Fundamentals of Life Science: Biomolecules, Cells and Inheritance

BIOL 2170-003 - Fall 2015
MTWR from 8:00-8:50 a.m. in WO 1205
4 Credit Hours

Instructor

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Office Hours: MW 2:00-4:00 p.m. (Please visit, I am here to help you succeed. If these times do not work for you just email me to make an appointment.)

Course Description

As a requirement for biology majors this four credit hour lecture course is the first half of a general introduction to the fundamentals of life science. The topics of discussion focus on molecular biology and provide the fundamental basis of knowledge required for all professions in the life sciences. The specific topics include the molecules of life, cell structure and function, the stages of cell division and how they are controlled, energy processing pathways in plants and animals, genetics, gene expression and cell signaling mechanisms. Students will be assessed with homework assignments completed outside of class and with in-class summative examinations about every four weeks.

Main Learning Outcomes

Students who successfully complete the course will be able to:

- Illustrate the scientific method through analysis of major biological discoveries.
- Outline the structure and function of the types of macromolecules found in all living organisms.
- Describe the structure and function of cells and the metabolic reactions that occur in cells.
- Explain the process of inheritance including genetic linkage and complex traits.
- Understand different types of mutations and their effects on gene products and on phenotype.
- Describe how RNA, DNA and proteins are synthesized.
- Understand recombinant DNA technologies and how they are used.
- Explain the process of cell division in both somatic and germ cells.

Required Material

If you have taken BIOL 2150 previously you should already have the required materials. The following materials are required for BIOL 2170:

Biology, How Life Works (1st Edition), Morris, Hartl, Knoll, Lue et al. editors (ISBN 978-1-4641-3826-3). Purchase a hardcover, loose-leaf or e-book version. The textbook can also be purchased in two separate volumes in paperback form. BIOL 2170 requires Volume One while BIOL 2150 requires Volume Two.

Clicker Registration

Not applicable.

General Information

- CHEM 1090 or CHEM 1230 or a CHEM placement score of 20 or BIOL 2010 or BIOL 2150 or ACT Composite 21 is a prerequisite for this course.
- Because students will have to perform simple calculations for some of the course, it is expected that students taking Biology 2170 have elementary mathematical skills. The types of calculations that students may be required to perform will involve the use of decimals, logarithms, ratios and negative exponents. Students are also assumed to have knowledge of the metric system.
- Please ask questions during the lecture, especially if you feel something was not explained clearly. You also have the option of asking questions by email or during office hours.
- Lecture slides will be available for download from Blackboard before class. Note that you can arrange your Blackboard settings so you are informed by email exactly when the lecture slides are posted to Blackboard. For instructions see the file “How to Set Up to Receive Email Notifications” under the “More Course Info” link on Blackboard.
- Graded exam answer sheets and homework assignments will be returned to you as soon as practicable.
- You may review your exams during my office hours to determine where you went wrong.
- Contact me immediately if there are any issues regarding your grades.
- If you believe there is an error in grading your exam, it is your responsibility to bring this to my attention within one week of the return of the exam return of the exam answer sheets to the class. After that time, all grades are considered to be final.
- Put away your cell phone while in class. Make sure it is off or in silent mode.
- If you are going to bring a laptop or tablet to class please use it for note taking only.
- Please do not bring food into the room, although a drink is acceptable.
- If you wish to make audio recordings of the lectures for your personal use, please ask me first. Recordings are not to be distributed without the permission of the instructor.
- A list of valuable resources, to help students with their academic and social life at the University of Toledo, can be found at “www.utoledo.edu/menu/current.html”. This includes tutoring services, the writing center, library information, and IT services among others.

Student Evaluation

Your **final grade** will be calculated as follows:

54.6% Best three of the four in-class exams (100 pts, 18.2% of your final grade for each)
36.4% Comprehensive final exam (200 pts)
9% Homework (50 pts)
100%

Grading Scale:				
	90-100%	A	67-70%	C
	86-89%	A-	63-66%	C-
	83-85%	B+	59-62%	D+
	78-82%	B	55-58%	D
	74-77%	B-	50-54%	D-
	71-73%	C+	<50%	F

Students that have stopped attending class by the middle of the term will be reported at this time to meet state and federal laws regarding financial aid disbursement.

Homework

- The homework is assigned to encourage reading from the textbook before lectures, so *the best practice is to read the appropriate sections of the textbook before taking the assignment.*
- Homework will consist of pre-lecture questions derived from the previous and following week's materials.
- Homework assignments will usually be assigned on the Thursday of each week when there is no exam.
- Homework assignments are due on the following Monday at the start of class. Homework assignments that are not turned in within the first 5 minutes of class on the following Monday are considered late and will be assigned a 0.
- Each homework assignment is worth 5 points.

Exam Information

- Four one-hour exams will be given during the semester and each will consist of 50 multiple-choice questions. These exams will cover only new material (since the last exam). Exam questions will be mainly based on the material covered in the lectures. However, examination questions also may be derived from the text assignments, so students are required to read the appropriate chapters of the book.
- Of the four one-hour mid-term exams, only three will count towards your grade. In other words, you get to drop your lowest mid-term exam score.

- The final exam (two hours in length) will be comprehensive and consist of 100 multiple-choice questions and five bonus questions.
- Examinations will start and end at the specified times. Additional time will not be given to students who come late for exams and latecomers will not be permitted to start if someone has already left the exam.
- Bring at least two pencils and an eraser to the exams.
- Quiet is to be maintained **AT ALL TIMES** during which an examination is being taken! Please be considerate of your fellow students. If you need to talk about something please do it outside of the room where examination is being taken. Violators of this rule will have their examinations confiscated and they will receive a grade of F for the examination.
- Students will be asked to present a **picture ID** when turning in their exam and answer sheet.
- If for any reason the university is closed on the day of a scheduled exam, the exam will be given during the next scheduled class, unless told otherwise.
- The exam schedule will not be changed for individuals who have more than one exam on an exam day. This also applies for the final exam. The best way to prepare for this situation is to be aware of your exam schedules and review course materials regularly in advance of the exams.

Absences

- Make-up exams and adjustments to homework deadlines will only be provided for *serious* medical or personal reasons that are backed up with the proper documentation such as a doctor's note. *Accommodations will be made only if the instructor is notified by email or phone call as soon as possible after the absence.*
- Make up exams will be scheduled within a week of the original exam date. If multiple students need a make-up exam they will write it at the same time in the Testing Center (FH1080). If it is not possible for a student to take the make-up exam within one week then the three remaining in-class exams will be used to determine the final grade for that student. Make-up exams will be long answer or essay format.
- Additional information regarding absences can be found in the University of Toledo Missed Class Policy, located at www.utoledo.edu/facsenate/missed_class_policy.html.

University Policies

Policy Statement on Non-Discrimination on the Basis of Disability:

- The University of Toledo abides by the Americans with Disabilities Act (equal and timely access) and Section 504 of the Rehabilitation Act of 1973 (non-discrimination on the basis of disability). If you have a disability and are in need of academic accommodations, but have not yet registered with the Office of Academic Access (OA) please contact the office by phone (419-530-4981) or email as soon as possible for more information and/or to initiate the process of accessing academic accommodations.
- Students receiving accommodations through OA are encouraged to discuss these with me, after class or during my office hours, so that I may be better informed on how to assist you during the semester.

Academic Dishonesty:

- The university policy on academic dishonesty can be accessed at:
  "http://www.utoledo.edu/dl/students/dishonesty.html"
- Do not talk to other students or use electronic devices during examinations. Keep your eyes on your own work. Those who violate these rules will receive an F for the exam.

Keys to Success

1. **Attend every class.** Material presented during class will be emphasized for the exams and homework assignments contribute to your final grade. In-class interactions with the instructor help strengthen your understanding of the material. If you need help with the material communicate with the instructor.
2. **Do not wait until a day or two before the exam to study.** This is one of the worst and most common mistakes students make. We will be covering a great deal of material and it is very easy to get behind. Go over your notes as often as you can between exams and make sure you understand the material *before* your last study session. Ask questions about topics you don't understand as soon as possible, either during lecture or during office hours.
3. **Be active with your studying.** Reading the textbook before class, taking notes during class, and making a separate set of study notes after class will aid in your ability to understand and retain the presented concepts. Participating in the Supplemental Instruction (SI) sessions will also help you in this regard. Passively reading the textbook and listening to the lectures without being engaged in the material may not lead to success.
4. **Test yourself.** Have a roommate or classmate ask you questions about the material in your notes. Do all of the available self-assessment questions in the textbook. Online activities associated with the textbook are available on LaunchPad. Testing yourself will let you know where you might have to spend more time on the details. It is also important to come to my office to review your exam results and take notes. The comprehensive final exam will address the same topics you were tested on through the semester.
5. **Form a study group.** It helps with number four above and you will find out how well you know the material when you try to explain it to someone else.
6. **Additional information.** This can be found in the files "Keys to Success" and "Survival Skills" under the "More Course Info" link on Blackboard.

Topics Covered For Biology 2170-003 (Fall 2015)

Week	Chapters
Week 1 Chapter 1: Introduction: life Chapter 2: Molecules of life	1-2
Week 2 Chapter 2: Molecules of life Chapter 3: Nucleic acids and the encoding of biological information	2-3
Week 3 Chapter 3: Nucleic acids and the encoding of biological information Chapter 4: Translation and protein structure	3-4
Exam I (Sept. 10)	
Week 4 Chapter 12: DNA replication and manipulation	12
Week 5 Chapter 6: Making life work	6
Week 6 Chapter 7: Cellular respiration	7
Week 7 Chapter 8: Photosynthesis	8
Exam II (Oct. 8)	
Week 8 Chapter 5: Organizing principles	5
Week 9 Chapter 9: Cell communication	9
Week 10 Chapter 10: Cell form and function	10
Week 11 Chapter 11: Cell division	11
Exam III (Nov. 5)	

Week 12 14
Chapter 14: Mutation and DNA repair

Week 13 15
Chapter 15: Genetic variation

Week 14 16
Chapter 16: Mendelian inheritance

Week 15 17
Chapter 17: Beyond Mendel

Exam IV (Dec 3)

Week 16 19
Chapter 19: Genetic and epigenetic regulation

Final Exam: Monday Dec. 14, 8:00-10:00 a.m.

Other important dates: September 7 is the last day to drop; October 30 is the last day to withdraw.

The pace of the lectures varies from year to year so the exact day a particular topic is discussed may differ from this schedule. However, the topic order and the exam dates will not change.