

Bio 311C provides an introduction to biological macromolecules, cell structure and function, energy transformation (including major features of cellular respiration and photosynthesis), and the molecular biology of inheritance and cell division. This course is designed for science majors and pre-health profession students but is open to all meeting the **prerequisite**, which is credit for, or concurrent registration in, Chemistry 301.

University Core Curriculum Objectives: This course can fulfill 3 hours in the natural science and technology component of the university core curriculum, and addresses the following four core objectives established by the Texas Higher Education Coordinating Board: communication skills, critical thinking, teamwork, and empirical and quantitative skills.

Instructor: David Herrin, Dept of Molecular Biosciences, herrin@utexas.edu, 471-3843 (office), Campus mail code: A6700. Office: PAI 2.24; Office hours: Tu 1-2, Fri 2-4.

Lecture Class Meetings: MWF 12:00-12:50 pm in WCH 1.120

Discussion Section Instructors: Bikash Shrestha (b.shrestha@utexas.edu) and TBA (to be announced). Also, office hours for both to be announced.

Discussion Section meetings by unique number:

48510 Th 8:00-9:00 am GDC 6.202
48515 Th 9:00-10:00 am JES A303A
48520 Th 1:00-2:00 pm WEL 3.402
48525 Th 2:00-3:00 pm JES A217A
48530 W 3:00-4:00 pm BIO 301
48535 W 4:00-5:00 pm BIO 301

Course Materials and Resources

Required Textbook: *Campbell Biology*, 10th edition, 2014 (authors: Reece, Urry, Cain, *et al.*). There are assigned sections for reading (preferably before the lecture). The textbook should also come with an online resource called “MasteringBiology”, which has study aids, although usage of it is not required.

Required Technology: We will use **Squarecap** in class for taking attendance and posing questions. You can access it on a laptop, tablet or cell phone (though many people have more trouble with it on a phone). There will be an instructional handout posted on Canvas on using **Squarecap**; I believe it may cost up to \$10.00 to sign up.

Required Lectures: The Canvas Site (<https://canvas.utexas.edu/>) for this course is also essential as it will have the lecture slides (in modules), exam scores, learning strategies, Discussion materials, etc. I will endeavor to post the lecture slides to Canvas at least 2 nights before the lecture. **The lecture slides are in powerpoint format, and you will want to preview them and bring them to class.** Since most of the slides do not have to be in color to be understood, you can print them out as black-on-white laser copies as follows: in powerpoint, they usually print with a white background if you select “Handouts” from the “Print” menu, and then select “Pure black and white” from the “Color/Grayscale” menu. In some cases, you may have to select “Grayscale” to get everything on the slide to print in a black-on-white format. You can also select the number of slides to be printed on each page, but I **strongly suggest** printing only 2 slides per page, so you will be able to read all of the text and labels.

Required Discussion materials: You will do practice quizzes and worksheets in Discussion and turn them into the TA, who will provide them.

Optional: There is a Course Transformation Program student resource web site for Bio 311C: <http://bio311.biosci.utexas.edu/>, which covers most of the topics we will cover.

Course grading system

The course grade is based mostly on 3 exams, 2 mid-terms and 1 comprehensive final. In addition, there will be points awarded for lecture attendance, and participation in Discussion (in the form of practice quizzes and worksheets). There will be 3 mid-term exams administered, and the lowest one will be dropped. ***There will be no scheduled make-up exams; if you miss a mid-term exam that becomes the one that is dropped.***

The points breakdown is as follows:

2 Mid-term Exams (100 points ea)	= 200 pts	(55.6%)
1 Final Exam	= 130 pts	(36%)
Lecture attendance	= 16 pts	(4.4%)
Discussion quizzes/worksheets	= 14 pts	(3.9%)
Total = 360 pts = 100%		

Your final % score will be converted to a letter grade according to the following scale:

A = 93% and above, A- = 90-92.9, B+ = 87-89.9, B = 83-86.9, B- = 80-82.9, C+ = 76-79.9, C = 72-75.9, C- = 68-71.9, D+ = 62-67.9, D = 55-61.9, D- = 50-54.9, F <50%)

Exams: The mid-term exams and the final exam will be objective tests that are computer-graded, and in the format of classic multiple-choice (MC) questions, as well as true-false, matching, fill-in-the blank and identification questions in the MC format. Sample tests (from last year) will be posted on Canvas. The exams are based on the material covered in the lectures - which mostly aligns with the textbook - and reinforced in discussion. One or more of the exam scores may be adjusted by an upward adjustment (on all the tests) at the Instructor's discretion. The exam scores will be uploaded to Canvas. The answer sheets will be handed back in Discussion sections, where the TA will also go over the test.

Lecture attendance: Points will be awarded according to the following scale of lecture attendance: 95-100% attendance = 16, 85-94% = 12, 75-84% = 8, 65-74% = 4, 55-64% = 2, < 55% = 0.

Other Resources

- **Residence Hall Study Groups:** The College of Natural Sciences Residence Hall Study Group Program (<http://cns.utexas.edu/students/support/residential-halls-study-groups>) provides *free* academic support for students enrolled in BIO 311C/311D through study group facilitation and help from experienced students. Go to Jester City Limits or Kinsolving dining room on Sunday through Thursday evenings to study with your classmates and to get help.
- **UT Sanger Learning & Career Center** (JES A115) offers free drop-in tutoring, workshops, and career advising, and one-on-one tutoring is also available. The Center has a very helpful staff, peer mentors, and many online resources (<http://lifelearning.utexas.edu/>).
- **Special Needs:** If you have special learning or testing needs, the University provides appropriate accommodations for students with documented disabilities. Please contact the Dean of Students office (SSB 4.104, 471-6259, TTY 471-4641) and visit <http://www.utexas.edu/diversity/ddce/ssd/>

Excused Absences (other than exams)

Written documentation is required if you miss lecture or discussion for a legitimate reason (e.g., illness or required school-related travel) and you want consideration for the missed points.

Religious holy days sometimes conflict with class and examination schedules. UT Austin policy states that a student must notify the instructor at least 14 days prior to such an absence.

Scholastic Dishonesty (don't do it, it ain't worth it)

All written work is expected to be the student's own individual work. Cheating will not be tolerated. See UT's academic integrity policy: http://deanofstudents.utexas.edu/sjs/acint_student.php

Classroom courtesy: Please help us all concentrate on learning biology in the classroom: kindly turn off your cell phone notifications; avoid surfing and texting; minimize distracting conversation; and avoid late arrivals. Thank you very much - your classmates and your instructors will appreciate it!

Lecture Topics and Exam Schedule

Dates	Tentative list of topics*	Readings in Campbell/10e
Jan 20,23	Introduction, Elements and Bonds	1.1, 1.2, Chap 2
Jan 25, 27	Water and Carbon	Chaps 3 and 4
Jan 30, Feb 1,3,6	Large Biological Molecules	Chap 5
Feb 8,10	Prokaryotic Cells	27.1-27.3
Feb 13	Exam Review	
<u>Feb 15</u>	<u>Exam 1 (covers from Jan 20-Feb 13)</u>	
Feb 17,20	Eukaryotic Cells	Chap 6
Feb 22,24	Membrane Structure and Function	Chap 7
Feb 27, Mar 1,3	Energy transformation, ATP, Enzymes	Chap 8
Mar 6,8,10	Cellular Respiration and Fermentation	Chap 9
Mar 13-17	Spring Break	
Mar 20	Exam Review	
<u>Mar 22</u>	<u>Exam 2 (covers from Feb 17-Mar 20)</u>	
Mar 24,27,29,31	Photosynthesis	Chap 10
Apr 3,5	Cell Communication	11.1-11.4, 12.3
Apr 7,10	DNA Replication and Repair	12.1, Chap 16
Apr 12,14,17	Gene Expression	Chap 17
Apr 19	Exam Review	
<u>Apr 21</u>	<u>Exam 3 (covers from Mar 24-Apr 17)</u>	
Apr 24,26,28	Gene Regulation in Prokaryotes and Eukaryotes	Chap 18
May 1,3	Mitosis and Meiosis	12.2-12.3, Chap 13
May 5	Course wrap-up/review	
May 12 (2 pm)	Final Exam (comprehensive, but 1/3 on material from Apr 24-May 5)	

* Exam dates are set, but the schedule for each topic is approximate

Other significant date: Last day to drop the class (with Dean's approval) is Monday April 3.

BIOLOGY 311C

INTRODUCTORY BIOLOGY I

Introduction to structure & function, energy flow, and the transmission & expression of genetic information in living systems.



BIG IDEA I

STRUCTURE RELATES TO FUNCTION

- 1 **Biological Hierarchy:** Biological systems are structured at many interrelated levels.
- 2 **Chemistry for Biology:** The structure and properties of chemicals determine the behavior and functions of molecules in organisms.
- 3 **Biological Molecules:** Cell components and cells are made up of biological molecules with specific chemical properties.
- 4 **Origin of Life:** The first living cells originated by chemical evolution in pre-biotic earth.
- 5 **Cell Structure:** The structure of cells has evolved to perform a variety of essential functions.
- 6 **Biological Membrane:** Cell membranes are selectively permeable barriers.
- 7 **Cell Communication:** Cells communicate with each other and can convert environmental signals to complex integrated responses within a cell.



BIG IDEA II

ENERGY IS TRANSFORMED
TO SUSTAIN LIVING SYSTEMS

- 8 **Metabolism:** Energy transfer and transformation is critical to all aspects of biology from cells to ecosystems.
- 9 **Respiration:** Organic molecules are broken down in cellular respiration to make ATP.
- 10 **Photosynthesis:** Light energy is harnessed into chemical bond energy of organic molecules in photosynthesis.



BIG IDEA III

GENETIC INFORMATION IS
EXPRESSED AND TRANSMITTED

- 11 **DNA Structure & Replication:** DNA is the molecule of heredity in all organisms.
- 12 **Transcription & Translation:** Genetic information flows from DNA to RNA to protein.
- 13 **Gene Regulation:** Cells can regulate gene expression at many points during the process.
- 14 **Recombinant DNA:** Scientists utilize knowledge of gene structure and regulation to express modified genes.
- 15 **Cell Cycle:** Mitosis is essential for growth, development and reproduction of somatic cells.
- 16 **Meiosis:** Meiotic cell division leads to gamete formation, generates genetic variability and transmits alleles from one generation to the next.

CORE COMPETENCIES

CONTENT INDEPENDENT

A

Ability to apply the process of science, by practicing observation, hypothesis testing, and experimental design.

B

Ability to use quantitative reasoning, in data analysis and interpretation.

C

Ability to use modeling and simulation in a systems biology approach.

D

Ability to communicate and collaborate with other disciplines.

E

Ability to understand the relationship between science and society.