

***INTRODUCTION TO BIOLOGY I  
BIO 311C***

**Uniques: 89815, 89820**

**Class meetings: 10 to 11.20 am in PAI 2.48**

**Lecturer: Dr. Anita Latham**

**Office: PAI 1.22B**

**Office Hours: Tue and Wed 11.30 am to 1 pm (or by appointment)**

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**The best way to contact us outside of class time and office hours is by email.**

**Course description:** 311C is designed for majors in biological sciences, and for others if required by their departmental programs. This course covers major concepts in biological chemistry, cellular organization, metabolism, cell cycle, gene expression, gene regulation, recombinant DNA and stem cells.

**Prerequisites:** You must have already completed with a grade of at least a C or be registered for CH 301 or equivalent chemistry course. If you do not meet this requirement, you will be automatically dropped from this class.

**Required Textbook:** *Biology* by NA Campbell and JB Reece. Benjamin Cummings, 8<sup>th</sup> edition. The book comes with an online access to [www.masteringbio.com](http://www.masteringbio.com) which has very helpful animations and quizzes in the Study Area. If you purchase a used textbook, then you will have to separately purchase masteringbio online access. This online access is recommended although not required for this course.

**Prior knowledge and skills required for BIO 311C**

**To be academically competitive in this course, a student should be able to do the following prior to the start of the course:**

1. Be able to explain a simple biological process clearly.
2. Read a descriptive paragraph in a science textbook, and identify the major points.
3. Be able to identify what a question is asking and to answer a question clearly and to the point.
4. Read a college course syllabus and identify and locate the course resources that are provided by instructors, textbook, and online resources, and be able to plan what activities you need to add in order to be successful in the course.
5. Utilize basic math and algebra functions to solve calculations, including calculations involving fractions, exponents, and scientific notation. Add, subtract, multiply, and divide simple numbers without using a calculator.

6. Without using a calculator, determine the  $\log_{10}$  of 100 and the  $\log_{10}$  of 0.001.
7. Determine information from a graph, and construct a graph from given data.
8. Be familiar with measurement scales. Tell the process by which numbers are converted from one unit of measurement to another; for example, how to convert meters to inches or  $\text{cm}^3$  to liters. Be able to estimate.
9. From linear dimensions, calculate the volume of a sphere or the volume of a cube. Calculate density from a given mass and volume.
10. Distinguish between elements, compounds, homogeneous mixtures, and heterogeneous mixtures. Describe the differences between solid, liquid, and gas samples of a pure substance.
11. Understand the basic organization of the periodic table. Use the table to determine atomic mass and atomic number, find elements with similar properties based on location within the table.
12. Identify the parts of an atom and the number of protons and electrons in atoms and ions. Determine the number of valence electrons in the elements H, C, N and O, which are important in biological molecules.
13. Define isotope.
14. On the basis of relative electronegativities of elements, predict whether a compound is covalent or ionic. Predict polarity of covalent bonds within molecules.
15. Calculate the molar mass of a compound from information in the periodic table. Calculate molarity given moles (or mass) and volume.
16. Define pH and explain the difference between two solutions, one with pH 2 and the other with pH 5.
17. Define kinetic energy and potential energy, and give examples of both.
18. State the first and second law of thermodynamics.
19. Describe the cell theory, and distinguish between the two major types of cells.

**Objectives for this course:** The emphasis of this course is to be able to remember and understand the details and be able to understand it well to be able to apply to new situations. Some general objectives are given below:

1. Dynamic hierarchical organization of life, compartmentalization: organelles, enzyme pathway and membrane localization, molecular turnover; diffusion, water balance, surface area
2. Chemical bonds: their significance within macromolecules and in the interactions among molecules

3. Specific recognition, communication, response: Specificity of protein binding, receptor proteins, signal transduction systems, cell-cell communication, cellular response to signals.
4. Energy transformation: free-energy changes in organisms; energy-coupled processes in cellular respiration and photosynthesis; ATP-ADP cycles, energy flow in ecosystems
5. Enzyme regulation: feedback control, activators and inhibitors of enzyme function.
6. Heredity: continuity of genetic information: transmission to the next generation, mutation; differential gene expression, gene structure and genomics
7. Structure-function relationship at all levels: protein, membrane, cell, organ. Relationship between structure and function is a product of evolution by natural selection. Evolution is the process that explains both the unity and diversity of life.
8. Processes of science: Science building & using models; observations & experiments; asking questions. Our knowledge of the biological world is predicated upon the ongoing process of hypothesis and experimentation

**Lecture presentation slides:** Material will be presented in class in the form of power point slides. Selected slides will be uploaded on Blackboard at <http://courses.utexas.edu> under “Course documents” and students can access this class using their UT EID. Students will need to take additional notes in class in order to supplement information on slides.

**Classroom courtesy:** Please help us all concentrate on learning biology in the classroom: be on time to class, turn all cell phones to off, stay off the internet, avoid leaving early, and minimize distracting conversation. Thank you - your classmates and I will appreciate it.

**Class attendance:** is required and class participation encouraged! Attendance will be taken after the first day of class, and will be used to assess student’s performance in the course. We have found a strong correlation between a student’s overall performance and attendance. A student during class found to be engaged in non-class related activities (talking, reading the newspaper, surfing the web etc) may be marked as absent from class.

Portions of the material relevant to exams will be emphasized during class; such information may not be present in slide presentations, hence it is in the student’s best interest to attend class regularly. If you must miss a lecture, review the slides, do the required reading and check with at least one other classmate who attended the lecture for any additional notes. *After* you have done this, you may also make arrangements with your lecturer or T.A. to review the material you missed.

**iClicker:** We will be using the iClicker – a type of classroom response/assessment system to help with the learning and teaching process. Please purchase the iClicker at the Co-op. You can register it at [www.iclicker.com](http://www.iclicker.com) using the number provided at the back of the iClicker (for Clicker ID) as well as your UT EID (for student ID). Bring your iClicker to class every day. Most classes

will have questions that will require you use the iClicker. It is your responsibility, to make sure that the batteries are functional and that the iClicker is in proper working order. ***Participation in iClicker questions in class will earn you up to 2% extra credit.*** You may miss up to 3 classes and still receive full credit. We will start counting iClickers from Monday, June 6.

**Discussion sections:** will be conducted by the T.A. She will review major concepts covered in class. Each student is expected to attend a discussion section assigned to him or her by the unique number. Practice worksheets and Quizzes will be given in some discussion sections. Quizzes may be in the form of multiple choice and/or short answers. You are allowed to make up ONE missed quiz at the convenience of the T.A.

***Discussion sections start the week of June 6***

**Please attend the discussion you are registered for based on your unique number.**

**Homework:** Homework assignments will be posted on Bb every Friday. Bring your **COMPLETED** homework to discussion section for submission. Questions regarding homework should be addressed in discussion sections. Further details will be provided by the TA in discussion.

**Announcements:** Important announcements by the lecturer or the T.A. may be made during class/discussion. It is the student's responsibility to be aware of these announcements. Some last minute changes in schedule may be posted on Blackboard. Students are encouraged to regularly check Blackboard and email for these postings.

**Read the assigned material in the textbook:** The powerpoints for each week will be posted on Blackboard. Reading assignments from the text will also be indicated on the powerpoint slides. Read the assigned text pages and go over the powerpoints before coming to class. There may be material in the text which was not covered in lecture and for which you are responsible, so make sure to take notes in class. Additionally, the combination of listening to a lecture, reviewing the slides and your notes, and reading the text will make it easier for you to understand and remember the material. ***Practice Self quizzes at the end of each chapter will provide a good review of the concepts and help students tackle both memory based as well as application questions on the exam.***

**Exams:** There will be **TWO** in-class midterm exams and one **comprehensive** final exam. The exams cannot be missed or turned in late unless permission is granted **in advance** for **extraordinary, documented circumstances**. For such students make up exams can be scheduled at an "earlier" date but ONLY with **PRIOR** approval. Student I.D.s will be checked at exams. Exams will include some memory based as well as some thinking/application based questions.

Students may not leave the room during an exam. If you need to leave the room, please hand in the exam first. Make sure all books, backpacks are placed at the side of the room and cell phones/pagers turned off. Make sure to come to all the exams on time. No late comers will be allowed to take the exam especially if a student has already taken the exam and left the exam room.

Once exams are graded and returned, students will get up to three days to evaluate the exam for any errors in grading/adding up points. After which NO regrade requests will be entertained. Exams written in pencil will not be eligible for regrading.

**Final grade based upon:**

- (1) ***Discussion section Quizzes, Activities***: contribute to 15% of the final grade (60 points total). Further information will be provided by T.A. in discussion.
- (2) ***Home work worksheets***: Weekly home work will be assigned which will contribute to 5% of the final grade (up to 20 points completion and submission grade)
- (3) ***Two midterm exams each worth 100 points***. You can earn a maximum of 200 points - for 50% of your final grade (*i.e.* 25% per exam)
- (4) ***Comprehensive final exam worth 120 points*** - for 30% of your final grade.
- (5) ***Extra Credit for using iClicker***: up to 2%

**Grading:** We will be adopting the plus/minus grading system this semester. Your grade will be based on the following rubric:

Grade	Percent
A	93.50-100
A-	90.00-93.49
B+	86.50-89.99
B	83.50-86.49
B-	80.00-83.49
C+	76.50-79.99
C	73.50-76.49
C-	70.00-73.49
D+	66.50-69.99
D	63.50-66.49
D-	60.00-63.49
F	59.99 and below

The grade categories MAY be slightly modified to reflect the overall performance of the class, but this is not a guarantee. This will only be decided at the end of the semester. DO NOT COUNT ON A CURVE OR CATEGORY ADJUSTMENT TO RAISE YOUR GRADE.

**Helpful hints to do well in this class:**

- 1) Make sure to read the assigned chapters ahead of time as well as after the lecture.
- 2) Come to class regularly, on time and pack only after the bell rings or lecture ends.
- 3) When not clear, ask questions! You can ask questions in class, after class or in discussion.
- 4) Do not hesitate to come to office hours for further help with concepts.
- 5) FORM STUDY GROUPS! The best way to understand concepts is to explain these to your friends. If you need help forming study groups consult with T.A.
- 6) Do not doze off or sleep during class! Stay alert by taking notes and participating in class

- 7) Turn off cell phones/pagers.
- 8) Do not read newspapers or surf the web during class
- 9) Read to understand, remember key terms, and learn how to apply course information
- 10) A Study guide will be provided prior to each exam. Use these as a guide to learn and understand concepts to study for exams.
- 11) After each exam, analyze results to see how you can improve in the next exam
- 12) Make sure to talk to the instructor or the T.A. as soon as you have trouble with the course. DO NOT wait until the last minute to get assistance!

**Policy on scholastic dishonesty:** Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the university. Since such dishonesty harms the individual, all students, and the integrity of the university, policies on scholastic dishonesty will be strictly enforced.

**Students with disabilities:** In order to receive academic accommodations, students must present a letter from the Services for Students with Disabilities (SSD) area of the Office of the Dean of Students as soon as possible. Please inform Dr. Latham in writing at the beginning of the course or as soon as possible if you need special accommodations for the exams.

**Accommodations for religious Holy days:** As per university policy, accommodations will be made for religious holy days. The student must make the instructor aware in writing of a religious-related absence at least fourteen days prior to class absence (especially if it conflicts with an exam) or first class day for religious holy days that fall within the first two weeks of the semester.

## TENTATIVE SCHEDULE

### Refer to powerpoints for relevant reading from each chapter

June	2	Chemical bonds, water and environment (Chapters 2, 3)
	3	Organic compounds, Carbohydrates (Chapters 4, 5)
	6	Lipids and Amino acids (Chapter 5)
	7	Proteins and nucleic acids (Chapter 5)
	8	Chem evol and Prok cells, Organiza of cells (Chaps: 25, 27, 6)
	9	DNA structure and replication (Chapter 6)
	10	Transcription
	13	Translation and mutations
	14	Organization of cells (Chapter 6)
	15	Review for Exam 1
	<b>16</b>	<b>Exam 1</b>
	17	Organization of cells (Chapter 6)
	20	Membranes (Chapter 7)
	21	Cell signaling and signal transduction (Chapter 11)
	22	Gene regulation (Chapter 18)
	23	Gene regulation (Chapter 18)
	24	Energy (Chapter 8)
	27	Respiration (Chapter 9)
	28	Respiration (Chapter 9)

	29	Review
	<b>30</b>	<b>Exam 2</b>
<b>July</b>	1	Photosynthesis (Chapter 10)
	5	Cell cycle and regulation (Chapter 12)
	6	Cloning
	7	Final exam review

**COMPREHENSIVE FINAL EXAM: July 9, 9 am to noon (Tentative)**