

COURSE OVERVIEW

Natural and man-made changes in the environment can put tremendous stress on the ability of organisms to maintain homeostasis affecting human health, agriculture, and biodiversity. We will explore fundamental principles of cellular homeostasis and learn modern molecular and genetic research tools that are revealing unprecedented insights into how cells detect environmental stress and activate protective genes and proteins. You will participate in classroom discussions and laboratory experiments on physiological, genetic, and molecular responses to environmental stress. Experiments will be limited to non-vertebrate organisms including the model nematode *Caenorhabditis elegans*.

MAIN OBJECTIVES

This course will introduce students to major concepts stress biology with a focus on regulation of genes, and give students practical experience with molecular and genetic methods used to study gene regulation and function. Experiments will be conducted with *C. elegans*.

COURSE SCHEDULE

Class will meet in Carr Hall 110 TWRF - Period 3 – 4 (9:35 AM – 11:30 AM) and RF - Period 5 (11:45 AM – 12:35 PM)

Format? – The course will include lectures and discussions to introduce topics and laboratory sessions to learn methods and complete experiments.

Prerequisites? - Coursework in general biology is required and genetics is recommended (e.g., BSC2010 & 2011 and PCB 3063 or AGR 3303 or PCB 4522).

Cost? - A fee of \$300 per student is needed to cover costs of supplies and reagents.

TENTATIVE SCHEDULE

Week 1 (2/12/18)

Lecture and discussions – introductions; syllabus; review of basic cell, gene, and protein structure and function; molecular genetics and model organisms; methods in molecular biology

Lab 1 – omics, transcriptomics, working with large datasets in Excel and R, make an expression table; PCR and DNA primer design

Lab 2 - model organisms and introduction to *C. elegans*, *C. elegans* anatomy, life cycle, and behavior

Fieldtrip – UF ICBR tour

Week 2 (2/19/18)

Lecture and discussions – introduction to stress, gene regulation, protein regulation, cell signaling; extracellular matrix regulation of stress responses

Lab 1 – 2-step qPCR of the heat-shock response,

Lab 2 - testing of new primers, standard curve generation

Fieldtrip – UF aquatic toxicology labs

PCB4917, Molecular and Genetic Responses to Environmental Stress, 4 h

Week 3 (2/26/18)

Lecture and discussions – Cytoprotective genes - protein chaperones, chemical chaperones and osmolytes, detoxification, antioxidants, antimicrobial proteins; Regulatory genes – receptors, post-translation modifications, transcription factors, chromatin modifiers

Lab 1 – test primers in high salt and furrow mutants

Lab 2 – statistics and data presentation

Week 4 (3/5/18) – SPRING BREAK

Week 5 (3/12/18)

Lecture and discussions – Written exam – remaining time spent working on experiments, data analysis, reports, and presentations

Lab – remaining time spent working on experiments, data analysis, reports, and presentations

Fieldtrip – UF pharmacogenomics lab

Week 6 (3/20/18)

Lab – student projects and presentations

READINGS

There is no required textbook. Reading material will be selected from available sources or provided.

TENTATIVE GRADING

Written exam	20
Discussion participation	10
Lab participation	10
Mini-projects	20
Student written reports	20
Student project presentations	20
Total	100

Point Range (%)	Letter Grade
≥ 90.00	A
≥ 86.66	A-
≥ 83.33	B+
≥ 80.00	B

≥ 76.66	B-
≥ 73.33	C+
≥ 70.00	C
≥ 66.66	C-
≥ 63.33	D+
≥ 60.00	D
≥ 56.66	D-
< 56.66	E

Detailed grading policies for the University can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

POLICIES

Attendance and absences

Attendance is mandatory.

Class demeanor

Students will be expected to spend the majority of the week in class completing experiments and participating in discussions and presentations. Students will need to arrive on time. Cell phones are not to be used during presentations and discussions for personal reasons.

Communication with Dr. Choe

Written communication should be made in Canvas (e.g., mail and announcements) unless there is an emergency. If a student fails to check Canvas, the instructor is not responsible for missed information. Grades will only be made available in person or via Canvas.

Academic Honesty

All students are expected to hold themselves to a high standard of academic honesty.

Of course, you must work alone on all exam questions.

If you witness any instances of academic dishonesty in this class, please notify the instructor or contact the Student Honor Court (392-1631) or Cheating Hotline (392-6999). For additional information on Academic Honesty, please refer to the University of Florida Academic Honesty Guidelines at: <http://www.dso.ufl.edu/judicial/procedures/academicguide.html>. Students with special needs

Students with Special Needs

Students with disabilities are required to register with the Disability Resource Center (DRC) if they are requesting accommodations. The DRC may be contacted at (352) 392-2565 or refer to the website at <http://www.dso.ufl.edu/drc>. It is the student's responsibility to notify the instructor of any accommodation requests. I am happy to help.

No accommodations are available to students who lack this documentation. It is the policy of the University of Florida that the student, not the instructor, is responsible for arranging accommodations when needed.

UF counseling Services

Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include: 1) UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services. 2) Career Resource Center, Reitz Union, 392-1601, career and job search services. Many students experience test anxiety and other stress related problems. "A Self Help Guide for Students" is available through the Counseling Center (301 Peabody Hall, 392-1575) and at their web site: <http://www.counsel.ufl.edu/>.

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Online course evaluations

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at: <https://evaluations.ufl.edu/results/>.