Honors Fundamentals of Life Science II

BIOL 2170-091 - Spring 2015
MW from 1:00-2:40 p.m. in WO1240

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.

Course Description

As a requirement for biology majors this course is the second 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 use a new textbook, designed to emphasize core concepts, and online content including videos and notes (organized on "iTunes U") to formulate a basic level of molecular biology knowledge outside the classroom. Active analysis of course topics will take place during class time using a combination of instructor-guided discussions and student-centered learning activities. Students will use an Apple iPad to view the online content at home and to participate in the active learning sessions during class.

The course at least partially follows a "flipped classroom" model where homework-like activities are performed in the classroom while information previously obtained in lectures is instead acquired at home using the online materials.

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

If you have taken BIOL 2150 previously you should already have the required textbook and access to the LaunchPad website, however you will still have to re-register to LaunchPad at a course-specific URL that will be sent to you by email. 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.
- **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. LaunchPad access instructions will be sent to you by email.
- **Apple iPad**: Students are required to bring an Apple iPad to class. The course will rely on iTunes U, which is only available on the Apple iPad, not any other brand of tablet.
- **iPad Apps:** Please have these free iPad apps loaded and ready to use on your iPad: iTunes U (to access course content), ScreenChomp (for drawing) and LectureTools (to respond to questions in class).

General Information

- CHEM 1090 or a CHEM placement score of 20 or BIOL 2150 is a prerequisite for this course.
- Exam, "clicker" and discussion grades will be posted on Blackboard. Grades for online homework will be available on LaunchPad. Contact me immediately if there are any issues regarding your clicker or homework grades.
- You can view your most recent exam in my office, only up until the day of the next scheduled exam. You will only have this time period to respond with any exam grading concerns.
- Put away your cell phone while in class. Make sure it is off or in silent mode.
- While you are in the classroom your iPad or laptop is to be used only for participation in the assigned learning activities or for note taking.
- Please do not bring food into the classroom, although a drink is acceptable.
- If you wish to make audio recordings of the classroom activities 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:

45%	Best three of the four in-class exams (15% of your final grade for each)
25%	Comprehensive final exam
18%	In-class learning activities including "clicker" questions
10%	Homework (quizzes and Learning Curve adaptive learning questions)
2%	Discussion board contributions
---	Honors assignment (see below for details)
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 exam, quiz, clicker, discussion and in-class activity results, weighted 70%, 10%, 5%, 2% and 18% respectively. Students that have stopped attending class will be reported at this time to meet state and federal laws regarding financial aid disbursement.

iTunes U

- As this course partially follows the flipped classroom model, along with the textbook readings your homework will include regular viewing of assigned online content, such as mini-lecture videos and notes, which will be available on iTunes U.
- Enroll in the BIOL2170 iTunes U course by following the instructions posted on Blackboard. Do this as soon as possible as you will be expected to access the syllabus at the first class.

Quiz Homework

- Pre-class quizzes will be taken using the LaunchPad textbook website. Most quizzes will consist of ten multiple-choice or fill in the blank type questions.
- The quizzes are assigned to encourage viewing and promote retention of the assigned online content and textbook readings. *It is important to read the appropriate sections of the textbook before taking the quiz.*
- Quizzes are due before the start of class.
- The first quiz will be due on **January 21** before the third class. The quizzes will continue through the remainder of the semester and will be due before the start of each class.
- You can take each quiz twice to try to improve your score if necessary.
- Adaptive quizzing using LearningCurve will be assigned before exams instead of the regular quizzes. LearningCurve is a personalized learning program using game-like quizzing to motivate and engage students. It is available within LaunchPad. Each LearningCurve assignment will be given the same grading "weight" as a pre-lecture quiz.
- Your lowest pre-class quiz or LearningCurve activity grade will be dropped from the calculation of your final homework grade.
- If you have any problems signing on to LaunchPad or using the website please call **tech support at 1-877-587-6534**. Homework deadline extensions will not be given unless there is record that you attempted to resolve your issue with LaunchPad tech support or the instructor before the homework due date.

Discussion Board

- Before every class session you will be required to ask a question about the textbook or online material using the discussion board. This encourages students to think critically about the assigned materials and identifies topics that require additional discussion in class.
    - Deadline to submit your question on the discussion board: **10 am** the day of class. The first discussion board question must be submitted by **January 21** before the third class.
    - Grading: The focus is on participation. For each pre-class discussion forum one point will be given for any "reasonable" question or comment related to the material.
    - Discussion grade (%) = Total points collected/(Total points available - 1) x 100
    - The most interesting and the most frequent questions will be addressed in the next class.
- A 1% **bonus** will be added to the final grades of three students who contribute the most interesting questions through the semester.
- Students are also encouraged to reply to any question on the discussion board if they know the answer or have an insightful comment. Three students that make the most regular and substantial contributions to the discussion board will also be considered for a 1% **bonus**.

In-Class Activities

- Classes will typically begin with discussions based on the assigned online content with a focus on answering the questions submitted to the discussion board.
- A short topic-based lecture will follow to re-enforce material not available in the online content.
- Student-centered learning activities will usually occupy the remainder of the class time. Education research indicates active learning strategies, such as those used in this course, result in increased learning and retention and better develop a student's critical thinking ability.
- The types of activities will include case studies, think-pair-share, concept mapping, problem sets, quizzes and minute papers. Students will be assessed during these activities either through the collection and grading of their written work or by recording their responses to "clicker" questions.
- Formative assessment: Students will have the opportunity to immediately view the results of their clicker responses. Repeated questioning (graded and non-graded) through the class period will allow the student and the instructor to quickly gauge student understanding and adjust the activities accordingly as the class progresses.

Honors Assignment

- The honors version of BIOL2170 requires an additional group assignment (four students per group) to be completed. The assignment is to produce a short five-minute video on your iPad where you discuss a topic of current interest in molecular biology in the format of a science news show where you explain the importance of your topic to the viewer.
- Your group will choose a topic to discuss based on a suitable article of your choice that was recently published in a newspaper, magazine or journal article.
- The first step in the assignment will be to pick a topic (first approved by the instructor) and write a paragraph outlining your discussion of the chosen topic (due: February 18). The second step will be to write a draft of the script for your video (due: April 1). The final video will be due April 27. The rubric for this assignment will be available on Blackboard.
- Students that complete the assignment and meet expectations will have passed the honors requirements for this course and will receive the honors designation. Those that exceed

expectations will also have their final grade increased to the next higher letter grade, for example an A- would be increased to an A. Those that do not complete the assignment, or do not meet the expectations set out for the assignment, will receive a two-step decrease in their final grade (A down to B+, for example).

- Note that the **assignment details may change** and we may instead do a classic written assignment depending on a student vote.

Exam Information

- There will be four one-hour exams during the semester and each will consist of a combination of multiple-choice and short answer questions. These exams will cover only new material (since the last exam). Exam questions will be based on the online content and material covered in class.
- The final exam (two hours in length) will be comprehensive and the same format as the in-class exams. 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.
- 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 in-class activity grades or quiz 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 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 with no multiple-choice questions.
- 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"
- Using someone else's iPad to answer "clicker" questions during class 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 that violate these rules will receive an F for the exam.

Keys to Success

1. **Attend every class.** Learning activities and in class questions will count for 18% of your final grade. In-class activities will allow you to develop your critical thinking skills and help strengthen your understanding of the material.
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 class or during office hours.
3. **Be active with your studying.** Making a separate set of concise study notes will aid in your ability to understand and retain the concepts you learn from the textbook, the online resources and the in class activities. Passively reading the textbook or watching videos without being engaged in the material will 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 online LaunchPad activities (Quizzes, Animations, 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" on iTunes U and under the "More Course Info" link on Blackboard.
7. A list of valuable resources, to help you with your 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	Session	Topic	Chapter
Jan 12	1	Chemistry of Life	2
Jan 14	2	Macromolecules I: Proteins, Carbohydrates and Lipids	2
		Martin Luther King Holiday	
Jan 21*	3	Macromolecules II: DNA is the Genetic Material	2/3
Jan 26	4	Transcription and RNA Processing	3
Jan 28	5	Translation and Protein Structure	4
Feb 2		**Exam I**	
Feb 4	6	Membranes, Diffusion and Osmosis	5
Feb 9	7	The Internal Organization of Cells	5
Feb 11	8	Energy and Enzymes	6
Feb 16	9	Cellular Respiration	7
Feb 18	10	Cellular Respiration II	7
Feb 23		**Exam II**	
Feb 25	11	Photosynthesis	8
Mar 2	12	Cell Communication	9
Mar 4	13	Cytoskeleton	10
Mar 9		*Spring Break*	
Mar 11		*Spring Break*	
Mar 16	14	Cell Junctions and the Extracellular Matrix	10
Mar 18	15	Cell Division I	11
Mar 23		**Exam III**	
Mar 25	16	Cell Division II	11
Mar 30	17	DNA Replication	12
Apr 1	18	DNA Manipulation and Genomes	12/13
Apr 6	19	Genomes and Mutations	13/14
Apr 8	20	DNA Mutations and Genetic Variation	14/15
Apr 13		**Exam IV**	
Apr 15	21	Mendelian Inheritance I	16
Apr 20	22	Mendelian Inheritance II	16
Apr 22	23	Genetic Linkage and Complex Traits	17/18
Apr 27	24	Regulation of Gene Expression I	19
Apr 29	25	Regulation of Gene Expession II	19
May 6		**Final Exam (2:45 - 4:45 p.m.)**	

The pace of the classes 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.

*January 21 is the first day we will be using the Lecture tools app for in-class questions. This is also the day the first of the **pre-class quizzes** is due.

Other important dates: January 26 is the last day to drop; March 27 is the last day to withdraw