

# Biology 314, Spring 2015

## Principles of Molecular Cell Biology

**Prerequisites:** Biol 212

**Objectives and Learning Goals:** During the course of 314, students should:

- Obtain a foundation in cell biology from a molecular perspective
- Develop an appreciation that research in cell biology is ongoing, based on studies of the primary literature and recent secondary sources
- Develop skills in interpretation and analysis of data obtained from experiments in cell biology
- Gain an understanding of cellular and subcellular structure and how it relates to function
- Understand the concept of allostery/allosteric regulation
- Gain knowledge and understanding of the types and functions of small and macromolecules found in cells
- Understand how energy is transferred within biological systems at molecular and cellular scales
- Understand how macromolecules assemble to generate membranes, organelles and whole cells
- Understand the ways in which molecules are transported across membranes, between organelles and into and out of cells.
- Be able to compare and contrast different modes of cell-cell signaling
- Recognize the basic mechanisms of different signaling pathways
- Deduce the consequences of signaling gone awry
- Define the stages of the cell cycle and their major components
- Identify the consequences of mutations in these components (cancer)
- Define the properties of cells and how these properties enable cells to acquire specialized characteristics
- Integrate basic concepts in cell biology to an understanding of how stem cells work
- Integrate basic concepts in cell biology to an understanding of the mechanisms of cancer

**Grading procedure:** The course grade will be based on a) three out of four one-hour exams, each worth 100 points; b) a cumulative final exam worth 100 points; and c) clicker/quiz/homework questions totaling 150 points (75 for each instructor). Clicker questions will be worth 1 point for a correct answer and 0.5 points for an incorrect answer. Students should register clickers in Blackboard by the end of the first week of classes to ensure credit for their clicker answers. The total points for the semester will be 550. Grades will be assigned based on a curve of the total points; **there will be no opportunity to increase your grade at the end of the semester.**

THE FINAL EXAM IS MANDATORY FOR ALL STUDENTS- *including graduating seniors*. All four exams should be taken, but to accommodate students who may have job interviews, personal tragedies, weddings, trips or illness and also the vagaries of winter weather, the lowest score will be dropped. There will be more opportunities to obtain clicker points than there are points available. **NO EARLY or MAKEUP EXAMS or CLICKER QUESTIONS will be given.**

**Blackboard Learn:** A class web site has been set up using Bb Learn. From the ISU home page use the Blackboard link and log in using your ISU username and password. Bb Learn will be used for e-mail communications, quizzes and assignments throughout the semester.

**Exam Schedule:** All exams will be taken at the Online Testing Center. See <http://www.elo.iastate.edu/online-testing-center/> for testing center policies and hours. Only one attempt will be allowed for each exam.

Exam 1: Wed Feb 11<sup>th</sup> – Tues Feb 17<sup>th</sup>

Exam 2: Fri Mar 6<sup>th</sup> – Thurs Mar 12<sup>th</sup>

Exam 3: Tues Apr 7<sup>th</sup> – Mon Apr 13<sup>th</sup>

Exam 4 and Final: Offered during finals week (May 4<sup>th</sup> – May 8<sup>th</sup>)

Note: Due to changes at the Online Testing Center designed to minimize wait times, the final exam is likely to be scheduled for specific dates and times during this week. Please plan on being available through Friday of

finals week to be able to take your exam. There will be an announcement later in the semester regarding the exact details.

**Academic Dishonesty:** The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office.  
<http://www.dso.iastate.edu/ja/academic/misconduct.html>

**Disability Accommodation:** Iowa State University complies with the Americans with Disabilities Act and Sect 504 of the Rehabilitation Act. If you have a disability and anticipate needing accommodations in this course, please contact the instructor within the first two weeks of the semester or as soon as you become aware of your need. Before meeting with the instructor, you will need to obtain a SAAR form with recommendations for accommodations from the [Disability Resources Office](#), located in Room 1076 on the main floor of the Student Services Building. Their telephone number is 515-294-7220 or email [disabilityresources@iastate.edu](mailto:disabilityresources@iastate.edu). Retroactive requests for accommodations will not be honored.

**Dead Week:** This class follows the Iowa State University Dead Week policy as noted in section 10.6.4 of the Faculty Handbook <http://www.provost.iastate.edu/resources/faculty-handbook> .

**Harassment and Discrimination:** Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact his/her instructor, [Student Assistance](#) at 515-294-1020 or email [dso-sas@iastate.edu](mailto:dso-sas@iastate.edu), or the [Office of Equal Opportunity and Compliance](#) at 515-294-7612.

**Religious Accommodation:** If an academic or work requirement conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the [Dean of Students Office](#) or the [Office of Equal Opportunity and Compliance](#).

**Contact Information:** If you are experiencing, or have experienced, a problem with any of the above issues, email [academicissues@iastate.edu](mailto:academicissues@iastate.edu).

## Biology 313, Spring 2015

### Class Schedule

<u>Schedule</u>	<u>Readings</u>
Jan. 12	Overview
Jan. 14	Ch 1 Introduction to Cells
Jan. 16	Ch 2 Molecules in Cells
Jan. 19	HOLIDAY – no class
Jan. 21	Ch 2 Molecules in Cells
Jan. 23	Ch 3 Energy, Catalysis and Biosynthesis
Jan. 26	Ch 3 Energy, Catalysis and Biosynthesis
Jan. 28	Ch 4 Protein Structure and Function
Jan. 30	Ch 4 Protein Structure and Function
Feb. 2	Ch 4 Protein Structure and Function
Feb. 4	Ch 11 Membrane Structure
Feb. 6	Ch 11 Membrane Structure
Feb. 9	<i>review for Exam I</i>
Feb. 11	Ch 12 Membrane Transport: transporters
Feb. 13	Ch 12 Membrane Transport: ion channels
Feb. 16	Ch 12 Membrane Transport: nerve cells
Feb. 18	<i>paper discussion</i>
Feb. 20	Ch 15 Intracellular compartments and protein sorting
Feb. 23	Ch 15 Intracellular compartments and protein sorting
Feb. 25	Ch 15 Intracellular compartments and protein sorting
Feb. 27	Ch 15 Vesicular transport/secretory and endocytic pathways
Mar. 2	Ch 15 Vesicular transport/secretory and endocytic pathways
Mar. 4	<i>review for Exam II</i>
Mar. 6	Ch 16 Cell communication: Overview and key players
Mar. 9	Ch 16 Signaling pathways: Ion channel linked receptors & steroids
Mar. 11	Ch 16 Signaling pathways: G-protein linked receptors
Mar. 13	Ch 16 Signaling pathways: Enzyme-linked receptors
Mar. 16-20	SPRING BREAK
Mar. 23	Ch 17 The cytoskeleton: Intermediate filaments and MTs
Mar. 25	Ch 17 The cytoskeleton: Motors and actin filaments
Mar. 27	Ch 17 The cytoskeleton: Cell movement & muscle contraction
Mar. 30	Ch 18 Cell-cycle: Overview
Apr. 1	Ch 18 Cell division: S phase & M phase
Apr. 3	Ch 18 Cell division: M phase and cytokinesis
Apr. 6	<i>review for Exam III</i>
Apr. 8	Ch 18 Cell death
Apr. 10	Ch 20 Extracellular matrix and connective tissue
Apr. 13	Ch 20 Cell-cell junctions
Apr. 15	Ch 20 Properties of stem cells
Apr. 17	Ch 20 Stem cells II
Apr. 20	<i>Stem cell paper</i>
Apr. 22	Ch 20 CancerI: Oncogenes
Apr. 24	Ch 20 CancerII: Tumor suppressors
Apr. 27	Ch 20 Cancer III: Lessons from colon cancer
Apr. 29	<i>Catch up and review</i>
May 1	<i>review for Exam IV</i>
May 4 – 8	<i>EXAM IV and Cumulative FINAL</i>