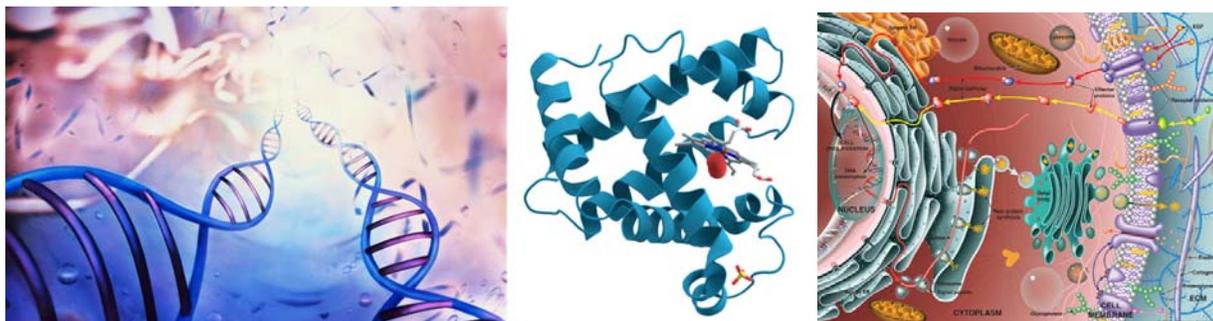


Biology 242: Course Syllabus – Fall 2017



Course instructors:

Dr. Larissa Williams, Carnegie 423, email: lwillia2@bates.edu

Dr. Derek Laux, Carnegie 535, email: dlaux@bates.edu

Course AIs and Lab Instructors:

Greg Anderson, Carnegie 530, email: ganderso@bates.edu

Carolyn Lawson, Carnegie 530A, email: clawson@bates.edu

PAL leaders:

Peter Cottingham, email: pcotting@bates.edu

Julia Kavanagh, email: jkavanag@bates.edu

A 3rd PAL leader is TBD

Course Meeting Times:

Lectures: MWF 8-9:20 and 9:30 – 10:50, Carnegie 113

Lab: M 1-4 pm T 8-11 am T 1-4 pm, Carnegie 524/534

Office hours:

Drs. Williams and Laux will survey the class in the first week to determine several common times that will be set aside each week for student meetings. Those times will be posted online on the BIO242 website and on our doors before the end of the first week of class. In addition, you are welcome to make an appointment with either instructor via email. You are encouraged to meet early and often with the instructors about the course and its material and expectations.

Peer mentoring and tutoring: The Peer Assisted Learning (PAL) program began at Bates in 2003 and has been a vital part of learning in the sciences ever since. Our PAL leaders will survey the class in the first week to determine the most convenient time to hold their sessions. One-on-one tutoring is also available to any student; please speak with one of your instructors and they will put you in touch with the Academic Resource Commons (ARC).

Required Texts:

- 1) Alberts et al., Essential Cell Biology, 4th edition (2013)
- 2) Hofmann, Writing in the Biological Sciences 2nd Edition, Oxford University Press, (2016)
- 3) Bio 242 Laboratory Guide (Fall 2017 edition) **NOTE:** The labs may change substantially from year to year, so you may not use a previous edition.

Course Catalog Description:

A view of life at the cellular and molecular levels. Topics include cellular energetics, membrane phenomena, genetics, and molecular biology. Laboratory studies include enzymology, bacterial transformation, the light reactions of photosynthesis, Mendelian genetics, bioinformatics, and DNA analysis using gel electrophoresis and polymerase chain reaction. Quantitative analysis of data and peer-reviewed scientific writing are emphasized. This course is required for the biology, biochemistry, and neuroscience majors. Prerequisite(s): BIO 190 and CHEM 108A Enrollment limited to 60. [S] [L] [Q] [W2]

Extended Course Description:

Welcome to BIO242: Cellular and Molecular Biology! In recent years, the fields of molecular and cellular biology have evolved as a response to our increased ability to study questions at the molecular level. The concepts in this course are fundamental to understanding biology across a variety of disciplines including agriculture, biochemistry, biotechnology, developmental biology, environmental science, ecology, evolution, genetics, immunology, human and veterinary medicine, neuroscience, pharmaceutical sciences, physiology, plant biology, etc. Skills learned in lecture and lab should translate to success beyond this course during your time at Bates and beyond.

Course Purpose:

This is the second of three core classes (BIO 190, 242, 270) in the Biology major and is required for Biochemistry and Neuroscience majors. Furthermore, this course is required for any student interested in human or veterinary health sciences. The content in this course is fundamental for most future courses, so it is important to not only learn the material, but also retain it! In addition, you will be learning, practicing, and refining scientific writing and engaging in cellular and molecular laboratory skills.

Course Learning Goals:

- 1) Understand and utilize the scientific vocabulary used in communicating information in cellular and molecular biology.
- 2) Understand and apply general concepts of cellular and molecular biology to relevant, specific problems.
- 3) Describe and discuss the properties and biological significance of the major classes of molecules found in living organisms and the relationship between molecular structure and function.
- 4) Link the rapid advances in cellular and molecular biology to a better understanding of diseases and biotechnology.
- 5) Recognize and practice normative conventions governing journal style scientific writing and its influence on the organization, use, and distribution of scientific knowledge and information.

Personal Learning Goals for this Course:

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Classroom Procedures:

This course will be taught as a “flipped-classroom” where your initial exposure to content will be outside of class through instructional videos, readings, and individual and collaborative activities. Before each class period you are expected to gain an understanding of the material through reading the book and/or watching videos. For each class period there are several online videos (3-8 videos of variable length) posted on Lyceum. Often you will spend up to several hours watching and taking notes these videos before *each* class. Because the videos are online, you can start and stop them at any time. This will allow you to approach learning this material at your own pace. If you learn best by reading, you may gain the most from the textbook and less from the videos. Alternatively, if you are a visual learner, the videos may be more useful than the book. Some students like to both

watch the videos and read the textbook. In the first week of the course, we encourage you to figure out how you learn best outside of class and approach the material in that way. As a preliminary assessment, you will complete an online quiz before each class. These quizzes are used to take to gauge your own understanding of the material and for the professors to gauge the classes' understanding going into the class period. As you figure out the best way you learn, these quizzes may be a great indication of how much you are retaining from watching the videos and/or reading the book. The score you achieve on these quizzes does not count toward your course grade, but their completion counts towards your participation grade. During class, we will use the majority of time to practice questions, complete application exercises, and engage in discussion-based activities. We may reserve some time to lecture on material that is particularly challenging to the class as evidenced by the pre-class online quiz scores.

Participation:

Readiness to learn means that you will come to class with questions and insights to offer others and prepared to discuss the relevance and application of the course materials.

Characteristics of Students Who Excel in this Course:

- Come to class having watched assigned videos, actively read required materials, and completed the pre-class online quiz
- Genuinely participate in your learning during class
- Take notes during class discussions and in active learning activities
- Review material from class every day
- Have a willingness to be challenged and work hard
- Understand that asking for help isn't a sign of failure but an important skill for improvement
- Prepare for assessments in study groups with peers well in advance (more than one week) and attend PAL sessions
- Manage your time well for both lecture and lab—don't do assignments last minute
- Work cooperatively with others and value their contributions. Successful team work involves being supportive and helpful with your peers.

Tips on Using This Syllabus:

- Use the intended learning goals to evaluate your academic progress throughout the course
- Refer to the assignment descriptions and point values often
- Use the recommended participations and study habits to obtain the grade you want

Assignment weighting for grade determination is as follows:

Assessments:	60 % (5 assessments at 6%, 15%, 12%, 12%, and 15%, respectively)
Lab Papers:	25 % (2 @ 12.5% each; includes Peer reviews)
Lab Misc. Assignments:	10 % (in the aggregate)
Participation:	5 % (engagement in lecture, lab, clicker questions, etc.)

To pass this course, you must have an average score of > 55% both on laboratory assignments and on the lecture assessments.

Assignment descriptions:

Assessments: The in-class assessments will emphasize material covered in pre-recorded lectures, the reading assignments, classroom sessions, lab materials, and any handouts. We STRONGLY suggest that you review the material daily. Questions on assessments will range from multiple choice, true/false, and short answer. Most questions will require application of the material rather than pure recall. The assessments will be administered during class on indicated days. Late arrivals and missed exams will result in a zero (0) for that exam. Missed exams may be made up only upon presentation and acceptance of a Dean's notice. If you need extended time due to learning differences, you must arrange with the Dean of Student's office at the beginning of the semester.

Lab papers: Collaboratively in your lab groups, you will write two journal-style scientific papers. For each paper you will also give and receive peer feedback. For the first paper, you will receive the option of a re-write/re-grade. Successful students will devote a lot of time to each paper and spend several weeks working on them in groups. Effective group work will require regular group meetings, team work, and many collaborative drafts.

Lab miscellaneous assignments: For most labs, you will complete pre-lab assignments that may include lab math and lab preparation questions. For lab math assignments, you will be able to re-do any questions for a new grade.

Participation: It is in your best interest to attend all lectures; attendance will be monitored through the use of daily clicker questions. If you miss a lecture it is *your* responsibility to obtain lecture notes and become familiar with the material. All lectures will be posted online. Lab attendance is required unless you have a Dean's notice. We can accommodate limited switching of lab days for sports or debate conflicts if notified within the first two weeks of the semester using the google worksheet that was emailed to you. There is no possibility of making up missed labs due to time and space constraints.

Class Communication: There may be occasion for us to notify class members, so be aware that you may receive email pertaining to this class. If you have a question / comment / request for us, please use individual email addresses, not the class email address (which delivers the message to everyone!).

Class email: fbio242a@lists.bates.edu or fbio242b@lists.bates.edu

Some course information will be distributed/posted via **Lyceum**. Access **Lyceum** from Bates College website OR the Bio 242 website (<http://abacus.bates.edu/~ganderso/biology/bio242/index.html>).

Due dates: Due dates for assignments are STRICTLY enforced. Late assignments will be docked one letter grade equivalent (10%) per day unless you have a Dean's notice.

Learning: If you have any issues or learning differences that affect how you learn, please let us know as soon as possible and see also the Dean of Student's office.

Campus resources: While college is an exciting experience, there are times when you may find yourself dealing with issues related to academic performance, identity, community, and family. The Biology 242 faculty and staff are not just your instructors; we are also mentors and resources. We always encourage you to come see any one of us for help, and if we cannot help you directly we can put you in touch with someone who can. Meanwhile, there are a number of great resources on our campus:

Office of Student Affairs: <http://www.bates.edu/student-affairs/>

Office of Intercultural Education: <http://www.bates.edu/oie/about-2/>

The Health Center: <http://www.bates.edu/health/>

International Student Programs: <http://www.bates.edu/student-affairs/student-support-and-advising/international-students/>

Academic Honesty – Read this!

Academic integrity is fundamental to learning, scholarship, and indeed all dimensions of academic life. At its simplest, this means that the work you submit must be your own unless collaboration is specifically allowed, that you use only those resources allowed; that you express yourself in your own words unless you are quoting, and that you properly acknowledge and cite the ideas, information, and other work that you used or that contributed to your understanding.

Your academic work is governed by *The Bates College Statement on Academic Integrity*, found here at: <http://www.bates.edu/student-affairs/student-conduct/academic-integrity-policy/>, and by any additional standards your instructors set in this syllabus or in individual assignments. The *Statement on Academic Integrity* provides a fuller discussion of academic integrity and definitions of plagiarism, misuse of sources, and cheating. You are responsible for reading the *Statement* carefully and abiding by its terms.

Your instructors consider cheating or plagiarism of any form in this class to be a serious violation of the above policy. Depending on the circumstances of the violation, we will assign a failing grade for the assignment and/or the course, require work to be redone, and/or impose other consequences; in addition, we will refer the matter to the Dean of Students for possible institutional action. Procedures for suspected violations are explained here: <http://www.bates.edu/student-affairs/student-conduct/student-conduct/>.

Some work in this course is collaborative (e.g. lab papers, in class problems), meaning that you may consult with peers on completing assignments. Other assignments are to be done individually. For each assignment we will indicate to what extent you are allowed to collaborate.

Part of academic honesty is utilizing sources correctly, but this can often be confusing for beginning college students. Excellent resources on utilizing sources correctly can be found here:

http://www.bates.edu/writing/files/2011/06/Guide_to_Working_with_Sources_August_2013_print.pdf.

Additionally, you will be taught in this class how to properly use citations in your written and oral work. Contact an instructor if you have any questions about these policies.

The Web: Information and misinformation abound on the Web. The Web can be a valuable resource, but it can also be misleading. If you have a question about the validity of a website or information derived from a website, please see one of us.

2017 Lecture Schedule for Biology 242: Cellular and Molecular Biology

Week 1	Topic	Chapter
Sept 6	Introduction, Cells	1, 2
8	Protein Structure/Function	4
Week 2		
11	Protein Structure/Function	4
13	Introduction to Scientific Literature and the Library Discussion of Feller et al., 1996	3
15	Energy and Catalysis Endnote assignment due in Google Drive Folder	3
Week 3		
18	Energy and Catalysis Writing an Introduction with Citations	3
20	Assessment I on Chapters 3 and 4 (beginning of class) DNA and Chromosomes	5
22	DNA, Chromosomes, and DNA Replication	5, 6
Week 4		
25	DNA Replication, Repair, and Recombination	6
27	DNA to RNA: Transcription I	7
29	DNA to RNA: Transcription II	7
Week 5		
Oct 2	RNA to Protein: Translation	7
4	Assessment II: Chapters 5, 6, 7	
6	Control of Gene Expression	8
Week 6		
9	How Genes Evolve, Family Trees	9, 10
11	How Genes Evolve, Family Trees	9, 10
13	Genetics and the Molecular Basis of Heredity	19
Week 7		
16	Genetics and the Molecular Basis of Heredity	19
18-22	Fall Recess	
Week 8		
23	Membrane Structure and Proteins	11
25	Assessment III – Chapters 8, 9, 10, 19	
27	Membrane Structure and Proteins continued	11
Week 9		
30	Generating Usable Energy - Photosynthesis	14
Nov 1	Generating Usable Energy - Metabolism: Glycolysis and the Citric Acid Cycle	13
3	Generating Usable Energy - Respiration	14
Week 10		
6	Protein Sorting	15
8	Vesicle Transport	15
10	Assessment IV – Chapters 11, 13, 14, 15	
Week 11		
13	Transporters and Ion Channels	12
15	Ion Channels and Membrane Potential	12
17	Cell Communication : General Principles and G proteins	16
Nov 18-26	Thanksgiving Recess!	
Week 12		
27	Cell Communication: G proteins and Enzyme Coupled Receptors	16
29	Cytoskeleton	17

Dec 1	Purposeful Work panel	
Week 13		
4	Cell Cycle Control	Chapter 18 to pg 638
6	Organization and Maintenance of Tissues	Chapter 20 to pg 707
8	Cell Death and Cancer	Chapter 18 to pg 638
Finals		
Wednesday Dec 13	Assessment V at 3:45pm Chapters 12, 16, 17, 18, 20	