Field of Study Course Proposal

1. Proposed Field of Study: FSNB
2. Course number: Biology 101
3. Course Title: Principles of Evolution
4. Catalog description
   This course examines the fundamentals of the theory of evolution as an example of how science works and progresses. The course consists of three modules. The first one will focus on the importance of genetic variation and the principles of the evolutionary theory; the second one will illustrate how evolutionary theory and evolutionary tree as guides in biological research; and the third one will center on principles of human evolution.
5. Prerequisites: none
6. Hours of credit: 4 (lecture and lab)
7. Estimate of student enrollment: 40 (One lecture with two lab sections of 20)
8. By whom and when will the course be offered:
   Rafael de Sá, first offered Spring 2005, alternating years thereafter.
9. Staffing implications:
   Teaching this course will require R. de Sá to be reassigned from one upper level biology course per year.
10. Adequacy of library, technology, and other resources:
    Resources are adequate. Lab space will be adequate when the Science Renovation will be completed
11. Relation to existing courses and curricula:
    No similar general education courses exist. An upper level course in Evolution for biology majors covers topics in this course (as well as other areas) in greater depth and detail
12. Contact Person: Rafael de Sá, Professor of Biology, rdesa@richmond.edu, x8542
**Purpose and Rationale**

The goal of this course is to provide students with an understanding of evolution and how it shapes our lives and our planet. It covers a broad range of topics including: what is evolution, the importance of evolutionary biology, scientific vs. non-scientific theories, speciation, extinction, and fossils, plate tectonics, how to build evolutionary hypotheses, biogeography, and a basic understanding of human evolution.

A course satisfying the General Education requirements in Field of Study in Natural Sciences-Biology (FSNB) will help students to:

1. Understand how science works through explicit examination of scientific concepts, methods, and the underlying principles that govern scientific practice.
2. Examine the scientific paradigms that shape scientific inquiry, with attention to their historical development and change.
3. Experience hands-on scientific experimentation, through laboratory exercises.
4. Practice problem-solving using quantitative methods, statistical analyses, and computer data manipulations where appropriate.
5. See relationships between scientific thinking and similar analytical models in other fields.
6. Understand how the sciences replicate, control variables, explain error, and build explanatory models through successive experimentation.
7. Develop a respect for the finite resources of our planet, responsible use of technology, the limits of humane research, and the fragile wonders of the natural world.
Proposed Syllabus Spring 2005

Biology 101
Principles of Evolution

Instructor: Rafael O. de Sá, Department of Biology, Gottwald Science Center
Phone: 289-8542
Email: rdesa@richmond.edu

Lectures: two 75 minutes lectures per week.
T and Th. 9:45 am - 11:00 am
Laboratory: one 2 hour lab per week
T 1:35 pm -3:30 pm or T 3:45 pm - 5:40 pm
Room: to be determined

Office Hours: Thursday, 11:00 am - 12:00 pm and 2:00-4:00 pm


Course Description: The goal of this course is to provide students with an understanding of evolution and how it shapes our lives and our planet. It covers a broad range of topics including: what is evolution, the importance of evolutionary biology, its history, origin of the universe and the Earth, origin of life, fossils, plate tectonics, biogeography, human evolution, cultural evolution, religion and evolution, and eugenics.

The course is designed for those with no previous college science background. It assumes some background in high school biology. If fulfills the Field of Study Natural Science Biology requirement.

Lecture Attendance: It is important to attend all lectures. Please be on time for all lectures.

Exam Format: Your final grade is based on a combination of 2 exams (exam 1 = 20%, final exam = 30%), 2 surveys (each worth 10%), and 2 written assignments (each worth 15%). The exams will be a mixture of short answers, multiple choice, and essay style questions. The final exam will be cumulative.

Surveys: To better understand the impact of evolution on our everyday lives, students will perform 2 surveys. Each student will ask 10 adults their views on a number of questions related to evolution and will hand in a typed summary of their findings, the raw data response sheets, and a brief discussion of what the
responses seem to indicate about society’s knowledge of, and relationship with, evolution. An in-class discussion of the results will follow each survey.

**Assignments:**

**Hominid Evolution and Class Presentation** - The class will be divided into groups of four and each group will select a prominent hominid fossil to research. Each member of the group will contribute to the research and the group will team-present their findings in class. Each student must also hand-in a written assignment on their selected topic.

**Movie Review** - Each student must write a five-page paper reviewing a movie relating to evolution. Students will be graded on their ability to explain how the movie incorporates evolution, evolutionary theory, evolution and society, etc. Possible movie choices include any movie based on medical procedures, scientific techniques, or biological topics. Examples include *Star Trek, Outbreak, Species, Alien, Medicine Man, Altered States, Mimic*, etc.

The grading scale to be used is:

- **A** = 93% and above
- **A-** = 90-92%
- **B+** = 87-89%
- **B** = 83-86%
- **B-** = 80-82%
- **C+** = 77-79%
- **C** = 70-76%
- **D** = 60-69%
- **F** = 59% and below

**Course Policies:** Make-up exams must be taken within one week of the missed exam and will be given strictly according to University rules (i.e. only because of absence due to illness, religious observance, or participation in University activities). A written statement from a physician, clergy, or University official is required.

Surveys and assignments must be handed at the end of the lecture that they are due. **Late surveys will lose 1% per day and late assignments will lose 5% per day, if late.**

**Honor Code Policy:** Cheating, in any form, will not be tolerated. Allegations of cheating will be referred to the Honor Council and may result in a course grade of F, expulsion, or other disciplinary action according to the rules of the University of Richmond.
Lecture Syllabus: Principles of Evolution, Spring 2005

What is Evolution?
Lecture 1. Jan 11. Introduction; Importance of evolutionary biology
Lecture 3. Jan. 18. The importance of Variation: genetic vs. phenotypic
Lecture 5. Jan. 25. Survey 1 due: What is evolution? Discussion = 10%

Evidence for Evolution
Lecture 8. Feb. 3. Fossils and Methods of dating
Lecture 10. Feb. 10. Extinction

Systematics, Evolution, and Development
Lecture 11. Feb. 15. Species and Speciation
Lecture 13. Feb. 22. Phylogeny building and Evolutionary Hypothesis
Lecture 15. Mar. 3. First Exam (Covers lectures 1 through 14) = 20%

SPRING BREAK (MARCH 5-13)

Human Evolution
Lecture 16. Mar. 15. Film: “Mysteries of Mankind”.
Lecture 23. Apr. 7. Class presentations.
Lecture 27. Apr. 21. Movie review due = 15%; Discussion

Final Exam. During Final Period = 30%
Laboratory topics

Week 1. Assessing Genetic Diversity
Week 2. Analyzing Genetic Diversity
Week 3. Analyzing Genetic Diversity
Week 4. History of Life, fossils
Week 5. Diversity of Life- Major Patterns
Week 6. Phylogeny reconstruction
Week 7. Evolutionary Hypotheses
Week 8. Evolutionary Hypotheses
Week 9. Hominid fossils
Week 10. Hominid fossils
Week 11. Hominid fossils
Week 12. Hominid fossils