



Fundamentals of Life Science: Biomolecules, Cells and Inheritance

BIOL 2170-002 - Fall 2015
MW from 4:00-5:40 p.m. in WO1201
4 Credit Hours

Instructor

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Office Hours: MT 10-11:00 a.m., WR 9-10:00 a.m. and R 3-4:00 p.m. (or by appointment; I am here to help you succeed so please visit)

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 in class with “clicker” questions, before class with quiz homework completed online and with in-class summative examinations every three 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 Materials

- **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. If you can do without a hard copy of the textbook you should consider purchasing just the LaunchPad access since LaunchPad includes an e-book version of the textbook. *If you purchase a used textbook it will not come with LaunchPad access so you will have to purchase LaunchPad access separately and it is quite expensive.*
- **LaunchPad Access:** Access to the LaunchPad website is provided with the purchase of any hard copy of the full textbook or with either of the two volumes. LaunchPad includes the full e-book version of the textbook, the assigned quizzes, adaptive learning questions (Learning Curve) and other online activities. Course specific LaunchPad access instructions will be sent to you by email when the course starts. If you want to purchase LaunchPad access because you have a used textbook or you intend to use the e-book version of the textbook, which comes with LaunchPad, access can be purchased by clicking “I want to purchase access” on the LaunchPad website at: www.macmillanhighered.com/launchpad/morris1e/22250/ECommerce/Unauthenticated#/index
- **Clicker:** A Turning Technologies response card can be obtained at the UT bookstore and elsewhere. The most basic model is sufficient. Register your clicker ID on Blackboard if you have not already done so for another course (see below).

Clicker Registration

Once you have registered your clicker ID on Blackboard for any course, you do not have to repeat the procedure for any additional courses, unless you change your clicker. If you have not already registered your clicker ID for another course on Blackboard you must do so by noon, Monday, **August 31**. Use the Blackboard “Clicker Registration” link and be careful not to enter the letter “o” in place of zero (0) when entering your device ID. The letter “o” is not used in any device ID. *If you miss the deadline or change clickers during the semester you must send me your new clicker ID by email.* The Blackboard registration mechanism will not be used after the August 31 deadline. You will not receive clicker question points unless your current clicker ID is registered in advance of the lecture.

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.
- 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 (usually the evening before the lecture). 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 Blackboard Email Notifications” under the “More Course Info” link on Blackboard.

- Exam and clicker grades will also be posted on Blackboard. Homework quiz grades will be available on LaunchPad. Contact me immediately if there are any issues regarding your clicker or homework grades.
- 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.

Student Evaluation

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

54% Best three of the four in-class exams (18% of your final grade for each)
31% Comprehensive final exam
10% Homework (Quizzes and Learning Curve activities)
5% Clicker points
100%

Grading Scale:	90-100%	A	67-70%	C
	87-89%	A-	63-66%	C-
	83-86%	B+	59-62%	D+
	79-82%	B	55-58%	D
	75-78%	B-	50-54%	D-
	71-74%	C+	<50%	F

A **midterm** grade will be posted on Blackboard to give you an indication of how well you are doing in the course near the midpoint. It will be calculated using the averages of the available in-class exam, quiz and clicker results, weighted 85%, 10% and 5% respectively. Students that have stopped attending class will be reported at this time to meet state and federal laws regarding financial aid disbursement.

Homework

- Homework will consist of pre-lecture quizzes and adaptive learning questions (LearningCurve) accessed on the LaunchPad textbook website.
- 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*.
- The first homework assignment will be due on **August 31** before the third lecture. The homework will continue through the remainder of the semester and will be due **at 3 pm**, one hour before the start of each lecture.
- Pre-class activities will consist of quizzes due before each lecture and LearningCurve activities due before each exam. Each quiz will contain multiple-choice and fill in the

blank type questions for a total of ten points. LearningCurve is a personalized and adaptive learning program that uses game-like quizzing to motivate and engage students. Completion of each LearningCurve activity will also earn ten points.

- Homework quizzes can be taken twice so you can try to improve your score if necessary.
- Your lowest pre-class quiz or LearningCurve activity will be dropped from the calculation of your final homework grade.
- If you have any problems with the LaunchPad web site, including registration or access to the homework, call the **tech support line at 1-800-936-6899**. An extension to the homework deadline will not be given unless there is record with LaunchPad tech support indicating you attempted to resolve your issue before the homework due date.

Clicker Questions

- In each lecture you will be asked several “clicker questions” about the lecture material. Your responses will be recorded using the Turning Technologies response card (clicker).
- **A full point is given for a correct answer, half a point for an incorrect answer.**
- Your clicker must be set to channel 41 to communicate with the receiver.
- We will start using the clickers in the third lecture (**August 31**).
- The grading system for clicker questions will be set so that you can still receive full credit even if you miss two classes during the semester. If, for example, 110 clicker points are available over the course of the semester (22 lectures x 5 questions) then you will only need to collect 100 points to receive the full 5% credit for clicker points.
- A small prize will be given to the student that maintains a perfect clicker score for the longest period through the semester.

Exam Information

- There will be four one-hour exams during the semester and each will consist of 50 multiple-choice questions and two bonus questions. The best three will count toward your final grade. These exams will cover only new material (since the last exam). Exam questions will be based on the material covered in the lectures and will address the main learning outcomes.
- **You may view your most recent exam in my office, only up until the day of the next scheduled exam. You have this same time period to respond with any exam grading concerns.**
- The final exam (two hours in length) will be comprehensive and consist of 100 multiple-choice questions and five bonus questions. Approximately half of the exam will cover the last section of the course while the remaining half of the exam will cover the earlier sections of the course.
- Bring at least two pencils and an eraser to the exams.
- Students will be asked to present a **picture ID** when turning in their exam.
- 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.
- 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.

- 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 clicker grades or 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>”
- Bringing a clicker to class for someone else is considered academic dishonesty for both students involved. Both students will be sanctioned according to university policy.
- 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 clicker points 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. 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. Go to the S.I. sessions to reinforce the material.
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 will not lead to success. *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.
4. **Test yourself.** Have a roommate or classmate ask you questions about the material in your notes. Do all of the available LaunchPad activities (Quizzes, Flash Cards, Tutorials, etc.) and the self-assessment questions in the textbook. Testing yourself will let you know where you might have to spend more time on the details.
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 can be found in the files "Keys to Success" and "Survival Skills" under the "More Course Info" link on Blackboard.
7. 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.

Course Schedule

Date	Lecture	Topic	Chapter
Aug 24	1	Chemistry of Life	2
Aug 26	2	Macromolecules I: Proteins, Carbohydrates and Lipids	2
Aug 31*	3	Macromolecules II: DNA is the Genetic Material	2/3
Sept 2	4	Transcription and RNA Processing	3
Sept 7		<i>Labor Day</i>	
Sept 9	5	Translation and Protein Structure	4
Sept 14		Exam I	
Sept 16	6	Membranes, Diffusion and Osmosis	5
Sept 21	7	The Internal Organization of Cells	5
Sept 23	8	Energy and Enzymes	6
Sept 28	9	Cellular Respiration	7
Sept 30	10	Cellular Respiration II	7
Oct 5		<i>Fall Break</i>	
Oct 7		Exam II	
Oct 12	11	Photosynthesis	8
Oct 14	12	Cell Communication	9
Oct 19	13	Cytoskeleton	10
Oct 21	14	Cell Junctions and the Extracellular Matrix	10
Oct 26	15	Cell Division I	11
Oct 28		Exam III	
Nov 2	16	Cell Division II	11
Nov 4	17	DNA Replication	12
Nov 9	18	DNA Manipulation and Genomes	12/13
Nov 11		<i>Veterans Day</i>	
Nov 16	19	Genomes and Mutations	13/14
Nov 18	20	DNA Mutations and Genetic Variation	14/15
Nov 23		Exam IV	
Nov 25		<i>Thanksgiving</i>	
Nov 30	21	Genetics I: Mendelian Inheritance	16
Dec 2	22	Genetics II: Dominance, Epistasis and Sex Chromosomes	16
Dec 7	23	Genetics III: Linkage and Complex Traits	17/18
Dec 9	24	Regulation of Gene Expression	19
Dec 17		Final Exam (2:45 - 4:45 p.m.)	

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.

*Register your **clicker** by noon on August 31, the day of first use. If you miss the deadline please email me your clicker ID instead of using the Blackboard registration. This also applies if you change your clicker ID during the semester. This is also the day the first of the **pre-class quizzes** is due.

Other important dates: September 4 is the last day to drop; October 30 is the last day to withdraw