



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 Inactivate 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

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: (check one) 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


Restrictions Enforced by System: Major, College, Degree, Program, etc. Include Code.

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)
This course provides environmental science majors with the cellular foundation required for subsequent courses in the BS curriculum with a focus on how biological systems respond to environmental threats. The course emphasizes the connection between cellular processes and a healthy environment, and how this relationship is jeopardized by a variety of chemical and physical environmental perturbations.	
Indicate number of contact hours: Hours of Lecture or Seminar per week: <input type="text" value="3"/> Hours of Lab or Studio: <input type="text" value="3"/>	
When Offered: (check all that apply) <input checked="" type="checkbox"/> Fall <input type="checkbox"/> Summer <input type="checkbox"/> Spring	

Approval Signatures

 20 Mar 2014 _____

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 Curriculum Committee of the College of Science

1. **COURSE NUMBER AND TITLE:** EVPP 210: Environmental Biology: Molecules and Cells

Course Prerequisites: Co-requisite: CHEM 211

Catalog Description: This course provides environmental science majors with the cellular foundation required for subsequent courses in the BS curriculum with a focus on how biological systems respond to environmental threats. The course emphasizes the connection between cellular processes and a healthy environment, and how this relationship is jeopardized by a variety of chemical and physical environmental perturbations.

2. **COURSE JUSTIFICATION:**

Course Objectives: To provide BS Environmental Science majors with the necessary depth and breadth in the life sciences for upper level courses in the BS curriculum.

Course Necessity: No course currently exists that serves this purpose.

Course Relationship to Existing Programs: Required introductory course in the BS Environmental Science major. Will provide the biological foundation for upper level courses in the BS curriculum.

Course Relationship to Existing Courses: The current introductory sequence in environmental science is EVPP 110-111, which is a general education requirement that accommodates non-science majors and therefore does not provide the necessary scope and depth of coverage required of our BS majors. The proposed EVPP 210 and two other courses in final stages of development would remedy this problem.

3. **APPROVAL HISTORY:**

Approved by ESP faculty on March 4, 2014.

4. **SCHEDULING AND PROPOSED INSTRUCTORS:**

Semester of Initial Offering: Anticipated first offering: Fall 2014.

Proposed Instructors: Albert Torzilli, Associate Professor of ESP

5. **TENTATIVE SYLLABUS:**

attached.

EVPP 210

Environmental Biology: Molecules and Cells

Lecture Syllabus

Fall 2014

Text: *Life: The Science of Biology*. 2008. Sadava, Heller, Orians, Purves, and Hillis. 8th Edition.

Course Description and Goals: This course provides environmental science majors with the cellular foundation for subsequent courses in the BS curriculum with a focus on how biological systems respond to environmental threats. Topics include the molecules of life, bioenergetics and metabolism, cell structure, DNA structure and applied genetics, and basic molecular environmental science. This course will emphasize the connection between cellular processes and a healthy environment, and how this relationship is jeopardized by a variety of chemical and physical environmental perturbations.

Course Content and Instructional Methods: The course consists of a coupled lecture and laboratory; both must be taken concurrently and your grade will depend on your performance in both lecture and lab. Below is a list of lecture topics by week. Following the lecture topics there is the lab syllabus.

<u>Week</u>	<u>Topic</u>	<u>Readings</u>
8/26	The Scientific Method. How environmental science influences policy.	Chap. 1
9/2	The Chemistry of Life: How is the biogeochemical cycling of carbon, nitrogen and phosphorus essential to life in the ecosystems on earth? Why are even small amounts of chemical pollutants in the environment a concern?	Chap. 2
9/9	Macromolecules: (carbohydrates, lipids, nucleic acids, proteins including enzymes). What macromolecules are most sensitive to electromagnetic radiation? What consequences can this have on biological systems – e.g ultraviolet light and skin cancer?	Chap 3
9/16	Cell Structure: What cell organelles are involved in detoxification reactions or how do we get rid of toxic chemicals?	Chap. 4
9/23	Membranes: Why is the structure of the cell membrane relevant when a cell is exposed to various environmentally toxic compounds such as organic pollutants, heavy metals, hormonally active agents, etc? EXAM 1	Chap. 5
9/30	Energy, Enzymes & Metabolism: How are biological systems from cells to ecosystems able to maintain order in the face of the ever present tendency for disorder and chaos?	Chap. 6
10/7	Respiration: pathways that harvest energy. Fermentation effects in the environment, acidification of aquatic environments by respiration, diversity of electron acceptors, dead zones in the Gulf of Mexico and Chesapeake Bay	Chap. 7
10/14	Photosynthesis: How does deforestation adversely affect all life on the planet? Why doesn't respiratory CO ₂ from all the organisms on the planet contribute to increasing the greenhouse effect? What is the explanation for the greenhouse effect?	Chap.8

10/21	EXAM 2; The Cell Cycle, Mitosis, Meiosis. Life begets life correctly most of the time – how does that happen? What fixes UV irradiation injury?	Chap 9
10/28	Genetics, Mendel and Beyond: Is mutation necessarily bad? If not, should we be all that concerned about mutagenic compounds in the environment?	Chap. 10
11/4	The Role of DNA in Heredity; DNA barcoding of environmental species.	Chap. 11
11/11	From DNA to Protein, Genotype to Phenotype: How do environmental perturbations affect the progression from genotype to phenotype? Teratogens in the environment or why are all the alligators female? Also, why are some male small mouth bass producing eggs?	Chap. 12
11/18	EXAM 3; DNA Fingerprinting & Sequencing—their impact on environmental studies. Techniques for exploring species diversity.	Selected Readings
11/25	Molecular Ecology; THANKSGIVING RECESS Exploring that diversity.	Selected Readings
12/2	Molecular Ecology Who is for sale in the bush meat market?	Selected Readings

EVPP 210 Environmental Science for ES Majors I
Lab Syllabus

Lab Manual: *Cell Structure & Function*. 2011. Fox & Madden. 3rd Edition

Laboratory is a required and integral part of EVPP 210.

Week	Topic	Lab Manual	What's Due	Quiz
8/26	The Scientific Method and Sample Size	Exercise 1	Lab worksheet	
9/2	Qualitative Analysis of Biological Molecules	Exercise 3	Lab worksheet	
9/9	Extraction of Proteins	Exercise 4	Lab worksheet	Quiz 1
9/16	Quantitative Analysis of Proteins	Exercise 5	Lab worksheet	
9/23	Food Biochemistry	Exercise 7	Lab worksheet	Quiz 2
9/30	Enzyme Activity 1	Exercise 6	Lab worksheet	
10/7	Enzyme Activity 2	Exercise 6	Lab worksheet	
10/14	Columbus Recess; no labs			
10/21	Introduction to Microscopy	Exercise 2	Lab worksheet	Quiz 3
10/28	Photosynthesis and Plant Pigments	Exercise 8	Lab worksheet	
11/4	Mitosis & Meiosis	Exercise 9	Lab worksheet	Quiz 4
11/11	Extraction & Quantitative Analysis of Nucleic Acids	Exercises 10 & 11	Lab worksheet	

