LSC # 117
Action 11-5-92

COVER SHEET: Request for Approval to Use W-Designation

TYPE I. PROFESSOR COMMITMENT
(✓) Professor Alicia V. Linzey Phone 357-7958
(✓) Writing Workshop? (If not at IUP, where? when? IUP)
(✓) Proposal for one W-course (see instructions below)
(✓) Agree to forward syllabi for subsequently offered W-courses?

TYPE II. DEPARTMENTAL 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) Alicia V. Linzey Phone 357-7958
(✓) Course Number/Title BI 271 Evolution
(✓) Proposal for this W-course (see instructions below)

SIGNATURES:

Professor(s) Alicia V. Linzey

Department Chairperson _____

College Dean William G. Cale

Director of Liberal Studies _____

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. Samples of assignment sheets, instructions, or criteria concerning writing that are given to students.

Provide 12 copies to the Liberal Studies Committee.
Please number all pages.

I. Writing Summary - BI 271 Evolution

BI 271 Evolution is proposed for designation as a "W" course. This course, which has historically been taught during alternate years, counts toward the 15 credits of biology electives that a majors student must complete during the program. The feasibility of offering Evolution as a writing intensive course will depend upon limiting enrollment to 25 students. Since 45-48 students have elected to take the course during each of the last two offerings, the "W" designation will require following the Departmental Undergraduate Curriculum Committee recommendation that the course be offered every year.

Five types of writing occur in this course.

1. Writing to enhance listening

Occasionally during lectures students will be asked to summarize, without consulting their lecture notes, the main points of a particular discussion. These will be collected, with selected papers being quoted from. Papers will be returned ungraded to students. The purpose of this exercise will be to monitor students' understanding of spoken material and provide practice in distinguishing between major points and illustrative materials.

2. Writing to enhance reading

Students will prepare a written summary of an assigned text chapter stating the major points being made by the author, with specific examples illustrating these points. These will be collected by the instructor and randomly redistributed to the class (each student and their paper will be assigned a number, but their names will be removed). During a portion of one lecture class, students will be divided into groups for the purpose of comparing these summaries.

The purpose of this exercise will be to monitor the student's comprehension level, to provide practice in evaluation of work by another, and to illustrate an additional learning tool to students. The papers will not be graded.

3. Writing for evaluation

There will be 3 lecture examinations and approximately 50% of the exam grade will be based on defining terms and responding to essay questions. Definitions will be evaluated on the basis of precision and completeness. Criteria for grading essays will include choice of appropriate information, organization,

4. Writing to enhance creative thinking and the ability to gather, evaluate, and synthesize subject matter.

This sequence of writing assignments will provide students the opportunity to acquire the tools needed to critically evaluate a research question and synthesize material.

a. Critique of Primary Literature

Students will write a 2-page paper summarizing and critiquing a paper from a primary literature source. (Evaluated, 10% of grade)

b. Research Paper

This paper (7-10 pages) must be on some aspect of evolutionary theory. The paper must pose a specific issue or question, summarize the available information that speaks to this question (properly referenced to primary literature), and suggest additional future research. This paper will contribute 35% to the course grade.

Students will submit their chosen issue or question, together with 5 references that present original research relating to the issue or question, by the 8th week of the semester. Feedback to students on suitability of topic and references will be provided.

By the 11th week of the semester, students will submit a first draft of the paper, together with an outline. This will be reviewed but not graded.

The final version will be due in the 13th week.

5. Writing to understand the context of course material in biological thought and practice.

a. Freewriting exercise (first class, mid-semester, and during the last week) in which the student describes in one paragraph their concept of what the study of evolution encompasses. This will illustrate frequent misconceptions of students at the beginning of the course and how their view changes as the course progresses. (Not evaluated)

b. Faculty Interviews

Groups of 3-4 students will schedule a 15-minute interview with a faculty member in the biology department (or someone from another department doing related work, such as geoscience or anthropology). A list of faculty willing to participate in this activity will be distributed to the students. Group assignments will be done in class to ensure an appropriate ratio of students to faculty. Students will ask the faculty member to describe his/her research and tell how they see the research as fitting into an evolutionary context. Students will write a one-page summary for distribution to the rest of the class. (Evaluated, 5% of grade)

II. Course Syllabus

I. CATALOG DESCRIPTION

BI 271 Evolution 3 cr (3 hrs lecture, 0 lab)

The study of evolution as the framework for biological thought. Emphases on mechanisms of evolution by natural selection and on origins of flora and fauna.

II. COURSE OBJECTIVES

The student will:

A. Gain an understanding of evolution as the unifying theory of life processes

B. Learn about the mechanisms underlying the process of evolution

C. Learn how biologists study evolution and how evolutionary thinking is applied to data

D. Gain an overview of the results of the evolutionary process by following evolutionary changes as revealed by the fossil record

III. COURSE OUTLINE

A. Historical Perspective (4%)
   1. History of evolutionary thought
   2. A perspective on evolution and religion

B. Physical and Chemical Origins (8%)
   1. Origins of the universe
   2. History of the earth
   3. Origin of life

C. Ecological Context of Natural Selection (9%)
   1. The "environment" as a selective force
   2. Concept of fitness

D. Phylogeny (30%)
   1. Evolutionary systematics
   2. History of diversity (fossil record)
   3. Human evolution

E. Genetic basis for evolutionary mechanisms (15%)
   1. Sources of hereditary variation
   2. Molecular evolution
   3. Population genetics

F. Mechanisms of Evolution (34%)
   1. Selection
   2. Adaptation
   3. Speciation
   4. Coevolution
   5. Cultural evolution

IV. EVALUATION METHODS

Final course grade is determined as follows:

50% Three examinations designed to test specific factual content material. They will be approximately 50% objective and 50% short answer and essay.

10% Two-page synopsis and critique of original research published in a scholarly research journal.

35% Paper (7-10 pages) on a topic in evolution. The paper must clearly identify a specific issue or question, briefly summarize important information from 3 different areas of science that speak to the issue, identify areas of agreement or disagreement, and suggest additional future research.

5% One-page summary of interview with a faculty member in which you will ask questions about the evolutionary context of the professor's research.

V. REQUIRED READING

Strickberger, M. 1990. Evolution. Jones and Bartlett Publ., Boston. 579 pp.

Other readings may be required.

VI. No special resources are required.

VII. Bibliography

Briggs, D. and S.M. Walters. 1969. Plant variation and evolution. Cambridge Univ. Press. 412 pp.

Brooks, D.R. and E.O. Wiley. 1986. Evolution as entropy. Univ. Chicago Press. 335 pp.

Dirzo, R. and J. Sarukhan (eds). 1984. Perspectives on plant population ecology. Sinauer Assoc. Inc. 478 pp.

Dawkins, R. 1987. The blind watchmaker. Norton & Co. 332 pp.

Dobzhansky, T., F.J. Ayala, G.L. Stebbins, and J.W. Valentine. 1977. Evolution. W.H. Freeman & Co. 572 pp.

Eldredge, N. and J. Cracraft. 1980. Phylogenetic patterns and the evolutionary process. Columbia Univ. Press. 349 pp.

Elliott, D.K. (ed). 1986. Dynamics of extinction. John Wiley & Sons. 294 pp.

Endler, J.A. 1986. Natural selection in the wild. Princeton Univ. Press. 336 pp.

Futuyma, D.J. 1986. Evolutionary biology. Sinauer Assoc. 600 pp.

Grant, P.R. 1986. Ecology and evolution of Darwin's finches. Princeton Univ. Press. 458 pp.

Grant, V. 1977. Organismic evolution. W.H. Freeman. 418 pp.

Jackson, J.B.C., L. W. Buss and R.E. Cook. 1985. Population biology and evolution of clonal organisms. Yale Univ. Press. 530 pp.

Klein, R.G. 1989. The human career. Univ. Chicago Press. 524 pp.

Merrell, D.J. 1981. Ecological genetics. Univ. Minn. Press. 500 pp.

Nitecki, M.H. (ed). 1984. Extinctions. Univ. Chicago Press. 354 pp.

Pianka, E.R. 1988. Evolutionary ecology. Harper & Row, Publ. 468 pp.

Ross, R.M. and W.D. Allmon. 1990. Causes of evolution: a paleontological perspective. Univ. Chicago Press. 479 pp.

Sheppard, P.M. 1975. Natural selection and heredity. Hutchinson & Co. 239 pp.

Sober, E. (ed). 1984. Conceptual issues in evolutionary biology. MIT Press. 725 pp.

Solbrig, O. 1980. Demography and evolution in plant populations. Univ. Calif. Press. 222 pp.

Wiley, E.O. 1981. Phylogenetics. The theory and practice of phylogenetic systematics. Wiley-Interscience. 439 pp.

Williams, G.C. 1966. Adaptation and natural selection - a critique of some current evolutionary thought. Princeton Univ. Press. 307 pp.

Wright, S. 1978. Evolution and the genetics of populations. Univ. Chicago Press. (4 volumes)

GUIDELINES FOR MAJOR WRITING ASSIGNMENTS

During the semester, you will complete two writing assignments that will contribute significantly to your grade in the course. One of these will be a two page paper that summarizes and evaluates a paper published in the primary research literature. The second will be an original treatment of some aspect of evolution based on information gathered from scientific publications. Information about format, content, procedures and methods of evaluation is provided in this handout.

I. SYNOPSIS OF JOURNAL ARTICLE

A. Choice of Article

You should select an article that is substantive, i.e. that addresses a significant question in evolutionary theory and demonstrates a thorough effort to examine that question. The article should be from a scientific journal that publishes original research. It should not be from a magazine of popularized science (like Scientific American) or from a book. Although there is one very obvious journal to consult (i.e. Evolution), other journals devoted to areas of study (such as Ecology or Genetics) or to taxa (such as the Journal of Mammalogy) are likely to contain articles dealing with evolution.

B. Content

Your synopsis should be a CRITIQUE of the article, but this does not mean that you must find something wrong with it! This means that you must EVALUATE the article. In essence, you will write a short paper about the paper. The synopsis will essentially have 5 basic sections:

1. Introduction - Provide a brief statement about the subject matter of the article. This should provide the reader with some background information and make clear the purpose of the research. To gain a full understanding of how the article contributes to a particular subject, you will probably need to consult books and other articles.

2. Materials and Methods - How did the author gather the data? This section need not go into detail, but should provide enough information to allow the reader to understand how the specific hypothesis(es) were evaluated.

3. Results - Give a brief summary of the main results and conclusions of the study. You may wish to refer to specific tables or graphs in the article (which will be attached to your synopsis, so you don't need to reproduce them).

4. Discussion - This is the section in which you should evaluate the author's work. Were the goals stated in the introduction achieved? Was the experimental design appropriate for the problem? Was the paper well written? Were the author's conclusions supported by the data? Was the experiment or study worth doing in the first place?

5. Literature Cited - List any articles or texts that you directly cited in your synopsis. Follow the format used in the Literature Cited section of the paper that you are reviewing.

C. Mechanics

Please put your name and a <u>full citation</u> of the article at the top of the first page of your synopsis. Attach a photocopy of the article. Your synopsis should be 2 pages in length (typed, double spaced). Strict adherence to this format is required. Synopses will be due 4 weeks from the beginning of the semester.

II. RESEARCH PAPER

This paper must be on some aspect of evolutionary theory. In this paper, you must pose a specific issue or question, summarize the available information that speaks to this question, and suggest additional future research. The format should be similar to a review article rather than being exactly like a scientific paper (which strictly speaking would have material and methods and results sections). The paper must be 7-10 pages in length (typed, double-spaced).

An article called "How to write a scientific paper" by Robert Day is on reserve at the library. You

should read this article carefully before you begin to write your paper. Although you will not be following the format of a scientific paper as described in this article, it has lots of useful hints about how to avoid common writing pitfalls. Also, appended to this article is a list of references in proper scientific format.

A. Choosing a Topic

Choosing your topic and narrowing it down to a specific question will undoubtedly be the most difficult part of the assignment. If you have already had a number of biology courses, it may be helpful to look through your notes and recall what subjects were of particular interest to you. Remember that what the study of evolution will add to your understanding of biology is a framework for the vast amount of information about living systems. Additionally, you may want to browse ahead in your textbook or take advantage of the necessity to choose a paper for your synopsis to begin looking in journals for suitable information.

An example of how one might proceed is as follows. Suppose you decide that you are really interested in extinction. Well, that's a pretty big subject, so you have to narrow it down. First, you might have to decide whether you are interested in extinction in the fossil record or in the ongoing process of extinction. Suppose you decide on the latter. The next step would be to read about population processes in your text and go to the library and browse through some other books on ecology, evolution, and conservation biology (perhaps you can find some case histories of declining species).

B. Narrowing the Topic

During your general reading, you begin to realize that that there is a distinction made between species extinction and population extinction (although they are certainly related) and that the "process" of extinction happens at the population level. Further, you get the impression that there are processes at work in small populations that make them different from large populations. What are these processes (make a list of them) and how might they contribute to population decline? Now you are getting closer to narrowing your topic sufficiently to cover it in a paper. To narrow the topic still further and frame a specific

question to address, you will probably have to do some additional reading in journals and review articles. A direction you might go would be to ask what evidence there is that reductions in population size are followed by a loss of genetic variability.

C. Researching the Topic

Since you must use references from the original literature, you will not be able to get much farther with your topic by using textbooks. However, they may contain references that will give you a starting place to look for journal articles. Since some of the articles you want will undoubtedly not be in the IUP library, you may want to make use of the interlibrary loan service. Sometimes, your instructor or another faculty member will have a copy of a specific article (If you seek help, however, you must provide a full citation for a specific article - don't just stop by someone's office and ask what they have on subject x). Once you obtain a single (preferably very current) article, you will have an entre into previous literature. As you have already surely gathered by now, you will be in deep trouble if you wait until the last minute to begin this task.

Another, but more diffuse, method of finding articles is to consult the various abstracting sources in the reference section of the library. If you can't find an up to date reference in the citation given in a text, however (because texts are usually a couple of years out of date when they are published), you may need to check some of the very recent abstracts.

D. Suggesting Future Research

This part of the assignment will probably be as challenging as choosing a topic. It is typical that research addressing a particular question or hypothesis will only give a partial answer and/or lead to a dozen or more unanswered questions. In reality, science is usually done by researchers nibbling away at the edges of a problem by asking many small questions until the "big picture" becomes clear. To participate in this ongoing process, researchers often will suggest avenues for future research. Once you have a grasp of the previous work in the area you have chosen, you

will be participating in the process of science by suggesting additional questions.

This part of your paper does not have to be very long, but should be more than a single sentence (e.g. don't put, "I would collect more data."). It should be a third to a full page in length. In other words, you have to make clear that you understand the subject well enough to propose meaningful research that is possible to carry out and that poses an answerable question (i.e. it must be science), but you do not have to put together an extensive research proposal.

E. Mechanics

Students will submit their chosen issue or question, together with 5 references that present original research relating to the issue or question, by the 8th week of the semester. Feedback to students on suitability of topic and references will be provided.

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