Honors Fundamentals of Life Science II

BIOL 2170-091 - Spring 2014
MW from 1:00-2:40 p.m. in WO1240

Instructor

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Office Hours: Monday 10 - 11:00 a.m. & Thursday 1 - 2:30 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, which they will borrow from the university for the semester, 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.
- Understand different types of mutations and their effects on gene products and on phenotype.
- Describe how RNA, DNA and proteins are synthesized.
- Understand the uses of recombinant DNA technologies.
- 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 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**: The University will loan students in this course an iPad for course and personal use during the semester. Basic iPad instruction will be provided by the Honors College.
- **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 Socrative (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, quiz, learning activity, "clicker" and discussion grades will be posted on Blackboard. Contact me immediately if there are any issues regarding your posted grades. Once the exam answers are available you will have *one week to respond* with any exam grading concerns.
- Note that you can arrange your Blackboard settings so that you are informed by email when new course content is posted to Blackboard. For instructions see the file "Changing Notifications in Blackboard" under the "More Course Info" link on Blackboard.
- 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 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.

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, Learning Curve adaptive learning questions and other online activities)
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

iTunes U

- As this course partially follows the flipped classroom model, 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.

Pre-class Quizzes

- Quizzes will be taken using the LaunchPad textbook website. Most pre-class 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.
- Quizzes are due at **noon** the day of the class.
- The first quiz will be due on **January 13** before the start of the third class.
- You can take each quiz twice to try to improve your score if necessary.
- Adaptive quizzing using LearningCurve will at times be assigned 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. Grading details and instructions will be available on Blackboard.
- The grading system for homework questions will be set so that you can still receive full credit even if you miss one assignment during the semester. If, for example, 25 homework activities (10 points each) are assigned over the course of the semester then you will only need to collect 240 points to receive the full 10% credit for homework points.
- 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: **midnight** the evening before class. The first discussion board question must be submitted by **January 12** before the third class.
    - Grading: The grading rubric will be supplied on Blackboard, but it will focus essentially on participation.
    - 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. 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 [Details may still change]

- 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 14). The second step will be to write a draft of the script for your video (due: March 15). The final video will be due April 18. 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).

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.

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.

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. Material covered in class will be emphasized for the exams. 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.

Course Schedule

Date	Session	Topic	Chapter
Jan 6	1	Chemistry of Life	2
Jan 8	2	Macromolecules I: Proteins, Carbohydrates and Lipids	2
Jan 13	3	**First Homework Quiz Due** Macromolecules II: DNA is the Genetic Material	2/3
Jan 15	4	Transcription and RNA Processing	3
Jan 20		*Martin Luther King Holiday* **(Last Day to Drop)**	
Jan 22	5	Translation and Protein Structure	4
Jan 27		**Exam I**	
Jan 29	6	Membranes, Diffusion and Osmosis	5
Feb 3	7	The Internal Organization of Cells	5
Feb 5	8	Energy and Enzymes	6
Feb 10	9	Cellular Respiration	7
Feb 12	10	Photosynthesis	8
Feb 17		**Exam II**	
Feb 19	11	Cell Communication	9
Feb 24	12	Cytoskeleton	10
Feb 26	13	Cell Junctions and the Extracellular Matrix	10
Mar 3		*Spring Break*	
Mar 5		*Spring Break*	
Mar 10	14	Cell Division and Cancer I	11
Mar 12	15	Cell Division and Cancer II	11
Mar 17		**Exam III**	
Mar 19	16	DNA Replication **(Last Day to Withdraw Mar 21)**	12
Mar 24	17	DNA Manipulation	12
Mar 26	18	Genomes	13
Mar 31	19	DNA Mutation and Repair	14
Apr 2	20	Genetic Variation	15
Apr 7		**Exam IV**	
Apr 9	21	Mendelian Inheritance I	16
Apr 14	22	Mendelian Inheritance II	16
Apr 16	23	Sex Chromosomes, Linkage and Complex Traits	17/18
Apr 21	24	Genetic and Epigenetic Regulation I	19
Apr 23	25	Genetic and Epigenetic Regulation II	19
Apr 30		**Final Exam (12:30 - 2:30 p.m.)**	

The pace of the class 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.