

This course is intended for Life Science majors or those with a strong background in the Biological Sciences.

This course may be used to fulfill the elective requirements of the MBB and Biological Sciences majors.

Offered

Fall

Credits

3

Prerequisites

Molecular Biology and Biochemistry 01:694:407-408 or equivalent

Course Description

This is an upper level course, targeted at seniors. The purposes of the course are:

- to introduce students to several important research areas of advanced molecular biology and biochemistry, in particular topics related to molecular pathways and signal transduction (past topics include cell cycle regulation, iPS and proteomics)
- to train students to think logically and independently through active participation in class discussion.

The course will present contemporary concepts and experimental techniques not covered in other classes.

The main purposes of the course are (1) to present several important research areas of advanced molecular biology and biochemistry, in particular, the topics related to molecular pathways and signal transduction; and (2) to train students to think logically and independently through active participation in class discussion. The course content includes cell cycle control, iPS and human genome research, none of which are covered in other classes of MBB. Both recent and classic papers including reviews will be used for class discussion, thus no textbook. The exams are open book, which consist of essay-type questions. We test students' abilities to make logical arguments. Your participation in class discussion is important, which would make your grade better. It may also upgrade your grading if your participation in the discussion is great and if your grade is in a borderline.

Note that if you feel ill due to COVID or FLU or whatever, do not come to classes. You can contact me by e-mail. If you miss any class or exam, we will make the class materials and discussion available for you and will do makeup exams.

If you have any questions, please contact me by e-mail me at matsumura@dls.rutgers.edu.

694:411 Molecular Pathways and Signal Transduction, Fall 2022

Time: MW 5 (3:50-5:10PM): Places: NH A237, Busch Campus.

1: Sept. 07 Introduction to the course (Drs. F. Matsumura).

Topic 1. Cell Cycle-regulation of mitosis (Dr. F. Matsumura)

2:	Sept.	12	Cell division control, G2/M transition
3:		14	Maturation-Promoting Factor (MPF)
4:		19	Cyclin
5:		21	cdc2 Kinase
6:		26	Regulation of MPF- Proteolysis & Phosphorylation
7:	Sep	28	Review Session
8:	Oct	03	Exam 1 for the lectures (9/12-9/28) by Dr. F. Matsumura
9:		05	Downstream Events I (nuclear lamin)
10:		10	Downstream Events II (Chromosome segregation I)
11:		12	Downstream Events III (Chromosome segregation II)
12:		17	Reversible cell division
13:		19	iPS-part I
14:		24	iPS-part II
15:		26	iPS-part III
16:	Oct.	31	Review Session
17:	Nov.	02	Exam 2 for the 8 lectures (09/28-10/31) by Dr. F. Matsumura

Topic 2. Genomics, molecular pathways, and human evolution. (Dr. S. Anderson)

18:	Nov	07	Introduction to human evolution
19:		09	Human genome and mutations
20:		14	Meiosis, recombination, and haplotypes
21:		16	Genes that make us human, I
22:		21	Review Session
		23	No class (Fri. Class)
	Nov.	24-27	Thanksgiving
23:		28	Exam 3 for lectures 11/ 7/22 – 11/21/22 by Dr. Anderson
24:		30	Genes that make us human, II
25:	Dec.	05	Aging, I
26:		07	Aging, II
27:		12	Review Session
28:	Dec.	14	Exam 4 for lectures 11/30/22 – 12/12/2022 by Dr. S. Anderson

Coordinator:

Fumio Matsumura: matsumur@dls.rutgers.edu

848-445-2838 Nelson Room A323