BIOLOGY 160: Cellular and Molecular Biology
Fall 2015

Tuesdays and Thursdays 9:40 – 10:30,
Alumni Memorial Building (AMB) Room 32

Instructor: Dr. Crystal McAlvin
Office: 128A Neyland Biology Annex (NBA)
e-mail: cbickley@utk.edu or cmcalvin@utk.edu
Phone: 865-974-2061
Office hours: Tuesdays and Thursdays from 11:00-12:00 pm (or by appointment)

Discussion: Discussions will meet in Neyland Biology Annex (NBA) once per week for 50 minutes each. Discussion accounts for 25% of your lecture grade. You will receive a separate discussion syllabus with additional information.

Required Texts and Materials:
- Mastering Biology software: free with purchase of a new textbook at bookstore; you can also purchase the software directly from Pearson as either Mastering with or without the e-Book.
- TurningPoint response “clicker” (“ResponseCard”) Instructions for registration and use are found on the lecture Blackboard site. Clickers can be purchased at the UT bookstore.

This course will be split between lecture and discussion.

In discussion sections, you will relate the concepts you are learning in lecture to the modern scientific investigations and discoveries being conducted by scientists. The discussion will focus on the same five big ideas (FBIs; see below) and scientific practices as the lecture course, but with a specific focus on helping students to be able to do the following by the end of the semester:
1) Interpret a figure.
2) Formulate a testable hypothesis to address a scientific question.
3) Synthesize information and identify patterns from the primary literature.
4) Evaluate data and come to a conclusion.
5) Use a model to make predictions.

What you should learn in this course (and for a Biology degree)

By the end of the course, you should be able to explain how scientists define and study cell biology, as well as how the five big ideas (FBIs) in biology relate to cell biology:

1) Evolution: Populations of organisms and their cellular components have changed over time through both selective and non-selective evolutionary processes.
2) Structure and Function: All living systems (organisms, ecosystems, etc.) are made of structural components whose arrangement determines the function of the systems.
3) Information Flow and Storage: Information (DNA, for example) and signals are used and exchanged within and among organisms to direct their functioning.
4) **Transformations of Energy and Matter:** All living things acquire, use, and release and cycle matter and energy for cellular/organismal functioning.

5) **Systems:** Living systems are interconnected, and they interact and influence each other on multiple levels.

You should also be proficient in the following **five scientific practices (FSPs):**

- Formulate empirically-testable hypotheses; ask scientific/critical questions
- Synthesize information and identify patterns (from readings or data)
- Interpret visual representations (figures and diagrams)
- Evaluate data and come to a conclusion (with evidence) (formulate an argument)
- Communicate information in writing

**Course Description:** Intended for science majors. An introduction to the major biological concepts emphasizing the cellular and molecular aspects of life. Organized along themes of evolution, structure and function, information flow, exchange and storage, pathways of energy and matter, and systems. **Satisfies General Education Requirement: (NS)**

**How you will learn the material**

- Learning results from being actively engaged with the material, repeatedly and in many forms. You are expected to come to class being prepared by having read the sections assigned for the lecture and by having completed any pre-class assignment.

- Being prepared for lecture is essential to succeed in the course, this includes having taken blackboard quizzes or mastering biology assignments as they arise. The lectures will be constructed assuming you will be responsible enough to prepare as indicated. You will be expected to participate in class discussions and activities and to complete assignments and homework on time. These activities are implemented to help you learn and master the concepts. MasteringBiology includes study modules that can also help you learn.

- The information will be presented in an organized fashion to facilitate learning and will strive to focus on the most challenging concepts. In addition, the instructors will provide you with many activities and assignments to facilitate your engagement with the material as well as to test your understanding, **but you will have to devote time outside of lecture to synthesize and link the concepts together.**

- Quizzes and tests, given in class or on Blackboard, will test your understanding of the concepts, NOT just your ability to memorize information.

**Course Website:** http://online.utk.edu

You will find the Biology 160 discussion and lecture web pages by signing on to Blackboard at http://blackboard.utk.edu/webapps/login/. If you don’t know how to use this resource, tutorials are available at [http://online.utk.edu/](http://online.utk.edu/). You should check Blackboard for new announcements and discussion threads.

You will have two course sites: one for lecture and one for discussion. You will find lecture notes and assignments posted on the lecture Blackboard site. Your discussion instructor will record your grades on the discussion site.
Additional Information on Required Materials

1) Clickers:

Clickers will be required for this class. Clicker questions will be asked randomly during the class, and may be based on previously covered material, reading assignments or any other in-class exercise I deem appropriate.

Clicker questions will be used primarily as a means to determine or track comprehension of the material. Clicker points that accrue over the course of the semester are added in to your overall score. Sometimes they will NOT be graded for accuracy and will count for “participation” points (number of points may vary). Bear in mind however that I will occasionally use clicker questions as a means of quizzing for accuracy points.

You will be offered more clicker points than necessary to account for occasional absences and/or forgetting your clicker. For example, I will offer up to around 175-180 pts worth of clicker questions, and you need to accumulate 150 pts for full credit.

Questions will begin on Tuesday 8/25/15 as a TEST and will start to count for real on Tuesday 9/1/15.

You must register your clicker device ID into the Blackboard course site:
- Go to online.utk.edu and login to your Blackboard course
- From the Course Tools link, click on the TurningPoint Registration Tool
- Enter and confirm your Device ID

2) Mastering Biology software: free with purchase of a new textbook at bookstore; you can also purchase the software directly from Pearson as either Mastering with or without the e-Book.

The first mastering biology assignment is due Monday night! 8/24/15 by 11:59 pm. There will be weekly (sometimes bi-weekly) mastering assignments that total up to 150 pts for Mastering biology assignments. It is YOUR responsibility to check the calendar of due dates in Mastering Biology. I will try to remind you in-class and by email, but it is your job to make sure that you complete your work on time. Late work will be penalized at 25% per day late. After four days, you cannot receive credit for an assignment.

Communications:
- You need to regularly check your UTK e-mail account for weekly announcements related to this course. If you are not receiving those e-mails, there is something wrong with your account! If this is the case, OIT will be able to help you.
- If you need to meet and can’t make office hours, please use your UTK e-mail (spam filters may exclude other addresses) to schedule a meeting.
- I am happy to answer your e-mail questions, but allow up to 24 hours for a response. Also, once we leave our offices we may not check our e-mail until the following workday, or the first day back after a weekend.

Study Rooms:
- 417 Hesler is a quiet study room for majors in Biology. It can also be reserved for group study. There is also a student study room in Neyland Biology Annex, room 103.
Grading and Exams:
The following grading rubric is a very close approximation of how points will be distributed. Please be aware that this is subject to modification.

Lecture exams will consist of multiple-choice questions along with short answer questions that total up to 100 pts. The final exam will consist of multiple-choice and short answer questions totaling 150 points. Discussion, clicker quizzes and assignments will make up the remaining points.

- Three regular exams (100 pts each) 300 points
- One Final exam 150 points
- Discussion 250 points
- In-class assignments & Clicker questions 150 points
- Mastering Biology 150 points

Course Total: 1000 points

Exams / Quiz / Assignment Policies:

- NO make-up in-class activities, clicker points, or mastering biology assignments will be given.
- There will be “extra” clicker points built into the course to allow for missing classes, forgetting your clicker, etc.
- Mastering biology will be set up to deduct 25% per day late to account for late work or forgetting an assignment.
- NO make-up exams will be given without a valid excuse (e.g., family emergency, medical emergency, etc). The excuse MUST be documented.
- VERY IMPORTANT: If you are going to miss an exam, you MUST contact me prior to the start of the exam. Send us an e-mail, and if you don't receive an acknowledgment of your email, send it again.
- Make-up exams may be short answers, fill-in-the-blanks, or essay and will be scheduled at the instructor's convenience and by their permission only.
- Assignments turned in after the due date will lose 25% of the points per 24 hours after the deadline.
- All work should be done independently (unless group work is permitted, and then you may ONLY work within your group on the assignment); plagiarism software will be used to check written assignments for copying from classmates or other sources. Plagiarism will result in stiff penalties – please see section below. **Using a classmates’ clicker to give them points is cheating!!**
- Exams will be prepared from all information sources: lecture, textbook, assigned reading outside of the textbook or handouts.
- Exam, quiz, assignments and activity scores will be posted on our class Blackboard site (online@UT)
- Be aware that no individual credit will be available for this class outside of what each instructor may offer for the entire class, i.e., no extra credit may be offered to a single student or a group of students if it is not also offered to the entire class.
Final letter grades will be determined by the total percentage of accumulated points as follows:

- A  93 – 100%
- A-  90 – 92%
- B+  87 – 89%
- B  83 – 86%
- B-  80 – 82%
- C+  77 – 79%
- C  73 – 76%
- C-  70 – 72%
- D+  67 – 69%
- D  63 – 66%
- D-  60 – 62%
- F  <60%

**Statement on Disabilities**
If you need course adaptations or accommodations because of a documented disability, or if you have questions about disabilities, contact Disability Services in 2227 Dunford Hall or call 974-6807 or email ods@utk.edu or visit their website at http://ods.utk.edu/

**Academic Counseling:**
Counseling Center: http://counselingcenter.utk.edu/
900 Volunteer Blvd
974-2196
email: counselingcenter@utk.edu

**Tutoring:**
The Division of Biology does not offer tutoring services. Your instructor (and lab instructor) will be happy to assist your learning (e.g. during office hours) but cannot serve as your personal tutor. Contact the Student Success Center and the Academic Support Unit of the Office of Minority Student Affairs for information about tutoring opportunities

1) The Student Success Center is a comprehensive source for information, services and resources to assist your success at UT: http://studentsuccess.tennessee.edu/studentsuccesscenter/
1817 Melrose Avenue
974-6641
email: studentsuccess@utk.edu

2) The Academic Support Unit of the Office of Minority Student Affairs offers some tutoring available to all students, but openings are limited and are filled quickly.
http://omsa.utk.edu/services/
1800 Melrose Avenue
974-6861
email: omsa@utk.edu

**Technical Assistance:**
http://remedy.utk.edu/contact/
Blackboard, clickers and/or general information regarding technical assistance:
Help Desk: 974-9900
OIT Computer Support Service Center and Walk-in Help Desk: Commons floor of Hodges Library
Statement on the Academic Dishonesty

Academic dishonesty of any sort will not be tolerated. This includes any action where you are misrepresenting work as your own: plagiarism, cheating on exams, copying another’s work, etc. You are expected to abide by the University of Tennessee’s honor statement:

“An essential feature of The University of Tennessee is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of the University, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity.”

All work should be done independently (unless group work is permitted, and then you may ONLY work within your group on the assignment); plagiarism software will be used to check written assignments for copying from classmates or other sources. **Plagiarism will result in stiff penalties. **Using a classmates’ clicker to give them points is plagiarism!!

Penalties for academic dishonesty range from the grade of zero for the assignment to an F for the course to the filing of formal academic dishonesty charges seeking dismissal from the University.
### Lecture Schedule

**This schedule is tentative and subject to change**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 20</td>
<td>Class Introduction, Cell Theory</td>
<td>Chapter 1.2</td>
</tr>
<tr>
<td>Aug 25</td>
<td>Chemical elements, chemical bonds, water, and functional groups</td>
<td>Chapter 2.1, 2.2, and 2.5</td>
</tr>
<tr>
<td>Aug 27</td>
<td>Biological Macromolecules: Proteins</td>
<td>Chapter 3.1-3.4</td>
</tr>
<tr>
<td>Sept 1</td>
<td>Biological Macromolecules: Nucleic Acids</td>
<td>Chapter 4.1-4.4</td>
</tr>
<tr>
<td>Sept 3</td>
<td>Biological Macromolecules: Carbohydrates</td>
<td>Chapter 5.1-5.3</td>
</tr>
<tr>
<td>Sept 8</td>
<td>Biological Macromolecules: Lipids, Membranes, transport across membranes, and transport of protein in the cell</td>
<td>Chapter 6.1-6.4, and Chapter 7.2-7.5</td>
</tr>
<tr>
<td>Sept 10</td>
<td>Transport across membranes and transport of protein in the cell, and cellular organelles</td>
<td>Chapter 6.1-6.4 and Chapter 7.2-7.5</td>
</tr>
<tr>
<td>Sept 15</td>
<td>Exam 1</td>
<td>Exam 1</td>
</tr>
<tr>
<td>Sept 17</td>
<td>Energy and Enzymes</td>
<td>Chapter 8.1-8.5</td>
</tr>
<tr>
<td>Sept 22</td>
<td>Harvesting chemical energy: respiration and fermentation</td>
<td>Chapter 9.1-9.6</td>
</tr>
<tr>
<td>Sept 24</td>
<td>Harvesting chemical energy: respiration and fermentation continued</td>
<td>Chapter 9.1-9.6</td>
</tr>
<tr>
<td>Sept 29</td>
<td>Photosynthesis: Energy from the sun</td>
<td>Chapter 10.1-10.3</td>
</tr>
<tr>
<td>Oct 1</td>
<td>Photosynthesis: Energy from the sun</td>
<td>Chapter 10.1-10.3</td>
</tr>
<tr>
<td>Oct 6</td>
<td>Exam 2</td>
<td>Exam 2</td>
</tr>
<tr>
<td>Date</td>
<td>Topic</td>
<td>Chapter</td>
</tr>
<tr>
<td>-------</td>
<td>------------------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Oct 8</td>
<td>Cell cycle and cell division: organization of the chromosome and mitosis</td>
<td>12.1-12.4</td>
</tr>
<tr>
<td>Oct 13</td>
<td>Cell cycle and cancer</td>
<td>12.1-12.4</td>
</tr>
<tr>
<td>Oct 15</td>
<td>FALL BREAK</td>
<td>FALL BREAK</td>
</tr>
<tr>
<td>Oct 20</td>
<td>Meiosis, recombination and diversity</td>
<td>13.1-13.3</td>
</tr>
<tr>
<td>Oct 22</td>
<td>Meiosis, recombination and diversity</td>
<td>13.1-13.3</td>
</tr>
<tr>
<td>Oct 27</td>
<td>DNA replication: synthesis and repair</td>
<td>15.1-15.5</td>
</tr>
<tr>
<td>Oct 29</td>
<td>DNA replication: synthesis and repair</td>
<td>15.1-15.5</td>
</tr>
<tr>
<td>Nov 3</td>
<td>Exam 3</td>
<td>Exam 3</td>
</tr>
<tr>
<td>Nov 5</td>
<td>How genes work, information flow in a cell: transcription and translation</td>
<td>16 and 17.1-17.4</td>
</tr>
<tr>
<td>Nov 10</td>
<td>Transcription and translation continued</td>
<td>16 and 17.1-17.4</td>
</tr>
<tr>
<td>Nov 12</td>
<td>Control of Gene Expression in Bacteria</td>
<td>18.1-18.5</td>
</tr>
<tr>
<td>Nov 17</td>
<td>Control of Gene Expression in Eukaryotes</td>
<td>19.1-19.6</td>
</tr>
<tr>
<td>Nov 19</td>
<td>Biotechnology</td>
<td>20.1-20.6</td>
</tr>
<tr>
<td>Nov 24</td>
<td>Biotechnology continued</td>
<td>20.1-20.6</td>
</tr>
<tr>
<td>Nov 26</td>
<td>Thanksgiving</td>
<td>Thanksgiving</td>
</tr>
<tr>
<td>Dec 1</td>
<td>Review</td>
<td>Review</td>
</tr>
<tr>
<td>Dec 8</td>
<td>Final exam</td>
<td>Cumulative</td>
</tr>
</tbody>
</table>