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BIOB 260.01B: Cellular and Molecular Biology

Laurie A. Minns

University of Montana, Missoula, laurie.minns@mso.umt.edu

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BIOB 260 Syllabus Summer 2020

Cellular and Molecular Biology

Course Information:

Instructor: Laurie Minns, PhD
Office: 106 Bio Research Building
Phone: 406-243-6013
Office Hours: by appointment
Email: Laurie.Minns@mso.umt.edu
Class Meetings: Mondays 8:30-am-10am (required on attendance through Zoom)
AND asynchronous/online activities

General Course Information:

This class will focus on the analytical exploration of the structure and function of the cell, the fundamental unit of life, with an emphasis on energy transformations and information flow. Topics include molecular building blocks, membranes, organelles, and mechanisms of replication, gene expression, metabolism, signal transduction, cell birth, cell death, and cell differentiation.

Prerequisites: BIOB160, or BCH 110/111 or B- or higher in BIOH112 and either CHY 123 or CHY143.

Course Goals:

Upon successful completion of this course, you will have a more specific knowledge of cellular and subcellular biology including the relationship between intracellular organelle form and function, molecular building blocks, membranes, the central dogma, metabolism, signal transduction and the regulation of the cell cycle.

Course Objectives:

- 1) Discuss the role of the plasma membrane and its selective permeability.
 - 2) Describe macromolecules and their role in metabolism.
 - 3) Describe intracellular mechanisms that control cellular homeostasis.
 - 4) Describe the central dogma and how it relates to cellular proliferation, differentiation and regulation.
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Course outcomes:

- 1) Demonstrate understanding of cellular and subcellular biological principles and knowledge.
- 2) Understand and analyze cellular processes governing development, growth and normal function of eukaryotic cells.
- 3) Describe the steps of DNA replication, mRNA transcription and translation and how they are controlled to regulate gene expression.
- 4) Describe the functions of various intracellular organelle and structural proteins.
- 5) Differentiate between mitosis and meiosis and describe the mechanism of regulation of each type of cellular division.
- 6) Distinguish prokaryotic transcriptional regulation from eukaryotic transcriptional regulation.

- 7) Practice the scientific method by making predictions, performing biological experiments and interpreting results, and determining the potential biological consequences.

Course Information:

Teaching methods: Lecture and Discussion

Student Responsibilities:

- 1) Students are expected to complete the required reading and assignments prior to class meeting times.
- 2) Students are expected to log on to the course Moodle site regularly to download course materials and read updated course announcements.
- 3) Regular attendance in lectures and discussion is strongly recommended for successful completion of the course.
- 4) If absence from lecture or discussion is necessary due to illness, it is your responsibility to obtain notes from another student.
- 5) Students are expected to be respectful during all course meetings and during meetings with course staff and Dr. Minns. Students who fail to do so will be subject to the student conduct code.

Required Course Materials Information:

Essential Cell Biology, 5th Ed. Alberts. et al., 2019 Norton and Company.
ww.norton.com ISBN 9780393679533

Computers and Course Website Information

Students are expected to be familiar with computers and the Internet. Students are responsible for their own software and computer equipment maintenance and setup as recommended by the University of Montana.

<http://umonline.umt.edu/student-support.php>

Class-Specific Computer and Software Requirements:

- Students will complete activities in the University of Montana Moodle BIOB260 course website. Students are expected to have a 'back up plan' if personal computers become compromised.
- The University of Montana maintains several computer labs on campus:
<http://www.umt.edu/it/support/computerlabs/default.php>
- Students are expected to download copies of course information from the Moodle website and to check email for class announcements.
- For technical support for using Moodle, please contact UM IT support:

<http://www.umt.edu/it/support/default.php>

Course Policies

Dr. Minns and the Laboratory Instructors follow academic policies as stated in the [2019-2020 UM Catalog](#). Students are responsible for being familiar with these policies.

These policies include but are not limited to:

- Student Conduct (http://life.umt.edu/vpsa/student_conduct.php)
- Class attendance
- Credit/No Credit Grading

- No more than 18 CR credits may be counted toward graduation. Courses taken to satisfy General Education Requirements must be taken for traditional letter grade. Courses required for the student's major or minor must be taken for traditional letter grade, except at the discretion of the department concerned.
- A CR is given for work deserving credit (A through D-) and an NCR for work of failing quality (F). CR and NCR grades do not affect grade point averages. The grades of CR and NCR are not defined in terms of their relationship to traditional grades for graduate course work.
- Election of the credit/no credit option must be indicated at registration time or within the first 15 class days on CyberBear. After the fifteenth day, but prior to the end of the 30th day of instruction, an undergraduate student may change a credit/no credit enrollment to an enrollment under the A F grade system, or the reverse by means of a drop/add form.
- The University cautions students that many graduate and professional schools and some employers do not recognize non traditional grades (i.e., those other than A through F) or may discriminate against students who use the credit/no credit option for many courses. Moreover, students are cautioned that some degree programs may have different requirements regarding CR/NCR credits, as stipulated in the catalog.
- Audit
- Incomplete Grading Policy

Plagiarism

- Plagiarism is the representing of another's work as one's own. It is a particularly intolerable offense in the academic community and is strictly forbidden. Students who plagiarize may fail the course and may be remanded to Academic Court for possible suspension or expulsion. (See Student Conduct Code section of this catalog.)
- Students must always be very careful to acknowledge any kind of borrowing that is included in their work. This means not only borrowed wording but also ideas. Acknowledgment of whatever is not one's own original work is the proper and honest use of sources. Failure to acknowledge whatever is not one's own original work is plagiarism.

Students with Disabilities:

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, [and Disability Services for Students](#). If you think you may have a disability adversely affecting your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommason Center 154 or 406.243.2243. I will work with you and Disability Services to provide an appropriate modification.

Cell Phones and other electronic devices

The use of cell phones and other electronic devices (including cameras, video recorders) is STRICTLY prohibited during all class times, including examinations.

Disruptive behavior

Students who are being disruptive in lecture by talking, texting or playing computer games will be asked to leave the classroom. Such behaviors impact the learning of other students in the classroom and will not be tolerated. Re-admittance to class is at the

discretion of the instructor. Students are expected to be ON TIME to all class meetings. If students arrive late to class and miss a quiz, that quiz cannot be made up. If students arrive late to group work activities will result in a deduction of points earned in that activity. These lost points CANNOT be made up.

Evaluation Methods:

Your course grade will be determined by your performance in the lecture as well as during mandatory discussion/final project group work that will take place during live synchronous sessions on Mondays according to the following evaluation methods:

Grading System:

Final Grades will be based upon a total of 580 points.

Activity	# of points
Lecture exam 1	100
Lecture exam 2	100
Lecture exam 3	100
Online homework	180
In-class activities:	100
Group Project Computer work (4*15pts each)	
Group Final Project presentation (20 pts)	
Group project peer-feedback (20 pts)	
Total	580

Grades will be calculated based upon the following system:	
Grade	Percent of Total Points
A	94-100%
A-	90-93%
B+	87-89%
B	84-86%
B-	80-83%
C+	77-79%
C	74-76%
C-	70-73%
D+	67-69%
D	64-66%
D-	60-63%
F	59% and Below

Make-up Examinations

- o Make up exams are NOT available. Students must complete the exam by the required deadline. An exception can be made in the case of a documented extenuating circumstance.

Correspondence

An official UM student email address must be used for all correspondence.

Late Work and Makeup Work Policy

Late work is not accepted. Make up work is not accepted for missed in-class activities. Group work discussion activities and in-class CANNOT be made up for any reason.

Group Work Policy

All team members are expected to contribute productively to the final project. Each group member will provide feedback on other group member's contributions equal to 20% of the in-class activity grade. Group work ground rules:

1. Come on time and prepared to work.
2. Communicate professionally in all correspondence.
3. Ask question if you are confused or want clarification.
4. Absolutely no side conversations or cell phone use during in-class assignments; computers are provided so that you can access important databases.
5. Working on 'other' non BIOB260 group project work will result in a 0 for that week's group assignment.
6. Be reliable. If you had a task assigned to you for your group previously, make sure you come prepared to present your completed work and discuss that task.
7. Use credible evidence! I will provide you with several resources to help you along this group project journey. Your textbook will also be an important resource.
8. Determine the strengths and weaknesses of your group and assign tasks accordingly.
9. Do not complain to me about your other group members. Try to work things out with each other first. You will have an opportunity to grade your group members at the end of the semester. Remember, working together effectively is worth 20% of the in-class activity grade.
10. Do not leave early- there is always something you can find to make your final project even better!!!

Important Dates and Assigned Readings (this may be amended by Dr. Minns during the Semester)

Lecture Schedule

Day of the Week	Dates	Topics	Readings Reading Quizzes	Group Project	Other Activities
Week 1	May 11-17	<ul style="list-style-type: none">• Cells: The fundamental Unit of Life• Chemical Components of Cells• DNA and	Chapter 1 Chapter 2 Chapter 5	Introduction to group projects/group assignments	

		Chromosomes			
Week 2	May 18-24	<ul style="list-style-type: none"> • Protein Structure and Function • Energy, catalysis and biosynthesis • DNA replication, repair and recombination 	Chapter 4 Chapter 3 Chapter 6	Part 1: May 18 Genomes and designing primers	Exam 1 due May 24 (Chap. 1-6)
Week 3	May 25-31	<ul style="list-style-type: none"> • From DNA to protein: how cells read the genome • Control of Gene expression • How Genes and Genomes evolve 	Chapter 7 Chapter 8 Chapter 9	No live session due to Memorial Day	Pre-Assignment Discussion of (hou Paper): due 11:59pm T 5/27/2020
Week 4	June 1-7	<ul style="list-style-type: none"> • Modern recombinant DNA technology • Membrane Structure • Membrane Transport 	Chapter 10 Chapter 11 Chapter 12	June 1: Origins of the novel coronavirus (Pine.Bio)	Exam 2 due June 7 (Chap. 7-12)
Week 5	June 8-14	<ul style="list-style-type: none"> • Energy generation in mitochondria and chloroplasts • Intracellular compartments and protein transport • Cell signaling 	Chapter 14 Chapter 15 Chapter 16	Jun 8: Covid-19 Pathogenesis (Pine.Bio)	
Week 6	June 15-21	<ul style="list-style-type: none"> • Cellular Division and the cell Cycle • Sexual reproduction and the power of genetics • Cell communities: tissues, stem cells and cancer 	Chapter 18 Chapter 19 Chapter 20	June 15: Group Project Presentation	Exam 3 due June 21 (Chap.14, 15, 16, 18, 19, 20 and group projects)