic environment.
4. Students will gain an understanding of the evolutionary constraints that shape the behavior of animals.
5. Students will become familiar with some of the more important mathematical models that provide a theoretical framework for much of the current research in this field.
6. Students will become familiar with the primary literature.
7. Students will demonstrate their ability to develop hypotheses and design experiments relating to animal behavior.
8. Students will polish their technical writing skills through the preparation of a model research proposal and various other writing assignments.

### III. Course Outline

The number of lectures allocated to each topic are based on the assumption of 26 lectures of 1.5 hours each. These numbers are approximate since some time will be devoted to discussion, in-class writing exercises and oral presentations by graduate students.

- A. Historical Perspective (1)  
Ethology and Tinbergen's four questions  
Comparative Psychology
- B. The Acquisition of Behavior (2)  
primarily innate behavioral patterns  
primarily learned behavioral patterns  
imprinting  
the instinct to learn
- C. The Neural Basis of Behavior (1)  
perceptual constraints  
orientation and navigation
- D. The Physiological Basis of Behavior (2)  
the role of hormones  
drives and motivation  
behavioral homeostasis
- E. Behavior Genetics (1)  
methodology  
genetic variation  
environmental interactions
- F. The Evolution of Behavior (2)  
phylogenetic and paleontological analysis  
historical trends
- G. Natural Selection and Behavioral Adaptation (2)  
the optimality approach  
critique of the adaptionist paradigm
- H. Competitive Interactions (2)  
dominance hierarchies  
territoriality
- I. Spatial Behavior (2)  
habitat selection and the ideal free distribution  
dispersal

migration

- J. Feeding Behavior (3)
  - optimal foraging theory
  - behavioral adaptations
- K. Anti-predator Behavior (2)
  - avoiding detection
  - avoiding capture
- L. Reproductive Behavior (2)
  - mate choice
  - parent-offspring conflicts
- M. Social Behavior (4)
  - costs and benefits
  - kin selection and altruism
  - game theory and evolutionarily stable strategies
  - the social insects

#### IV. Evaluation Methods

- 60% Exams. There will be two exams during the semester and one during final's week. Exams consist of essay and short answer questions.
- 24% Research proposal. Students, in consultation with the instructor, will develop a hypothesis related to some aspect of animal behavior, and design an experiment to test that hypothesis. They will then write a 10-15 page proposal modeled after an NSF research proposal. The first draft of the proposal, worth 12% of the total grade, will be due about two-thirds of the way through the semester. The final draft, also worth 12%, will be due two weeks before the end of the semester.
- 16% Four short writing assignments. For each assignment, the student will review and evaluate an article from the primary literature. There will be an opportunity for students to evaluate each other's work since this can be a very effective teaching tool.

Graduate students will be held to a higher standard than undergraduates, both for the exams and the writing assignments. For example, graduate students will write a more extensive literature review for the research proposal and their experimental design must include a complete description of the proposed statistical analysis. Generally, undergraduates will not have to be as familiar with statistics. In addition, each graduate student will give a 20-30 minute oral presentation to the class. In this presentation the student will summarize a paper from the primary literature that deals directly with the lecture topic for that day.

**V. Required Textbooks, Supplemental Books and Readings**

**Textbooks:** Alcock, J. 1992. *Animal Behavior*. 5th Ed. Sinauer Associates, Inc., Sunderland, MA.

McMillan, V. E. 1988. *Writing Papers in the Biological Sciences*. St. Martin's Press, New York.

Supplemental readings from the primary literature will be on reserve in the library.

## **The Research Proposal**

Science is not just a body of knowledge. It is a process - a way of learning about nature. The best way of learning this process is by doing it. In this course you will develop some of the skills used in science by writing a research proposal. After becoming thoroughly familiar with the scientific literature on one topic of animal behavior you will develop an original question or hypothesis regarding that topic. You will then design and describe an experiment to test the hypothesis.

### **What is a Research Proposal?**

Scientists usually need financial support in order to do research. The proposal is a request for support from a funding agency. A variety of agencies supply money for research in Animal Behavior. The National Science Foundation (NSF) is one of the major supporters of basic (non-applied) research in the country. At IUP there is even some "in-house" funding of faculty and student research.

The research proposal consists of several parts. In the Introduction the author briefly outlines the proposed project and why it is scientifically interesting or important. The Literature Review puts the proposal into a larger context by summarizing what is known about the problem based on the published results of previous research. Finally, the author describes in detail the proposed experimental design or methodology. The proposal is reviewed and ranked (i.e. graded) by other scientists. If it ranks highly relative to other proposals the research will be funded.

### **How to Choose a Topic**

You must choose a general topic for your research proposal early in the semester. The textbook is a good place to start. Look at the chapter headings and read about any topics that look interesting. There will also be several books on reserve that you may find useful.

Once you have identified a few possible topics begin reading the scientific literature in these areas. The references listed in various textbooks are a good place to start. In addition, you can use my computer database which lists over 3,000 references, many in the field of animal behavior. Eventually, you will narrow your reading to the topic that most interests you.

### **Reviewing the Scientific Literature**

Once you have selected a general topic for your research proposal you must begin the time-consuming process of familiarizing yourself with the scientific literature. You may find it useful at this point to get a package of index cards and fill out one card for each reference you find. Put the complete citation at the top of the card and below that briefly summarize the contents of the paper. Be sure to use the proper format when writing the citation. This will come in handy when you prepare the Literature Cited section of your proposal.

There are several ways of finding references on your topic. Every research paper includes a literature review. This is a good way to find older literature. To find more recent articles simply browse through the latest issues of journals that seem to cover the topic of interest. This is more convenient at places like Penn State and Pitt where students have access to the stacks. Searching through computer databases can also be helpful. Biological Abstracts, which you will find in the reference section of the library, can be useful if you have a very specific topic. Otherwise it is very time consuming.

Do not expect to use all the titles you find in your research proposal. You might have to read the abstracts of 100 articles to find the 10-20 that will be useful in your proposal. These are the ones that you will read in their entirety and discuss in your literature review.

### Formulating a Research Question

Coming up with an idea for an original research project will probably be the most challenging part of this assignment, especially if you have never done something like this before. One approach is to list on paper every question you can think of. Do not worry about how silly or confusing your questions are, just keep writing until you fill up the page. Put the questions aside for a day, then study them carefully and pick out one to six that seem most promising. Rephrase your questions in the form of hypotheses (we will discuss this in class) and bring this list to your first conference with me. If necessary I can help you refine your hypothesis.

There are several requirements to keep in mind when you develop your hypothesis. Your project must be experimental rather than observational. A lot of very important behavioral research simply consists of observing animals. But for the purpose of this assignment you must demonstrate your ability to design a rigorous scientific experiment. Thus, a long term observational study of whale social behavior would not be suitable for your proposal. An experimental study of social behavior in bees would be more appropriate. We will discuss the elements of experimental design in class.

A second requirement is that the project cannot have been done before. One point of this assignment is to give you the experience of formulating an original scientific hypothesis. At times you might feel that all the important questions have been answered, but this is not so. Do not get discouraged. If you have trouble coming up with ideas talk to me about it.

### Writing the Proposal

Your grade will be based on the following criteria.

1. **Format.** The proposal must be typed (left-justified), double-spaced, with 1-inch margins and 10-15 pages in length, not including the literature cited section. It will consist of five parts: Title page, Introduction, Literature Review, Methods and Literature Cited.

The Introduction should be brief with just enough background to explain why your research question is interesting and then an explicit statement of your research question.



The literature review is not an exhaustive survey of every word published about your topic. The papers you choose to discuss should be directly relevant to the study you are proposing. After reading your review of the literature it should be obvious why your question is important and how it relates to the research others have done. In the Methods section you will describe the experimental design to test your hypothesis. The format of the Literature Cited section will be discussed later.

2. **Logical Organization.** The structure and flow of your proposal is very important. Remember, each paragraph begins with a topic sentence and the entire content of the paragraph must relate to this topic. Paragraphs must be logically tied together.
3. **Clarity of Expression.** Have a friend read your proposal before you submit it. If your friend cannot understand the proposal you have not written it clearly.
4. **Originality.** All scientists read the literature and base their research on what has been done before. In that sense, no research is completely original. Nevertheless, you should be able to come up with a project that is not just a slight variation on what someone else already did.
5. **Mechanics and Style.** If you need help with grammar, word usage or composition consult an appropriate reference guide. The University Writing Center is also available for help. No more than five technical errors are allowed in your proposal. The same mistake made twice counts as two errors. If there are more than five errors of spelling, grammar or punctuation you will lose points for sloppiness. Proofread carefully. You should use a word processor rather than a typewriter. Corrections and revisions are much easier on a word processor.

### **Journal Article Critique**

**Write a 1-2 page critique of the assigned article. First, describe briefly the hypothesis being tested and the experimental design. Then critique the experiment and the Authors' interpretation of the results. Include the following points in your critique.**

**Did the experiment include proper controls?**

**Were there sufficient replicates given the variability of the results?**

**Did the author's conclusions logically follow from the results of the experiment?**

**Graduate students should also discuss whether the authors used the appropriate statistical tests to analyze their results.**

**Your critique should be typed, double-spaced, with 1-inch margins.**