

Spring 2013 Syllabus BIO 4500 Cell Biology (4 credits)

COURSE DESCRIPTION: Cell biology is the organization and function of cellular structures in animal, plant, and microbial systems. Emphasis on the molecular basis of metabolism, transport, mobility, nerve conduction, and the cell cycle.

COURSE GOALS AND OBJECTIVES: Cell biology is an important course for practically anyone who wants a career in biology, be it in medicine or research. At the end of this course you will have obtained a greater understanding (and appreciation) of cell biology. By the end of the course students will have learned:

- How organisms obtain energy
- The assembly, structure and function of proteins, DNA, RNA and membranes
- How proteins are sorted
- How cells communicate
- The structure and function of the cytoplasm
- How cells divide and how cell division is regulated
- The basics of the immune system
- Understanding common experimental tools used in cell biology

These goals support the Department of Biology Education Outcome #1, #3 and #4 and VSU General Education Outcome #5.

PREREQUISITES: BIOL1107, BIOL1108, BIOL3200, CHEM1211, CHEM1212

INSTRUCTOR: Dr. Theresa Grove
Office: BC 1099 Lab: BC 2080
Phone: 333-5336
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OFFICE HOURS: Monday 11:00 a.m. -12:00 p.m.
Friday 9:00-11:00 a.m.
Or by appointment

TEXT BOOK: Molecular Biology of the Cell by Alberts *et al.* (2008) 5th ed. (ISBN978-0-8153)

LECTURES: Monday and Wednesday 8:00-10:50 a.m.

LAB: Section A: T/Th 8:00-10:50 a.m.
Section B: T/Th 2:00- 4:50 p.m.

ATTENDANCE POLICY: Attendance to both lecture and lab is required. If you miss a lecture or lab I reserve the right to determine what constitutes an excused or unexcused absence. To name a couple of examples of unexcused absences, scheduled appointments or leaving town, except for University related activities (e.g. you are on a sports team or are presenting at a conference), do not constitute excused absences. "Not feeling well" will only work one time as an excused absence; any additional "not feeling well" absences will be counted as unexcused.

Quizzes and in-class assignments will be given throughout the semester, which is why attendance is required. Generally, quizzes or in-class assignments in lecture cannot be made up if

lecture is missed. If you missed the lecture and I approved your absence the total number of points possible to you will be reduced. If you missed quizzes and/or in-class lecture assignments and I did not approve the absence a zero will be given for that particular assignment, quiz, etc.

Labs cannot be made up; therefore do not miss a lab. I also reserve the right to determine what constitutes an excused absence from lab. If you miss 2 labs (excused or unexcused) you will not be able to earn higher than a C for your final grade. If you miss 3 labs, you cannot earn higher than a D. If you miss more than 3 labs you will earn an F for the course.

CONDUCT: Arrive on time to lecture and lab. If it seems like there is a significant number of students arriving late to lecture and/or lab, I will start locking doors at 5 minutes after the scheduled start time, and the door will not be opened for any late arrivers. Turn off cell phones during lecture and lab; there is no reason you should be texting or calling anyone. Don't talk during lecture; if you don't understand something or didn't hear something ask. Unless it's an emergency (and texting does not constitute an emergency) do not get up in the middle of lecture, leave and come back. Do not to ask to get up and leave the room during an exam, unless it is an emergency.

EXAMS: There will be 4 in-class exams (excluding the cumulative final). Types of questions that may be included in the exams are fill in the blank, essay, short answer, matching, multiple choice, and multiple-multiple choice. Do not miss any in class exams. You will be able to drop the lowest regular exam grade; however the final will not be dropped.

LAB: Lab exercises will be available on Blazeview or will be handed out in class prior to the lab period. It is your responsibility to read them before coming to lab. Short quizzes will be given during the lab and will be based on the previous week's lab and the objectives of the current week's lab. The quizzes will be handed out immediately at the start of the lab and will be collected ~10 minutes later. If you arrive late you will have a shorter amount of time to finish the quiz, and if you arrive after the quiz is collected you will receive a zero (0) for that quiz. As mentioned previously, a student will not be able to make up a lab.

LAB RULES AND REGULATIONS: Use common sense when working in the lab, and if you have any questions, ask!

- Bring a notebook to lab to write down your data.
- Read the lab handouts ahead of time so that you have some idea of what will be going on in the lab.
- Be on time for lab. Instructions, clarifications and changes in protocols will be given at the beginning of lab, and I will not repeat myself just because you are late.
- No eating or drinking in the lab at any time. Some of the chemicals we will be using are toxic or mutagenic.
- Clean up after yourself. Remove all labels/tape from the glassware, rinse and place in the tub by the sink.
- If you break something or think you may have broken something, please tell me. Accidents happen. It's a bigger problem if you do not tell me because I won't be able to fix or replace whatever is non-functional. If you have any questions about using a piece of equipment, it's always better to ask.

HOMEWORK: Homework problem sets and questions will be handed out periodically throughout the semester. No late homework assignments will be accepted. Emailed homework will not be accepted.

PRIMARY RESEARCH ARTICLES: Throughout the semester recent scientific articles will be handed out. Students will be required to read the articles and answer questions about the research, which will

be turned as assignments. We will discuss these papers in class, and students will be asked to explain figures in the results, the purpose of the research and the hypothesis being tested, and the final conclusions drawn from the data.

FINAL EXAM: The final exam is cumulative and is NOT optional. Because this class is not following the normal semester schedule, the final will be tentatively scheduled for Monday, March 4 at 8:00 a.m. and will not be held during the regularly scheduled finals.

GRADE SCALE: For all students, grades will be based on all exams and assignments. The grading scale is:

A	90-100%
B	80-89
C	70-79
D	60-69
F	<60

ASSESSMENTS: Grades will be based on:

Exams (3 at 100 points each)	300 points
Lab Quizzes (~10 at ~10 points each)	~100 points
Lab Report (More information to follow)	50 points
Final Exam	100 points
Other Assignments	~50 points
Total: ~600 points	

ACCESS OFFICE FOR STUDENTS WITH DISABILITIES: If you are registered with the Access Office and are eligible for special testing or some other learning process, please be sure to let me know. If you are a student with disabilities and have not registered with the Access Office, please do so and notify me if you intend to use their services. The Access Office is located in Farber Hall-South. The phone numbers are 245-2498 (voice) and 219-1348 (tty).

TENTATIVE LECTURE SCHEDULE Note: this is a VERY tentative schedule and will most likely be adjusted throughout the semester. Below are the chapters that will be covered. A lot of material will be covered over the next two months, and I cannot stress enough that every day you should go over your notes to learn the information presented in lecture.

January

7 Introduction and Chapter 2: Cell Chemistry and Biosynthesis
 9 Chapter 3: Proteins
 Chapter 10: Membrane Structure
 14 Chapter 11: Membrane Transport
 16 Chapter 12: Intracellular Compartments and Protein Sorting
 Chapter 13: Intracellular Vesicular Traffic
 21 *No Class: MLK Day*
 23 *Exam 1 (8:00-9:15 a.m.) over Chapters 1, 2, 3, 10, 11*
 Chapter 14: Energy Conversion—Mitochondria and Chloroplasts
 28 Chapter 4: DNA, Chromosomes and Genomes
 30 Chapter 5: DNA Replication, Repair and Recombination

February

4 *Exam 2 (8:00-9:15 a.m.) over Chapters 12, 13, 14, 4*
 Chapter 6: How Cells Read the Genome
 6 Chapter 7: Control of Gene Expression
 Chapter 15: Mechanisms of Cell Communication
 11 Chapter 16: The Cytoskeleton
 13 Chapter 19: Cell Junctions, Cell Adhesion and the Extracellular Matrix
 18 *Exam 3 (8:00-9:15 a.m.) over Chapters 5, 6, 7, 15, 16*
 Chapter 17: The Cell Cycle
 20 Chapter 18: Apoptosis
 Chapter 20: Cancer
 25 Chapter 25: Adaptive Immune System
 27 *Exam 4 (8:00-9:15 a.m.) over Chapters 19, 17, 18, 20, 25*

TENTATIVE LAB SCHEDULE Note: these lab exercises may change from what is listed below.

January

8 *No lab*
 10 Microscopy Review and Cell Size Determination
 15 Cell Fractionation
 17 Using a hemocytometer and phagocytosis
 22 Mitochondrial Isolation and Analysis
 24 Membrane Permeability
 29 Staining of polytene chromosomes from *Drosophila*
 31 Effects of MS-222 on red blood cell size

February

5 Part I of DNA Lab
 7 Part II of DNA Lab and Part I of Protein lab
 12 Part II Proteins Set up slime mold
 14 Chemotaxis and Movement of the slime mold *Physarum polycephalum* Myofibrillar
 19 Regeneration of Cilia and Flagella and Examination of the Cytoskeleton
 21 Tissue Culture
 26 Hepatocyte Isolation
 28 Morphology of Cancer Cells and Radial Immunodiffusion