



Course Approval Form

For approval of new courses and deletions or modifications to an existing course.

registrar.gmu.edu/facultystaff/curriculum

Action Requested:

Create new course Delete existing course

Modify existing course (check all that apply)

Title Credits Repeat Status Grade Type

Prereq/coreq Schedule Type Restrictions

Other: _____

Course Level:

Undergraduate

Graduate

College/School: **Department:**

Submitted by: **Ext:** **Email:**

Subject Code: **Number:** **Effective Term:** Fall Spring Summer

(Do not list multiple codes or numbers. Each course proposal must have a separate form.) Year

Title: Current

Banner (30 characters max including spaces)

New

Credits: (check one) Fixed Variable or to

Repeat Status: (check one) Not Repeatable (NR) Repeatable within degree (RD) Repeatable within term (RT) Maximum credits allowed:

Grade Mode: (check one) Regular (A, B, C, etc.) Satisfactory/No Credit Special (A, B C, etc. +IP)

Schedule Type Code(s): (check all that apply) Lecture (LEC) Lab (LAB) Recitation (RCT) Internship (INT)

Independent Study (IND) Seminar (SEM) Studio (STU)

Prerequisite(s):

Corequisite(s):

Instructional Mode:

100% face-to-face

Hybrid: ≤ 50% electronically delivered

100% electronically delivered

Special Instructions: (list restrictions for major, college, or degree; hard-coding; etc.)

Are there equivalent course(s)?

Yes No

If yes, please list _____

Catalog Copy for NEW Courses Only (Consult University Catalog for models)

Description (No more than 60 words, use verb phrases and present tense)	Notes (List additional information for the course)
An examination of the principles of ecology, evolution, and the impact of humans on the world around them. Topics will include evolutionary history, biological diversity, and analyses of interactions among organisms and between organisms and their environment.	
Indicate number of contact hours: Hours of Lecture or Seminar per week: <input type="text" value="3"/>	Hours of Labor Studio: <input type="text" value="3"/> Hours of Recitation = <input type="text" value="1"/>
When Offered: (check all that apply) <input checked="" type="checkbox"/> Fall <input checked="" type="checkbox"/> Summer <input checked="" type="checkbox"/> Spring	

Approval Signatures

Department Approval _____ Date _____ College/School Approval _____ Date _____

If this course includes subject matter currently dealt with by any other units, the originating department must circulate this proposal for review by those units and obtain the necessary signatures prior to submission. Failure to do so will delay action on this proposal.

Unit Name	Unit Approval Name	Unit Approver's Signature	Date

Course Proposal Submitted to the COS Curriculum Committee

1. COURSE NUMBER AND TITLE: BIOL 308: Foundations of Ecology and Evolution

Course Prerequisites: BIOL 213-214 and 311 or EVPP 110-111 or permission of the instructor

Catalog Description: An examination of the principles of ecology, evolution, and the impact of humans on the world around them. Topics will include evolutionary history, biological diversity, and analyses of interactions among organisms and between organisms and their environment.

2. COURSE JUSTIFICATION:

Course Objectives: This course examines the principles of ecology, evolution, and the impact of humans on the world around them. Topics will include evolutionary history and theory, the processes that generate and maintain biological diversity, methods for interpreting and measuring the earth's biota, analyses of interactions among organisms, and between organisms and their environments, models of populations and ecosystems, and the conflicts between human population growth and conservation of the environment. This course will de-emphasize rote learning and will instead emphasize the use of "concept mapping," a pedagogical tool designed to reveal linkages/patterns among concepts.

Course Necessity: This course will become part of the new core curriculum in Biology and will replace Biology 307: General Ecology.

Course Relationship to Existing Programs: This course will replace Biology 307 in certain certificate programs as well as in the Biology BA and BS programs.

Course Relationship to Existing Courses:

3. APPROVAL HISTORY:

4. SCHEDULING AND PROPOSED INSTRUCTORS:

Semester of Initial Offering: Fall 2011

Proposed Instructors: Dr. Cody Edwards and Dr. Larry Rockwood

5. TENTATIVE SYLLABUS: See attached.

Syllabus

Foundations of Ecology and Evolution (BIOL 308)

Credits: 5

Lecture: 3 hours per week.

Lab: 3 hours per week

Recitation/Discussion: one hour per week

Prerequisites: BIOL 213-214 or EVPP 110-111 or permission of instructor

Course Description/Objectives: This course examines the principles of ecology, evolution, and the impact of humans on the world around them. Topics will include evolutionary history and theory, the processes that generate and maintain biological diversity, methods for interpreting and measuring the earth's biota, analyses of interactions among organisms, and between organisms and their environments, models of populations and ecosystems, and the conflicts between human population growth and conservation of the environment. This course will de-emphasize rote learning and will instead emphasize the use of "concept mapping," a pedagogical tool designed to reveal linkages/patterns among concepts.

Required Texts:

Lecture: *Life* (9th edition). Sadava, D., D. M. Hillis, H. C. Heller, and M. R. Berenbaum. Sinauer Associates, Inc.

Lab: Custom Lab Manual from GMU.

Recitation: *The Diversity of Life*. E. O. Wilson. W. W. Norton & Company.

Lecture Schedule		
Week	Topic	Reading Assignment
1	History of Evolutionary Thought	Chapters 21 and 25
2	Evidence of Evolution: Hardy-Weinberg Equilibrium, Mutation, Genetic Drift, Gene Flow, Natural Selection	Chapter 21
3	Reconstructing and Using Phylogenies	Chapter 22
4	Species and Speciation Exam I	Chapter 23
5	Evolution of Genes and Genomes	Chapter 24
6	Ecology: Levels of Organization, the Physical Environment	Chapter 54
7	Ecosystems: Primary Production and Energy Flow	Chapter 58
8	Ecosystems: Secondary Production and Decomposition Exam II	
9	Ecosystems: Biochemical Cycles, the Carbon Cycle, and Global Warming	
10	Population Ecology: Density Independent/Dependent Growth Models	Chapter 55
11	Population Ecology: Life Tables and Life Histories	
12	Species Interactions Exam III	Chapter 56
13	Community Ecology	Chapter 57
14	Conservation Biology	Chapter 59

Laboratory: The goal of the laboratory is to educate and engage students on the essential elements of evolution and ecology and to provide students with the knowledge, essential skills, and techniques necessary to observe, interpret, and analyze the world around them. As such, labs will involve simulations, demonstrations, exercises, and discussions that reinforce the student's understand of the ecological and evolutionary concepts introduced in lecture. Labs are designed to move beyond simple presentation of facts and instead enhance problem-solving skills, stress interrelationships among topics, and communicate the relevance and excite of ecology and evolution.

Laboratory Schedule.

Week	Topic(s)	Lab/Field	Homework Due (points)
1	Introduction to Biodiversity	Lab	None
2	EvoBeaker: Hardy, Weinberg, and Kuru	Computer Lab	From week 1 (10)
3	(1) Set up Experiment for Research Paper (2) Genetic Drift	Lab	From week 2 (10)
4	(1) Collect Data for Research Paper (2) Natural Selection	Lab	From week 3 (15)
5	(1) Building Phylogenetic Trees; (2) Set up intraspecific completion experiment	Lab	From week 4 (15)
6	EvoBeaker: HIV Clock	Computer Lab	From week 5 (15)
7	EvoBeaker: Islands and natural selection	Computer Lab	From week 6 (15)
8	Wetlands *Assignment to be completed in class	Field	From week 7 (15) *From week 8 (10)
9	Aquatic Ecology	Field & Lab	None
10	Harvest intraspecific competition experiment	Lab	From week 9 (15)
11	Human Survivorship Curves	Field & Lab	From week 10 (15)
12	Plant Community Structure	Field	From week 11 (15)
13	Species Area Curves in Lichen Communities	Field	From week 12 (20)
14	Forest Carbon Sequestration *Assignment to be completed in class	Field & Lab	From week 13 (15) *From week 14 (15)
		Total Points	200

Recitation/Discussion: The goals of this recitation are to reinforce and expose the course concepts by stress interrelationships among topics, communicate the relevance and excite of ecology and evolution, and development of higher order problem-solving skills introduced in lab. To accomplish these goals, the focus of the recitation will be placed on biodiversity --- how it is created, defined, explored, destroyed, and, hopefully, preserved. This recitation/discussion will also emphasize data analysis and writing. The writing intensive exercises will be evaluated in the recitation/discussion.

Recitation Schedule

Week	Sample Topic(s)	Homework Assignment	Points
1	Review of Basic Data Analysis	None	
2	Review of Non-Parametric Statistics; Analyzing and Presenting Biological Data in Tables and Graphs	From week 1	5
3	Researching and Reading the Biological Literature Assignment: Summarizing a Scientific Paper	From week 2	5
4	How does one write a Scientific Paper?	From week 3	10
5	The Fundamental Unit of Evolution	Preliminary Data Analysis for Research Paper due	10
6	New Species	From week 5 Data Analysis Returned	10
7	The Forces of Evolution *Assignment to be completed in class	From week 6 *From week 7	10 10
8	Adaptive Radiation	Research Paper Due	40
9	The Unexplored Biosphere	From week 8	10
10	Biodiversity Reaches the Peak	From week 9	10
11	Research Paper Returned Individual Student Conferences	From week 10	10
12	The Life and Death of Species	None	0
13	Biodiversity Threatened	From week 12	10
14	Environmental Ethics *Assignment to be completed in class	From week 13 *From week 14	10 10
	Final draft of research paper due		40
		Total Points	200

Footnotes

- 1) Students who do not achieve a minimum of 6 points out of 10 on the journal summary **must** see the writing tutor before submitting their 50 point paper.
- 2) Points will be deducted if papers are late.
- 3) All papers must be submitted in hard copy and entered into the Safe Assign plagiarism program.

Writing Intensive Requirement

All students at George Mason are required to take a writing intensive course in their major. **Biology 308 is the writing intensive course.** This means that you must write a paper of approximately 3000 words in length. This paper is graded, edited and returned to you. You must then resubmit this paper, taking into account the suggestions of the editor. In this course you will fulfill this requirement in the recitation based on an experiment done in the lab. Your recitation teaching assistant will be editing and grading your paper. The first draft is worth 40 points and the second draft 40 points. There will be other writing assignments in the laboratory and recitation portions of this course.

Notes:

- A. Unless the instructor announces otherwise, if a scheduled exam is canceled by snow or for any other reason, the exam will be given during the next scheduled class period.
- B. We generally do not allow make up exams. If you miss one of the three hourly exams, it will automatically be dropped. If you miss two hourly exams you will be asked to drop the course. **In exceptional cases, with documented evidence** of a serious illness, and with approval by the instructor, a missed exam may be made up **on the day of the final exam.** You should contact the instructor immediately if you are having medical difficulties or are going to miss any exam for any reason. If we have not heard from you by the time and date of the exam you will get a zero on that exam. **Make up exams will be all essay questions and have no extra credit points.**
- C. **Blackboard.** Power points and other material will be available on Blackboard. Go to: courses.gmu.edu to access

blackboard. Although Power Points will be available on Blackboard, **this is no substitute for coming to class and taking notes.**

D. If you are a student with a disability and you need academic accommodations, please see the _____ instructor and contact the Disability Resource Center (DRC) at 703-993-2474. **All academic accommodations must be arranged through that office.**

E. Important Web Pages:

GMU Writing Center <http://writingcenter.gmu.edu/>

F. **iclicker.** All students must have an iclicker remote to be used in class for quizzes and in class exercises. These may be purchased at the bookstore. The iclicker will be used in a large number _____ of Biology classes in the future. You should keep your iclicker remote until you graduate. At that _____ time you can sell it back to the bookstore.

G. Quizzes and diagnostic exams

There will be 9 short quizzes or diagnostic exams during the semester. You will get full credit (5 points out of 5) for taking the diagnostic exam and, although quizzes will be graded, participation points will be awarded for taking the quizzes. That is, there are four questions per quiz, which are graded; you get one point for taking the quiz. Quizzes as a whole are worth 6% of your grade, the three worst quiz scores will be dropped. If you do not attend class on the day of a quiz, you get a zero for that quiz. As noted above, **you are required to purchase an iclicker remote** for these quizzes and the diagnostic exams. If you do not use your remote, you lose the participation point. Quizzes may be given at the beginning, middle or end of the class. **Quizzes are open book, but you must work individually.**

Exams

There are three exams and a final. You will be able to drop one of the three hourly exams and count the best two. Each of these hourly exams is each worth 17% of the grade and the final exam is 20% of your grade. Exams will be of a mixed format: a combination of short answer essays, problems, graphs, as well as multiple choice and matching questions. To study for the exams it will be useful to study, in addition to notes you have taken in class, the text book, the relevant chapters in the lab manual, sample exams and the Power Points. Sample exams will be posted on Blackboard. We give extra credit points on exams that usually result in raising your grade by as much as 5%. **Therefore, when we compute the final grade for the course, we do not curve.**

Summary	Percent of Grade
Laboratory	20
Recitation	20
Two hourly exams @17% each	34
Final Exam	20
Quizzes	6

Grading Scale

Letter Grade	Percentage	Registrar's Equivalent on a Scale of 0-4.0
A+	> 95	4.0
A	92-95	4.0
A-	90-92	3.67
B+	88-90	3.33
B	82-88	3.00
B-	80-82	2.67
C+	78-80	2.33
C	69-78	2.00
D	60-69	1.00
F	< 60	0.00