

ENES 120 - BIOLOGY FOR ENGINEERS – Term Syllabus – Spring 2019

Version of Jan 22, 2019

Department of Engineering, Physical, and Computer Sciences
Montgomery College, Rockville

Introduction to the functions and interactions of biological systems from a quantitative perspective. Topics include concepts in molecular and cellular biology, mechanisms of concepts in molecular and cellular biology, mechanisms of thermodynamics, genetics, gene expression and regulation. Introduction to the modern biological experimental techniques, methods of data analysis and biostatistics. An overview of role of bioengineers.

Prerequisites:

Chem 132 or Chem 135, and Math 181. **Biol 150 strongly recommended. Phys 161 & 262 very helpful.** (If you last took biology only to pass Maryland's high school graduation requirements this course is going to be *very hard to get a B in.*)

3 semester hours / 3 50-minute lectures each week.

Course Outcomes:

Upon course completion, a student will be able to:

- Identify different types of cells, list their parts, and describe their structural components and the differences between them.
- Identify and describe the functions of different types of bio-molecules.
- Describe mechanisms underlying the working of molecular biological processes including enzyme catalysis, metabolic pathways, membrane trafficking, gene expression and signal transduction.
- Quantitatively analyze biological processes including enzyme catalysis, metabolic pathways, gene expression and signal transduction.
- Use Excel, MATLAB and other software to quantitatively analyze biological processes.
- Describe selected experimental techniques in biology and the underlying concepts.
- Enhance teamwork, communication and peer review skills through assigned projects.

Course Meeting Schedule:

Lecture: TR 2:00 – 3:45 pm, Science Center 409 (SC 409).

Instructor Coordinates:

Instructor: Dr. Aaron Rappaport

Office/Phone: SC 411. Adjuncts don't really have a phone, so please contact me by email.

Office Hours: **TBD by class poll, or by appointment (usually by phone).**

email: Aaron.Rappaport@montgomerycollege.edu (checked daily except Saturdays).

I do not check blackboard email.

Course Textbook (required):

Bruce Alberts (and seven others), Essential Cell Biology, 4th Ed. (Loose Leaf), Garland Science (2014). ISBN: 9780815345251. Available at the Rockville campus bookstore. Any version of this edition will do. Earlier editions will probably cover most of the course material, but I won't be able to tell you either what things they don't cover or what the page numbers are for the reading in them. There will also be reading from other sources, which I will post on Blackboard.

The reading load is very heavy. A major goal for this course is for you to learn to learn science by reading, which is a key professional skill.

Students are responsible for the assigned reading even if parts of it are not covered in lecture.

How to Use the Textbook:

Much, but not all, of the course subject matter can be learned by looking at the section and subsection titles, the figures and their captions, and the list of key concepts and vocabulary at the end of each chapter. Several of the Panels that are found in the various chapters are absolutely essential. The textbook also contains a glossary that defines some of the words used throughout. If the glossary isn't helpful, use the index to find where a term is first defined.

Some Subjects Won't Be Covered In the Textbook:

For some of these, there will be assigned reading either from freely available online textbooks or from articles that I post to the course blackboard site. For other subjects, the only reference will be your notes and the lecture slides.

Two Terminology Sheets Are Posted in Course Content/Resources:

"To describe (biological systems), researchers had to give them names... They are not just arbitrary gibberish as you may have thought. They were created at a time when scientists knew and used Latin and Greek, and most of them are derived from a fairly small number of Latin and Greek roots. If you are familiar with some of these then the terms don't feel quite so arbitrary and you may find it easier to remember them." – MCDB 4650, University of Colorado, Vocabulary Aids for Embryology 1993.

Required Textbook Problems (not for hand-in):

Often showing up on exams will be problems from required problems in the textbook, which will not be handed in. These are essential for learning the course material. Not doing them means losing 10 – 20 points on exams that you could easily have gotten. The problems are answered in the Answers section after the last chapter of the book, but it's far better to attempt them before doing so.

Exams:

One side of one 8.5" x 11" page of your own hand-written notes (not photocopied) may be used on each exam, except that for the final this "cheat sheet" may be twice as long. Your sheet must be handed in with your exam.

Exams during the semester are administered in class and are approximately 50 minutes in length. If you need to take an exam at the Assessment Center you must contact me well-beforehand or have a documented emergency. In almost all cases, exams at the Assessment Center will be given *during or after* the time that the exam is given in class.

Grading: (3 Credits): A >90%, B >80%, C >70%, D >60%, F, I (P, AU, S, U, W)

10%	Attendance and classwork
20%	Homework
20%	Midterm 1
20%	Midterm 2
30%	Final Exam

- If a project is included then it may count up to half a midterms worth of credit. In this case, the credit percentages for the items above will be decreased proportionally.
- *Attendance at the exams is mandatory unless you have a documented emergency or accommodation.*
- *Skipping the final exam will automatically result in an F in the course.*

CLASS POLICIES

Course Schedule on Blackboard Will Contain All Readings and Assignments

The Course Schedule on Blackboard will be the official course schedule for homework and assigned reading, and will be updated throughout the semester, and quite frequently at first. *Do not rely on an old printed out copy of the schedule.* Consult the official one instead.

Policy on Late Assignments:

Absolutely no assignments will be accepted after official deadlines. Missing assignments will be dropped only in cases of *bona fide*, documented emergencies. Under certain circumstances, assignments will be accepted after due date (not deadline) with 10% deducted per day, *but only until graded assignments are returned to the class.*

Attendance:

Students are expected to attend all class sessions. "Excessive absence" is defined as one more absence than the number of times the class meets per week during a fall or spring semester (with the number of absences to be prorated for accelerated sessions.) For example, in a Monday-Wednesday-Friday class, four absences would be considered excessive. If you miss a class session, it is your responsibility to find out what you have missed.

Source: Collegewide Policies and Procedures Manual: Academic Regulations: Class Attendance (Section 9.823). [http://www.montgomerycollege.edu/departments/academicevp/Student_PandP.htm]

- *Attendance at the exams is mandatory unless you have a documented emergency or accommodation.*
- *Skipping the final exam will automatically result in an F in the course.*

Academic Honesty:

Common examples of academic dishonesty and misconduct can be found below and in the Student Code of Conduct, Section IV. These examples are not an all-inclusive list of all prohibited behavior. If you are in doubt about what constitutes academic dishonesty, consult your professor or the Student Code of Conduct.

Faculty members may impose grade sanctions for violations of academic ethics, normally ranging from a minimum of F on the assignment in which the dishonesty occurred to a maximum of an F in the course. Faculty members may choose to impose different sanctions. Faculty members also have the prerogative of referring a case to the campus Dean of Student Development with a specific request that the dean consider imposing additional sanctions.

Source: Collegewide Policies and Procedures Manual: Student Code of Conduct: Academic Dishonesty and Misconduct (Section IV). [http://www.montgomerycollege.edu/departments/academicevp/Student_PandP.htm]

You are expected to work with others on homework, but you are also expected to have mastered and understood what your group has worked out well enough to be able to sit by yourself afterwards and recreate the solution in your own words and in your own way.

If two or more solutions are too close to each other, both solutions will be given 0. You will also get a 0 if your homework is too close to a solution that can be found (illegally, by our copyrights) online. The first time that you are judged as having shared or copied a solution you will receive a 0 for the problem. The second time you will receive a 0 for the entire assignment. The third time, you will get an F in the class. When in doubt, ask the professor before handing the assignment in!

Classroom Conduct:

The College seeks to provide an environment where discussion and expression of all views relevant to the subject matter of the class are recognized as necessary to the educational process. However, students do not have the right to interfere with the freedom of the faculty to teach or the rights of other students to learn.

Source: Collegewide Policies and Procedures Manual: Student Code of Conduct: Classroom Behavior (Section III). [http://www.montgomerycollege.edu/departments/academicvp/Student_PandP.htm/]

Student Services:

Any student who may need an accommodation due to a disability, please make an appointment to see me during my office hour. A letter from Disability Support Services authorizing your accommodations will be needed. Any student who may need assistance in the event of an emergency evacuation must identify to the Disability Support Services Office; guidelines for emergency evacuations for individuals with disabilities are found at: www.montgomerycollege.edu/dss/evacprocedures.htm.

Student E-mail:

Student e-mail (montgomerycollege.edu) is an official means of communication for the College. It is expected that you check your student e-mail regularly and frequently, as you are responsible for information and announcements that will be sent to you from the College. When contacting the instructor, please use your Montgomery College e-mail account, as messages from other accounts are not guaranteed successful transmission to the instructor's e-mail account.

Veterans:

If you are a veteran on active or reserve status and you are interested in information regarding opportunities, programs and/or services, please visit the Combat2College website at: <http://www.montgomerycollege.edu/combat2college>.

Food and Shelter:

Any student who has difficulty accessing sufficient food to eat every day, or who lacks a safe and stable place to live, is urged to contact the Dean of Students Affairs on your campus. Furthermore, please notify the professor if you are comfortable in doing so. This will enable the professor to provide any resources that they may possess. We know this can affect performance in the course and Montgomery College is committed to your success. The Deans of Student Affairs are: Dr. Jamin Bartolomeo (GT), Dr. Tanya R. Mason (RV), and Dr. Clemmie Solomon (TPSS). See: <http://cms.montgomerycollege.edu/edu/secondary5.aspx?urlid=55>.