Bio 5240/7240 - Molecular Systems Biology
Course Syllabus
Winter Semester, 2019

Instructor: Dr. Jared M. Schrader

Email: schrader@wayne.edu

Class Web site: https://canvas.wayne.edu

CLASS MEETING TIME

MW 2:30pm to 3:45pm

CLASS MEETING LOCATION

0115 State Hall

COURSE DESCRIPTION

Molecular systems biology seeks to move from the reductionist nature of molecular biology into the holistic understanding of these components in biological systems. This course introduces the basic design principles of biological circuits and networks and their functional designs at the molecular, pathway, whole cell, and population levels. Students will perform a comprehensive group project to build a computational model of a simple biological network. Specific topics include:

- Biological circuits
- Synthetic design of biological circuits
- Cellular modeling
- Global cellular measurements
- Multi-cellular systems

LEARNING OBJECTIVES

At the end of this course students will be able to:

- Understand the basic principles of biological circuits. The main focus of this course will be to study the systems architecture, biomolecular function, and output of biological circuits.
- Design/model biological circuits by applying core principles of cellular networks to problems relating to the flow of biological information.
- Exhibit critical thinking by integrating experimental data with computational models of biological circuits.
- Demonstrate comprehension of primary literature related to the topics presented in the course including the array of cutting edge methods for global cellular measurements.

COURSE PREREQUISITES

Undergraduate students are required to have completed the following courses:
Biology Majors:
BIO 3070 (Genetics) or 3100 (Cellular Biochemistry)
MAT 2020 (Calculus II)

Engineering/Chemistry/Physics Majors:
Students from these disciplines are encouraged to enroll with departmental approval.

Graduate students in any scientific or engineering discipline may enroll.

OFFICE HOURS

By appointment only in Biological Sciences room 2119.

COURSE CREDITS

This is a 3 credit course.

TEXTBOOK

No textbook required. Readings from primary literature and reviews.

GRADING

This course can be taken by undergraduate students at the 5000 level or graduate students at the 7000 level. The 7000 level exams will contain additional advanced questions that apply the scientific principles towards the design of new experiments.

Class participation/attendance: 10% (100 pts total)
Exams: 60% (200 pts each, 600 pts total)

A total of three take home exams will be given. Each exam will follow a short answer format. The exams will be given on a Wednesday and turned in the following Monday. You are free to use whatever resources you like for the exam except for your peers.

Group project: 30% (300 pts total)

One group project will be performed to model the behavior of a biological circuit. Grading for this project will be based upon three equally weighted criteria, 1) generation of a working model 2) a written report of model results 3) group participation.

5000 level grades– Grades will be earned from a total of 1000 points. Final grades will be calculated using a distribution curve. After each exam, the class grade distribution will be given. At that time, tentative grade scales will be announced. Students earning the following percentage of points will receive a minimum of: A (≥90%), B (80-89%), C (70-79%), D (60-69%), or F (<60%). Anyone caught cheating on an exam or the assignments will automatically receive a failing grade

for the class. Plagiarism is a form of cheating and therefore subject to the same penalty.

7000 level grades – Grades will be earned from a total of 1000 points. Final grades will be calculated using a distribution curve. After each exam, the class grade distribution will be given. At that time, tentative grade scales will be announced. Students earning the following percentage of points will receive a minimum of: A (≥90%), B (80-89%), or C (<80%). Anyone caught cheating on an exam or the assignments will automatically receive a failing grade for the class. Plagiarism is a form of cheating and therefore subject to the same penalty.

SPECIAL CONSIDERATIONS FOR INDIVIDUALS WITH DISABILITIES

Students who have a physical or mental disabilities that may interfere with their ability to complete the requirements for this course successfully are invited to contact Student Disability Services (1600 David Adamany Library; 577-1851) to discuss appropriate accommodations on a confidential basis.

RELIGIOUS HOLIDAY CONFLICTS

Students who have a conflict with any of the scheduled class times due to religious reasons must notify Dr. Schrader in writing by class time on Jan. 9th.

ADD/DROP POLICY

Add forms will not be signed after the second week of class. Drop forms must be signed before the end of "study day," which is the day after the last day of classes.

UNEXPECTED UNIVERSITY CLOSURES

Closure of the University is announced by the following mechanisms:

1. The University Newsline (313) 577-5345 *
2. WSU Homepage (www.wayne.edu) *
3. WSU Pipeline (www.pipeline.wayne.edu) *
4. WDET-FM (Public Radio 101.9)
5. Other local radio and television stations

* Note: The information on closures and class cancellations is likely to be found at these locations before it is broadcast by local radio and television stations.

OTHER

1) Please turn off cell phones and all other electronic communication devices during class.

2) Any specific issue not covered by this syllabus will be resolved using University policies.
3) Disputes that cannot be resolved following the guidelines present in this syllabus will be resolved by following the guidelines of the University "Student Due Process."
4) Make-up assignments will **NOT** be given except under extremely extenuating circumstances.