**MCB 2210 Course Description**

In this course, we will investigate the structural organization of cells and how these structures are utilized to accomplish the myriad tasks that cells perform. We will look at how cells are constructed and how signal transduction cascades are used to control cellular processes. Cell biology is a dynamic field; it focuses heavily on how things change with time and in response to alterations in the environment. Time-lapse video and animation will be used to help students develop a four-dimensional visualization of these processes. The functions of individual cells will then be related to the interactions of cells in tissues of multicellular organisms and to perturbations of cell function caused by human diseases.

**Block 1:**

**Foundations: Basic organization of cells, some of the methods used to study cells, and a very brief refresher on membranes and proteins**

Introduction: What are cells? What is their basic structure?
What are some of the techniques used to study cells?
Review of membranes and proteins

**Membrane Transport and Introduction to Signal Transduction**

Moving substances across the plasma membrane via transport proteins
Establishing membrane potentials and using them for cellular work
How cells receive external signals, transmit them through the cell, and respond.

**Block 2:**

**Synthesis and targeting of proteins to organelles**

Nucleus, mitochondria, chloroplasts, peroxisomes, and the ER/Golgi.

**Membrane trafficking and the endomembrane system**

Vesicular transport of membranes and proteins; ER to Golgi and beyond. Exocytosis, endocytosis, phagocytosis, lysosomes.

**Block 3:**

**The Cytoskeleton and Cell Dynamics**

Actin, Microtubules, and other Cytoskeletal Elements
Molecular Motor Proteins
Membrane and Organelle Dynamics
Mitosis and Cytokinesis

**Block 4:**

**Specialized Cells and Tissues**

Cell Growth, Cell Cycle, Cell Death
Cell Connections and the Extracellular Matrix
Cell Movement, Motility, and Migration
Specialized Cells, Stem Cells, Pathogen-infected Cells, Cancer Cells

# MCB 2210: CELL BIOLOGY

Lectures M/W/F – 1:25-2:15pm

**Instructor**: Dr. Dave Daggett, david.daggett@uconn.edu
**Office Hours:** By appointment, BPB 302.

**Teaching Assistants & Office Hours**:
The course employs multiple advanced undergraduate teaching assistants (TAs). Between them, they offer many office hours times throughout the week, allowing students ample opportunity to seek help. Attending TA office hours regularly is highly recommended (see Strategy for Success below).

**Exams**: Typically, the course will have 4 "block" exams. These 4 exams will be the basis of your final grade and are thus very important. The format for the exams will be multiple-choice, and they will be held either at the Testing Center in Arjona Hall, or in the lecture classroom. The dates and location of the exams will be announced at the start of the semester - **mark your calendar then**. Except for extenuating circumstances that have been documented by the Dean of Students office or Student Health Services, makeup exams will NOT be given after the exam date! However, you may ask for permission to take a section exam *early* if you know you cannot attend on the scheduled date for a valid reason (i.e. professional interviews; please note that vacations, personal travel plans, graduations, social events, etc. are not valid reasons for rescheduling your exam). These requests will be considered on an individual basis. You must contact the professor prior to the exam regarding any exam-related issues or you will automatically receive a "0" for a missed exam. Students who must miss an exam due to religious observance should request to take the exam early. The University Senate has adopted the policy that "Students anticipating such a conflict should inform their instructor in writing within the first three weeks of the semester, and prior to the anticipated absence, and should take the initiative to work out with the instructor a schedule for making up missed work." The Dean of Students office is in Wilbur Cross Building Rm. 203 (860-486-3426; www.dos.uconn.edu).

**Text Book:** We are neither requiring nor recommending a specific text for this course. We feel that the Lecture Notes we provide (in which we have drawn from and synthesized the best elements of the available texts), together with class attendance and the problem sets will be all that most of you will need. Some of you may still decide that you want to have a textbook. For some students this is a good idea and will help to reinforce information presented in lecture. There is no one perfect book. Each cover most of the core material and each leave out some information we feel is important. Some options are listed here and while not at the Bookstore, are available from Amazon and other sources:

1. If you feel that you need more explanation of concepts, but don't want to get bogged down with too much detail, we suggest Karp's Cell and Molecular Biology: Concepts and Experiments, 8th Edition, ISBN-13: 978-1118886144, or Alberts' Essential Cell Biology, 5th Edition ISBN-13: 978-0393680379

2. If you want more depth and detail, there are several excellent options:
Alberts, Molecular Biology of the Cell, 6th Edition, ISBN-13: 978-0815345244
Lodish, Molecular Cell Biology, 8th Edition, ISBN-13: 978-1-4641-8339-3
Also, earlier editions of the Alberts and Lodish books are available free on-line at http://www.ncbi.nlm.nih.gov/sites/entrez?db=Books&itool=toolbar although the format is not ideal.

**Web Site**: This course uses a HuskyCT website. https://learn.uconn.edu/webapps/portal/frameset.jsp. Students should make extensive use of this resource. The HuskyCT site will contain links to critical announcements, Problem Sets, Animations, Lecture Slides, Exam access and other resources. The posted Lecture Slides allow you to print out a copy prior to class and bring them along. Lecture audio files will also be posted after each class. With all this information available, you will not need to take extensive notes during class. You should pay attention and attempt to understand the concepts while writing supplementary notes to reinforce the outline.

**Problem Sets:** A number of problem sets will be distributed on HuskyCT to accompany the lectures. We strongly suggest that you continuously work through these problem sets, as many of the exam questions will be based on questions from these! (Note that exam questions will not be taken verbatim from the problem sets, they will be modified; trying to simply memorize the problem set question answers will work against you in the exam). By understanding why the right answers are right AND, why the wrong answers are wrong, you will likely be able to answer the exam questions. In other words, MASTER THE PROBLEM SETS AND ALL WILL BE WELL!

**Overall Strategy for Success**: While you will learn many new terms and facts, the course emphasizes concepts and critical scientific thinking. Exams will focus on the material covered in Lecture and Problem Sets, and the Lecture Notes function as your textbook. Since much of the material presented in Lecture is provided in the Lecture Notes, you do not need to take extensive notes during class, aside from points of clarification or emphasis. Lectures are your critical opportunity to follow along attentively and understand the logic of the topics presented. You must then consolidate your understanding by thoroughly reading and reviewing the text and figures in the Lecture Notes, along with any supplemental videos, to help you make sure you can visualize these concepts. **Review the Lecture Notes shortly after class and multiple times during the Exam block, and at the same time, begin to work through the related Problem Sets questions!** Your engagement with the Problem Sets is critical to helping you understand the processes and integrate the information in the way you will be expected to on the Exams. Pay attention to how key experiments were conducted and interpreted. Focus on understanding the processes: many of the terms and details will stick with you because of your extensive Lecture Note reviewing and Problem Set work. Using TA office hours regularly to clarify any gaps in your understanding of the Lecture Notes or Problem Sets along the way is essential.

**Exam Review Sessions** are typically held on the 2 evenings before the Friday exams, with Dr. Daggett running the Thursday evening sessions. These are a great opportunity to ask questions about any topics or Problem Set questions that you still have after working through the materials. Mark these evenings on your calendar!!

**Academic Misconduct Statement:** Academic misconduct in any form is in violation of the University of Connecticut Student Conduct Code and will not be tolerated. This includes, but is not limited to: copying or sharing questions or answers on tests, plagiarism, claiming to have a conflict with the time scheduled for the final if the other exam is not actually occurring during the scheduled time, having someone else take tests for you. Depending on the act, a student could receive an F grade on the test, F grade for the course, or could be suspended or expelled. We take cheating very seriously. DO NOT DO IT.