Course description
ESRM/Fish 162
Introduction to Biology

Course Background and Content

Increasingly, experts in the biological sciences are expected to provide advice on global environmental trends and to identify key linkages between different levels of biological organization. Future careers in this field will involve creating and analyzing large datasets, working in teams, and collaborating across a broad range of subjects. It is therefore important for students to gain a broad foundational perspective in Biological subjects while also learning about topics relevant to their further educational goals in related courses. To this aim, we are offering this one-quarter series in introductory biology, ESRM/FISH 162 which will serve as an introduction for more advanced topics in the biological sciences.

ESRM/FISH 162 provides an understanding of how different living organisms have "solved" the limitations imposed by the physical environment. Our aim is to explain why these organisms are found where they are found, and why they appeared at different evolutionary time points. The class starts by discussing basic cellular biology, and examines how life functions at the cellular level. It then explores the physiology of microbes, plants, and animals, and how they respond to the environment. Students in the class will then enroll in Bio 180, which provides the larger context for many of the topics explored in 162.

Objectives

The main aim of this class is to provide a basic understanding of cell biology, and to examine the physiology and response of microbes, plants, and animals to the environment. This course aims to provide sufficient scientific background so that students can actively engage in the key environmental issues of our time. Specific learning objectives include:

- To gain a thorough background in Cell Biology and Physiology relevant to later courses
- To develop important research skills by reinforcing the scientific method, including correct development of hypothesis testing, interpretation and synthesis
- To gain experience in writing research reports in a clear and concise manner
- To strengthen collaborative relationships in scholarly activities
- To develop the basis for reading and critically evaluating popular media reports, and to learn to evaluate primary scientific literature
- To effectively contribute to discussions in environmental and biological issues that play an important role in our daily lives
- To obtain subject guidance for later classes in your chosen field

Course organization

Instructors in the class aim for effective and enjoyable learning, and will therefore implement a variety of learning opportunities in lectures and labs. There will be three lectures a week that will include timely and relevant material framed within a larger issue, and will have the goal of stimulating student interest and participation. A weekly lab session will be framed within an experimental approach that will develop critical thinking skills. Most labs are collaborative, and will involve group presentations, writing and homework. Assessment of your

learning will be aimed at exploring knowledge acquisition and "higher level" processing of information.

Instructors

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Meeting times and location, Winter 2009

Lectures MGH 389 M, W, Th, F 11.30-12.30
Labs FTR 113 T 1.30 - 4.20, W 8.30 - 11.20, W 1.30-4.20, Th 1.30-4.20

Textbook;

Freeman, Biological Science 3rd edition
Lab manual available at Copy n Print 4200 University Way

Grading;

Exam 1	100 points
Exam 2	100 points
Exam 3	100 points (the final exam is cumulative)
Labs	100 points
Total	***400 points***

Attendance in labs is required, and 60% of the lab points are needed in order to pass the whole course. Final grades are assigned as follows; the top 5% of students obtain a 4.0. The remaining grades are assigned in equal categories between the lowest 4.0 grade and the passing grade (50% of all marks). This approach means that grades are assigned in a non-competitive fashion.

Course policies:

Please see section in lab manual, and information on our website.

Course website:

Lecture notes in Adobe Acrobat format (*.pdf) are available for downloading at our class website http://courses.washington.edu/ef162/
You will need a UW NetID to access the lecture notes

Syllabus

Wk	Date	Day	Topic	Reading	Lab
1	5-Jan	M	What environmental challenges do living organisms face?	25-6, 77-9, 554-6, 10	
	7-Jan	W	Cells, the basic unit of life	Ch 7	Microscopy and cells
	8-Jan	Th	The chemistry of life	Ch 2	
	9-Jan	F	Protein structure and function	Ch 3	
2	12-Jan	M	Nucleic Acids	Ch 4, Ch 15	
	14-Jan	W	Carbohydrates and lipids- starch, cellulose, chitin; membranes	Ch 5&6	Photosynthesis,
	15-Jan	Th	Cellular respiration and fermentation; redox reactions	Ch 9	respiration,
	16-Jan	F	Photosynthesis	Ch 10	fermentation
3	19-Jan	M	*Holiday - ML King*		
	21-Jan	W	Microbial Physiology: How bacteria cope with environmental challenges	Ch. 17	Microbial physiology
	22-Jan	Th	Microbial adaptations to extreme environments		
	23-Jan	F	Transition to organismal level: cell-cell interactions	Ch 8	
4	26-Jan	M	Principles of development; gene expression	Ch. 18 and 21	
	28-Jan	W	**Exam 1**		Plant structure
	29-Jan	Th	Plant Physiology: Plant form and function; growth	Ch. 36	
	30-Jan	F	Plant Physiology: Reproduction	Ch 40	
5	2-Feb	M	Plant Physiology: Photosynthesis/Adaptations	Ch. 10	
	4-Feb	W	Plant Physiology: Nutrition; plant-microbe interactions	Ch 38	Water Economy
	5-Feb	Th	Plant Physiology: Water and nutrient transport	Ch 37	
	6-Feb	F	Plant Physiology: Plant sensory systems; hormonal responses	Ch 39	
6	9-Feb	M	Plant responses to the environment	Ch. 39	
	11-Feb	W	Bioenergy research		Experimental design
	12-Feb	Th	What makes an animal an animal?	690-8,552-3,558-64	
	13-Feb	F	Animal structure and the animal environment	Ch 41	
7	16-Feb	M	*Holiday - Presidents Day*		
	18-Feb	W	Gas exchange and circulation; living in water and on land	Ch 44	Animal circulation
	19-Feb	Th	Gas exchange and circulation; the circulatory system	Ch 44	& respiration
	20-Feb	F	**Exam 2**		
8	23-Feb	M	Water and electrolyte balance; living in water	Ch 42	
	25-Feb	W	Water and electrolyte balance; living on land	Ch 42	Neurons, reflexes
	26-Feb	Th	Electrical signals in animals	Ch 45	& feedback
	27-Feb	F	Eating to live; animal nutrition	Ch 43	
9	2-Mar	M	Eating to live; animal nutrition	Ch 43	
	4-Mar	W	Animal sensory systems; taste, smell and hearing	Ch 46	Animal movement
	5-Mar	Th	Animal movement	Ch 46	
	6-Mar	F	Chemical signals in animals; what do hormones do?	Ch 47	
10	9-Mar	M	Chemical signals in animals; how are hormones regulated?	Ch 47	
	11-Mar	W	Animal reproduction; which way and how is it done?	Ch 48	Analysing results
	12-Mar	Th	Animal reproduction; sex hormones	Ch 48	
	13-Mar	F	The animal immune system	Ch 49	
11	18-Mar	**Finals**	**2.30-4.20 MGH 389**		