Integrative Environmental Physiology

FISH 441 / FISH 541

description - details - grading - schedule

MWF - 10:30-11:20 - FSH 109
T - 1:30-4:20 - FTR 113

Quick links

- GoPost Discussion Board
- Lab Wiki *lab section only*

Course Description

Both freshwater and marine environments are continually changing in response to both natural processes and human activities, putting stress on aquatic organisms from microbes to marine mammals. This course will explore the surprising similarities and unique differences in the physiological response organisms have to stress caused by factors as natural as tidal cycles, and as unnatural as excess pharmaceuticals. The course will take an integrative approach across disciplines linked to physiology, with an emphasis on molecular physiology and endocrinology; and assumes students have been introduced to basic physiological concepts in other coursework. The main focus will be on functional responses to system stressors; however, the course will also explore potential impacts at the population level, and the evolutionary implications of physiological response to environmental stress. Case studies and research papers will be used along with a primary textbook. The laboratory for this course will involve student working cooperatively to develop research projects.

Class Format

Lectures will be a presented in a majority of instances in the "flipped" scenario where you will be expected to watch the lectures prior to class meetings. Content will come from textbook, current research activities in SAFS, research articles, and popular press. Discussions and interactive activities will be incorporated.

Lab Format

Lab will take a goal-oriented approach driven by small groups of students. The first few labs will be

spent introducing students to several molecular techniques commonly used to study the physiological responses of organisms to changing environments. The remainder of the quarter will be spent implementing these techniques in an independent project of their design. Methodologies that will be covered may include tissue sampling, nucleotide and protein extraction, SDS-PAGE gel electrophoresis, Western transfers and immunoblots, oxygen consumption monitoring, ELISAs, and microscopy. Detailed information concerning lab can be found at http://genefish.wikispaces.com/FISH441.

Policies

UW Policy on Academic Integrity: Plagiarism, cheating, and other misconduct are serious violations of your contract as a student. We expect that you will know and follow the University's policies on cheating and plagiarism. Any suspected cases of academic misconduct will be handled according to University regulations. More information, including definitions and examples of Academic Misconduct, can be found at here.

Disability Accommodations: To request academic accommodations due to a disability, please contact Disabled Student Services, 448 Schmitz Hall, (206)543-8924 (V/TTY). If you have a letter from Disabled Student Services indicating you have a disability, which requires academic accommodations, please present the letter to the instructor so we can discuss the accommodations needed for this class.

Common Sense Statement

You are an adult. You have responsiblities. Minimally you need to take control of your educational experience- ask questions, show up, and contribute.

Details

GoPost Discussion Board Please use this platform to ask questions, comment, and share knowledge.

Intructor Contact info:
email: sr320@uw.edu
twitter: sr320
phone: 206-866-5141
office: FTR 232

Recommended Textbook
Animal Physiology: from Genes to Organisms. Sherwood, Klandorf and Yancey. 2013 Brooks/Cole

other useful textbooks:
- Vertebrate Endocrinology, Norris. Third Edition. Academic Press
- The Physiology of Fishes. Evans. Second Edition. CRC Press
- Environmental Physiology of Animals, P. Willmer, G. Stone, I. Johnston, 2nd edition. Blackwell Publishing

Primary learning objectives
- Describe the relationship of genetic information and physiological processes
- Compare and contrast endocrine system in vertebrates and invertebrates
- Describe how organisms obtain information about their environment
- Design and carry-out experiments to effectively evaluate effects of environmental change on aquatic organism physiology

Grading

Lecture & Lab: 5 Credit

2 exams - 15% each
Weekly Exercises - 12%
Lab Notebook (9) - 3% each (27%)
Research Proposal - 5%
Research Project - 26%

Exams: Content of exams will include (but not limited to) lectures, readings, and laboratory material. If unavailable to take exam, arrangements should be made ahead of time.

Weekly Exercises: Assignments will be available every week (no-makeups)

Lab Notebooks: Electronic notebooks (wiki) documenting activities in lab. Content should accurately document research so that it can be repeated. Essential components (data) from each lab should be obvious. Responsiblity of student to inquire about essential components if needed. Notebook entries must be made within 7 days of lab. 10% point deduction for each day late.

Research Proposal: Sections should include Background, Research Objectives, Methods, Timeline, Expected Results (~1 page total): DUE OCTOBER 25th

Research Project: 5% Presentation, 15% Paper [5% Individual Contribution, 5% Draft DUE November 30, 5% Final Draft], 6% Peer Assessment (Group Performance, Presentations)

Lecture: 3 Credit

2 exams - 25% each

Weekly Exercises - 20%
Project Reporting - (4) 20%
Lead Class Discussion - 6%
Peer Assessment - 4%

Project Reporting: Starting November 2nd, you need to provide an update on the progress of your "group". This should include what occurred, what went well, what did not, in addition to your personal insight. Think of it like being a reporter or blogger. Posts should be made to message board.

*For those students who are registered for 500-level course (graduate students) you will required to submit a manuscript in publication ready format (those taking a lab) or those students taking the lecture only section will be required to maintain a separate blog where they post about the course on a weekly basis.

Slides

Slides are available on the Discussion Board, organized by week.

Tentative Schedule of Lecture Topics

Lecture Title (**focus**)
Course Concepts, Review Cell Biology
The cellular environment (**Molecular Physiology**)
Stress in the cellular environment (**Membrane Physiology**)
Fluid Balance (**Osmoregulation**) & *Review Basics*
When things go bad: Warming & Cooling (**Thermal Physiology**)
When things go bad: Warming; *Discussion*
When things go bad: No Oxygen (**Respiratory Physiology**)
When things go bad: **Xenobiotic response**
When things go bad: *Discussion*
EXAM
Fishermen and Farmers: Fear (**Adrenocorticotropic Physiology**)
Fishermen and Farmers: **Adrenocorticotropic Physiology: Inverts**
Sex: Finding the right one (**Pheromone, Spawning**)
Carry-over Repro and more...
Discussion (**Ocean Acidification and Homing**)
Research Project Discussion
Metamorphosis: Big taxa (**Smoltification, Amphibians, Development**)
Metamorphosis: Small taxa (**Shellfish, Development**)
Death and Dieing (**Senescence, Aging**)
EXAM
(**Epigenetics**)
Discussion: **Conservation Physiology**
Immune System: (**Cell Signaling, Innate Immunity**)
Immune System:
Pathogen Virulence: Why are some so bad? (**Virulence**)
Review
Presentations
Presentations

Textbook Readings

Lecture 1 - Chapter 1

Lecture 2 - Chapter 2

Lecture 3 - Chapter 3

Lecture 4 - Chapter 15

Lecture 5 - Chapter 11

Several Endocrinology Lectures - Chapter 7

Immune - Chapter 10

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