

CELL AND MOLECULAR BIOLOGY --- BISC 440, FALL 2014

Lecture: Tu & Th 9:30–10:45 AM Shoemaker RM 323

Lab Section 1: Wednesday 10–12:50 PM, Shoemaker RM 523

Lab Section 2: Wednesday 2-4:50 PM, Shoemaker RM 523

Instructor: Dr. Bradley W. Jones, 122 Shoemaker Hall

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Office Hours: Monday 1:00AM-3:00; Wednesday 1:00-3:00 PM; or by appointment

Course Description: This course will give students a rigorous and yet basic understanding and appreciation of the fundamental principles of molecular cell biology. The emphasis of the lectures will be placed on a detailed study of the major cellular components, with particular attention to the relationship between functions and the molecular and supramolecular organization of the cell. The laboratory segment of the course will expose students to common molecular biology techniques and methods for observing cells and gene activity. The emerging field of molecular cell biology, a union of several subfields of biology including genetics, cell biology, biochemistry, and microscopy offers a more comprehensive approach to the understanding of the cell, and ultimately the organism.

Learning Objectives: After completing this course a student should gain an understanding of the role of the cell as the fundamental unit of both structure and function in all living things; a students should have a rigorous yet basic knowledge of the fundamental principles of molecular cell biology.

Credit Hours: 4

Prerequisites: Bisc 336 & Bisc 330 or Phcl 344 (Genetics & Physiology)

Texts: *Molecular Biology of the Cell, 5th edition*, Alberts et al. (ISBN 978-0-8153-4105-5)

Molecular Biology of the Cell, 5th edition: The Problems Book, Wilson and Hunt (ISBN 978-0-8153-4110-9)

Date	Topic	Chapter
Tu 8/26	Organization and Introduction	
Th 8/28	Cells and Genomes	1 pp. 1-10; 15-24
Tu 9/2	Proteins	3 pp. 125-146
Th 9/4	Proteins <ul style="list-style-type: none">• Structure of proteins• Protein function	3 pp. 152-156; 157-166; 171
Tu 9/9	DNA and chromosomes <ul style="list-style-type: none">• Structure and function of DNA	4 pp. 195-201
Th 9/11	DNA and chromosomes <ul style="list-style-type: none">• Chromosomes - packaging of DNA	4 pp. 202-219; 222-224
Tu 9/16	How Cells Read the Genome (Quiz1) <ul style="list-style-type: none">• RNA structure and function, Genetic Code	6 pp. 331-340
Th 9/18	How Cells Read the Genome <ul style="list-style-type: none">• Transcription in Prokaryotes	6 pp. 331-340
Tu 9/23	Exam #1	
Th 9/25	How Cells Read the Genome <ul style="list-style-type: none">• Transcription in Eukaryotes	6 pp. 340-352

Tu 9/30	How Cells Read the Genome • Transcription continued, RNA processing	6 pp. 352-360
Th 10/2	How Cells Read the Genome • Translation, Post-translation	6 pp. 366-382; 388-392
Tu 10/7	Control of Gene Expression • An overview of gene control • DNA-binding motifs in gene regulatory proteins	7 pp.411-432
Th 10/9	Control of Gene Expression • How genetic switches work: Prokaryotes	7 pp.432-439
Tu 10/14	Control of Gene Expression (Quiz 2)	7 pp. 439-448
Th 10/16	Control of Gene Expression	7 pp. 439-448
Tu 10/21	Exam # 2	
Th 10/23	Membrane Structure	10 pp.617-640
Tu 10/28	Membrane Transport	11 pp. 651-669; 671-675
Th 10/30	Cytoskeleton • Structure of cytoskeletal filaments	16 pp. 965-983
Tu 11/4	Cytoskeleton • Molecular motors	16 pp. 1010-1022; 1025-1034
Th 11/6	Intracellular Compartments and Protein Sorting (Quiz 3) • Compartments • Endoplasmic reticulum	12 pp. 695-704;723-738; 742-745
Tu 11/13	Intracellular Vesicular Traffic • Transport through the endomembrane system	13 pp. 749-756; 760-764
Th 11/13	Exam #3	
Tu 11/18	Cell Communication • General principles	15 pp. 879-899
Th 11/20	Cell Communication • G-protein coupled receptors	15 pp. 904-911
Nov. 24-28	Thanksgiving Break	
Tu 12/2	Cell Communication • Calcium signaling	15 pp. 912 -915
Th 12/4	Cell Communication • Enzyme-linked cell-surface receptors	15 pp. 921-931; 935-941
Th 12/11	FINAL EXAM 8:00 AM	

Class Policy: Attendance is required. Do not miss lecture. Do not miss labs. Attendance and participation in the lab is mandatory. **Missed labs cannot be made up and will result in a score of 0 for that week's participation. See Lab Syllabus for details.**

Grades: There will be three lecture exams and a final cumulative exam. The final exam will count for twice as much as each lecture exam. There will also be 3 quizzes. The average grade of these quizzes will be counted as an additional lecture exam grade. Exams will account for 75% of the course grade. Laboratory participation, lab exams, and lab reports will account for 25% of the grade.

Make up exams: Students can make up exams immediately after the final exam if they have documentation regarding their absence (i.e. doctor's note, court date, death certificate). Missed quizzes cannot be made up.

Grading Scale: A: 93-100; A-: 90-92; B+: 87-89; B: 83-86; B-: 80-82; C+: 77-79; C: 70-76; D: 60-69; F: 59 or below

Final exam schedule: Thursday, December 12 8:00 AM

University rules allow a student to change the time of a final exam if that student has three tests on one day. The regulations read: "Any student having three or more examinations scheduled for the same day will arrange with the instructor to take the 12:00 noon examination or the 7:30 p.m. examination on some other mutually satisfactory date."

This syllabus is subject to change at the discretion of the instructor to accommodate instructional, and/or student needs.

Other Notes and Policies

Special Needs. Students with special needs (e.g. physical handicaps or learning disabilities) who need to make special arrangements should consult me within the first two weeks of the semester. It is the responsibility of any student with a disability who requests a reasonable accommodation to contact the Office of Student Disability Services (915-7128). SDS will then contact the instructor through the student by means of an Instructor Notification of Classroom Accommodations form.

Challenges to Assigned Grades. Challenges to assigned grades will be welcomed in writing. Challenges must be submitted within one week of a graded assignment.

Academic Integrity. Any form of misconduct -- cheating, plagiarism, fabrication -- will not be tolerated and may subject violators to a failing grade in the course.

Incompletes. Incompletes will not be given except in extreme circumstances beyond a student's control.

Withdrawals. The last date for withdrawal is Monday October 7.