



BIO 4301 – Cell biology

Fall 2016, Tuesday & Thursday 4:30-5:45 PM

Instructor: Dr. Kevin V. Young
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Office hours: Monday – Thursday (Del Rio) 10:00am – 12:00noon
or by appointment (or online by request)

Required Texts: Cooper, Geoffrey M. and Robert E. Hausman. 2013. The Cell: A Molecular Approach, 6th Edition. Sinauer Associates, Inc. Sunderland, MA 832 pp.

Website: **Blackboard** site for Cell Biology. I post announcements frequently.
<http://sites.sinauer.com/cooper7e> Very useful publisher site!

Student Learning Outcomes: By the end of the semester, each student should be able to:

- Appreciate and understand the dynamic nature of the cell, including how it receives and responds to information from its environment.
- Explain and compare different mechanisms for receptor activation and regulation.
- Understand and explain how membrane chemistry and regulation are essential in cell communication.
- Understand intracellular signaling cascades and their impact on cellular activities, including cytoskeleton rearrangements, motility and changes in gene expression.
- Understand mechanisms of cell cycle regulation.
- Understand how mRNA expression impacts gene expression and cellular outcomes.
- Predict how alterations or given drugs/chemical treatments would impact cellular behavior.
- Communicate clearly in writing understanding of scientific material.
- Have a strong grasp of the vocabulary of cell biology.
- Develop testable hypotheses based on provided information, design experiments to test hypotheses and interpret provided data.

Course Philosophy: I want to use our time together to solidify understanding, not start the learning process. I expect you to come to class having already studied the material, and in class we will quiz each other, do activities, and clarify misunderstandings. My hope is that learning cell biology will be a cooperative effort and that your understanding of the world around you will be forever changed from taking this course.

Tentative Lecture Schedule (Tues/Thurs 4:30-5:45). Exact dates subject to change.

The overall plan: one chapter per class period. Study each chapter before coming to class (I recommend the book *and* the website). In class we will learn through discussion, quizzing, activities, and lecture. After four chapters we will spend one class period reviewing the previous four chapters and asking practice questions. The next class we will have a test, and the following class we will start the process over again: 4 chapters, review, test, 4 chapters, review, test, etc. The final exam will consist of two separate tests: a regular test (covering only 3 chapters this time), and a comprehensive test that will not be part of your grade except that it can replace your lowest test score (if it is higher). Focus on the *process of learning*.

Date	Topic(s)	Readings
Aug. 23	Ch 1: An Overview of Cells and Cell Research	pp 3 –46
Aug. 25	Ch 2: Molecules and Membranes	pp 47 – 80
Aug. 30	Ch 3: Bioenergetics and Metabolism	pp 81 – 110
Sept. 1	Ch 4: Fundamentals of Molecular Biology	pp 111 – 156
Sept. 6	Review Chapters 1-4 for Test I Prep	pp 3 – 156
Sept. 8	EXAM I – Chapters 1 – 4	
Sept. 13	Ch 5: Genomics, Proteomics, and Systems Biology	pp 157 – 184
Sept. 15	Ch 6: Genes and Genomes	pp 185 – 216
Sept. 20	Ch 7: Replication, Maintenance, & Rearrangements of Genomic DNA	pp 217 – 258
Sept. 22	Ch 8: RNA Synthesis and Processing	pp 259 – 316
Sept. 27	Review Chapters 5-8 for Test II Prep	pp 157 – 316
Sept. 29	Exam II – Chapters 5 – 8	
Oct. 4	Ch 9: Protein Synthesis, Processing, and Regulation	pp 317 – 364
Oct. 6	Ch 10: The Nucleus	pp 365 – 396
Oct. 11	Ch 11: Protein Sorting and Transport	pp 397 – 446
Oct. 13	Ch 12: Mitochondria, Chloroplasts, and Peroxisomes	pp 447 – 478
Oct. 18	Review Chapters 9-12 for Test III Prep	pp 317 – 478
Oct. 20	Exam III – Chapters 9 – 12	
Oct. 25	Ch 13: The Cytoskeleton and Cell Movement	pp 479 – 530
Oct. 27	Ch 14: The Plasma Membrane	pp 531 – 570
Nov. 1	Ch 15: Cell Walls, the Extracellular Matrix & Cell Interactions	pp 571 – 598
Nov. 3	Ch 16: Cell Signaling	pp 599 – 650
Nov. 8	Review Chapters 13-16 for Test IV Prep	pp 479 – 650
Nov. 10	Exam IV – Chapters 13 – 16	
Nov. 15	Ch 17: The Cell Cycle	pp 651 – 690
Nov. 17	Ch 18: Cell Death & Cell Renewal	pp 691 – 722
Nov. 22	Ch 19: Cancer	pp 723 – 767
Nov. 24	<i>Thanksgiving Holidays – No Classes</i>	
Nov. 29	Review Chapters 13-16 for Test IV Prep	pp 651 – 767
Dec. 1	Comprehensive Review	pp 3 – 767
Dec. 6	EXAM V – Chapters 17 – 19 + Comprehensive Final	3:00-6:00 PM

NOTE: Exams will be offered on Blackboard and will be taken in a proctored setting in the computer lab for your campus. No lectures are scheduled for exam days, so just go to the computer lab (Uvalde B107; Del Rio 302; Eagle Pass D101; Castroville 113). You will have the opportunity to ask questions for 15 minutes before the exam begins, then you will have one hour to complete the exam.

Grade assessment:

There will be **5 lecture** examinations. Each lecture exams will be worth 100 points. Therefore, there are a total of 500 possible points during this course. On the day of Exam V there will also be a comprehensive final. The comprehensive exam will replace your lowest test score if you do better on it than on one of the previous tests. If you score lower on the comprehensive final than any other test, it will neither help you nor hurt you.

<i>Total points</i>	<i>Percent</i>	<i>Letter Grade</i>
450 – 500	90 – 100%	A
400 – 449	80 – 89.9%	B
350 – 399	70 – 79.9%	C
300 – 349	60 – 69.9%	D
299 or less	< 60%	F

Note: Test scores are only one measurement of learning, and I reserve the right to include other indications of learning into your grade, such as short writing assignments, data analysis, thoughtful participation in class, etc.

Americans with Disabilities Act (ADA):

Sul Ross State University is committed to equal access in compliance with the Americans with Disabilities Act of 1973. It is the student's responsibility to initiate a request for accessibility services. Students seeking accessibility services must contact Mary Schwartze, M. Ed., L.P.C., in Counseling and Accessibility Services, Ferguson Hall, Room 112. The mailing address is P.O. Box C-122, Sul Ross State University, Alpine, Texas 79832. Telephone: 432-837-8691. E-mail: mschwartz@sulross.edu

Academic Honesty:

Cheating will not be tolerated. The University expects all students to engage in all academic pursuits in a manner that is above reproach and to maintain complete honesty and integrity in the academic experiences both in and out of the classroom. "Cheating" includes, but is not limited to:

- Copying from another student's test paper, a laboratory report, other report, or computer files, data listings, and/or programs.
- Using, during a test, materials not authorized by the person giving the test.
- Collaborating, without authorization, with another person during an examination or in preparing academic work.
- Knowingly, and without authorization, using, buying, selling, stealing, transporting, soliciting, copying, or possessing, in whole or in part, the contents of an unadministered test.
- Substituting for another student; permitting any other person; or otherwise assisting any other person to substitute for oneself or for another student in the taking of an examination or test or the preparation of academic work to be submitted for academic credit.
- Bribing another person to obtain an unadministered test or information about an unadministered test.
- Purchasing, or otherwise acquiring and submitting as one's own work any research paper or other writing assignment prepared by an individual or firm. This section does not apply to the typing of the rough and/or final versions of an assignment by a professional typist.
- Plagiarism: using another's work and claiming it as your own. To avoid plagiarism, make sure you always use your own words to construct your written answers, and cite your sources.

Is education defined as something you can spit back on a test by staying up all night? Is that education? Or is it defined by what you remember after a year? Nobody's going to give much importance to what you memorized and then forgot.

~Dr. Bruce Alberts, past president of National Academy of Sciences

Some Study Tips:

Everyone has their own unique way of learning. How you study (the process) will have a huge impact on how well you understand and remember. Your target is to learn an entire chapter's worth of material (as much as 50 pages!) in a single study session. If you use all the resources available to you and take an active role in the learning process you will likely do much better.

Some specific tips are:

- Think about what it will take for you to learn 50 pages of difficult material. Make a plan, focusing on the process you intend to follow.
- Identify the obstacles that you anticipate ahead of time, and think of ways to get around those obstacles.
 - Think about the root cause of the obstacles and how to eliminate or avoid the cause of the problems, instead of just coming up with ways to solve the same problems over and over.
- Put your plan into action and evaluate how well it works.
- Make small adjustments to your plan, trying to measure the effect of just changing one thing at a time.
- Study all the assigned reading AHEAD of class. Make as much sense of the material as possible, and make specific notes of what you do and do not understand. Pay attention to how you go through the chapter so you can try experiments that involve changing one thing at a time.
- As you study, rephrase the material in the form of questions. We will quiz each other in class, so write down your questions along with what you consider to be the correct answer.
- Participate actively in class by asking questions, taking notes, and working in small groups.
- Review the class notes and make an outline summary of the topics. At the end of class turn in a paper describing which are your strongest areas for that chapter.
- The book's website has many helpful materials—I recommend using it.
- Develop an attitude of cooperation rather than competition. We want each student to succeed to the best of his or her abilities and circumstances.
- Stop being embarrassed. Don't make me discover what you don't understand—just tell me. Ask questions! Answer questions! The more we hear about others misunderstandings, the more we will all learn.
- Establish routines of continuous improvement via experimentation (improve your processes)

Although we will cover mountains of facts in this class, and although we will be learning vocabulary as though this was a language class, I am more concerned with you *becoming better learners* and learning the *process of science*. Every day you will be faced with an almost-overwhelming amount of complex new material, and I want to help you develop, improve, and adapt your own processes so you become continually better at working through and making sense of new information. I want you to work as a team, helping, pushing, and encouraging each other.

How much better are you now at the process of learning compared to last year? By the time you finish this class you will know you are a much better learner and you will have more confidence to face future challenges!