SYLLABUS for
Biology 1610 Fundamentals of Biology I
Spring 2019

Course Description
This course introduces the workings of life from the molecular to the multi-cellular level. Topics include molecular and cellular biology, energy metabolism, genetics, information flow, and cell signaling in development. We will use active learning - a form of evidence-based teaching strategy that directly involves the students in the learning process. Data show that active learning strategies significantly enhance student learning. Student participation both inside (in learning activities) and outside the classroom is essential. This course is part of a four-course sequence, which includes 1620 (focusing on evolution, physiology, and ecological interrelationships), and two labs, 1615 and 1625. 3 credits

Class Time and Location: Tuesdays and Thursdays 10:45 am to 12:05 pm in WEB 2230

Instructors and Class Help

Instructors for this course are:
Dr. Naina Phadnis leads module 1
Dr. Renee Dawson leads modules 2-4.

Instructor Office hours:
- Dr. Phadnis will not have regularly scheduled office hours but is happy to meet with you anytime by appointment. You can set up an appointment or ask quick questions by email. Please email Dr. Phadnis at <naina.phadnis@utah.edu>.
- Dr. Dawson will have office hours on Tuesday and Thursday from 12:30pm to 1:30pm in JTB 335 or you can set up a separate appointment by email. Please email Dr. Dawson at <dawson@biology.utah.edu>.
- Please DO NOT email instructors through Canvas. Email instructors directly at the email addresses listed above. Please put Biol 1610 in the subject line so your email can be given preference. Please also give both instructors 24 working hours to respond to your email.

Study Hall and Class Help: A designated and marked space in the Biology learning center (first floor of biology building) is our Study Hall. Students are encouraged to meet there to work on course assignments. This course offers Teaching Assistants (TAs) as well as Learning Assistants (LAs). TAs assist both the teachers and students while LAs specifically assist the students with their learning. LAs are undergraduate students who, through the guidance of weekly preparation sessions and a pedagogy course, facilitate discussions among groups of students that encourage active engagement, uncover misconception, and overcome content hurdles. LAs can help you with all course assignments and class concepts. LAs will not simply “give you the answer”. They will instead direct and empower you to figure out the answer on your own. LAs are available at designated times in the Study Hall. Students can also use that study hall space whenever the building is open to study and complete assignments. Please click on the link on the Canvas home page to access all LA/TA times and resources available to you.

Required Materials

on how to connect to Launchpad and iClicker Reef can be found on the Canvas home page. Please click on the GET STARTED Link on the canvas home page to access these instructions. Help will also be provided on the first day of class.

2. **Electronic Devices in Class**: Students are encouraged to bring their primary electronic devices (laptops/tablets/smart phones) to access course content and to participate in course activities. Do not use those devices in class for non-course related activities because it disrupts the class. The instructor has the right to ask you to leave the classroom for such behavior.

**Course Structure**

This course uses Canvas to guide student learning through three components: Pre-class, In-class and Post class work. Please click on the "Start Here" Link on the Canvas home page to find details about the course and a canvas course navigation video that lays out the structure of the course on canvas.

- **Pre-class**: Will include assigned readings, videos to watch, self-study, and an on-line pre-class graded assignment. These required assignments will be posted on canvas on the pre-class page for each class, and will be available one week prior to class meeting. Each pre-class online assignment is due by 9am the day of the class.

- **In-class**: A class may begin with a discussion designed to address misconceptions revealed by the pre-class assignment and extend student learning by in depth discussion of key concepts. An audience response system, the Reef App, will be used to assess student learning. For select core or challenging concepts, a learning activity will be carried out to help improve student comprehension. Worksheets for in-class activities will be graded and need to be handed to the TAs. *Recording class sessions without instructor permission is prohibited. Those with permission should use the recordings for personal study only. Students should not post class recordings in any public forum or pass on recordings to another student."

- **Post-class**: Students are expected to read the book, review class-notes and reflect upon the in-class session. Students have to complete an online graded post-class assignment for each week’s coursework. All post class online assignments are due Tuesday of the following week, by 11:59pm.

**Assignments and Grading**

Course grade will be determined from your percentage score out of 900 total points. Cumulative scores of 90%, 80%, 70% or 60% will guarantee grades of not less than A-, B-, C- and D respectively. See Assignment and grading table below.

<table>
<thead>
<tr>
<th>Assignment (Goal) Information</th>
<th>Total Points (calculation)</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **Pre-class** (Students explore and engage) Canvas pages include pre class work and Launchpad assignment | 50 (From percentile score) | • Students have 3 attempts per assignment.  
• Canvas will automatically **drop 3 lowest** scores.  
• Students will use score drop for missed assignments. |
| **In-class clickers** (Assess learning and identify misconceptions) Students will use the Reef app to participate in clicker activities. Subscription is included with textbook. | 50 (From percentile score) | • Canvas will automatically **drop 3 lowest** scores.  
• Students will use score drop for missed assignments. |
### Post Class: Draw to learn
*Draw to Learn* assignment on canvas. Upload a picture of your drawing from your notebook.

| 100 (From percentile score) | • Canvas will automatically drop 3 lowest scores.  
• Students will use score drop for missed assignments. |

### Post-class: Assessments
(Reinforcement, and practice)
*Canvas pages include post class work: practice exams and/or Launchpad assignment.*

| 100 (From percentile score) | • Students have 2 attempts per assignment.  
• Canvas will automatically drop 2 lowest scores.  
• Students will use score drop for missed assignments. |

### Worksheets
(Reinforce core concepts, metacognition, practice)
*Worksheets will be provided in class or on canvas.*

| 100 (From percentile score) | • Group work in class or practice exams available on canvas. Turn in to LAs or TAs.  
• Canvas will automatically drop 2 lowest scores.  
• Students will use score drop for missed assignments. |

### Quizzes
(Evaluate at regular intervals)
*In class, on paper, see schedule for dates*

| 100 (total score earned) | • Five 20-point quizzes  
• Practice exam-style questions  
• Will help students and instructors evaluate learning.  
• No drops |

### Mid Term exams
(Summative assessment)
*In class, on paper, see schedule for dates*

| 250 (total score earned) | • Two 125-point exams  
• Practice exams will be provided.  
• No drops |

### Final exam
(Summative assessment)
*In class, on paper, see schedule for dates, compulsory i.e. E for not taking*

| 150 (total score earned) | • 50% new material after second Mid term +50% comprehensive  
• Practice exams will be provided.  
• No drops |

### Total Points
900 Total Points

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**TENTATIVE) 1610 CLASS SCHEDULE**

*Please note that we may modify the course schedule to accommodate the needs of our class. Any changes will be announced in class and posted on Canvas under announcements*

<table>
<thead>
<tr>
<th>Class #</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1       | T, Jan 8 | **Module 1: Life and its Building Blocks**  
Introduction to the course |
<p>| 2       | H, Jan 10 | What is Life? |
| 3       | T, Jan 15 | Fundamentals of life’s chemistry |
| 4       | H, Jan 17 | Water is essential for life: Why? |
| 5       | T, Jan 22 | <strong>Quiz 1</strong> + pH and building blocks of life |
| 6       | H, Jan 24 | Nucleic Acids |</p>
<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Schedule</th>
</tr>
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<tbody>
<tr>
<td>7</td>
<td>T,  Jan 29</td>
<td>Proteins</td>
</tr>
<tr>
<td>8</td>
<td>H,  Jan 31</td>
<td>Enzymes and Energy</td>
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<tr>
<td>9</td>
<td>T,  Feb 5</td>
<td><strong>Module 1: Capstone</strong></td>
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<tr>
<td>10</td>
<td>H,  Feb 7</td>
<td><strong>Exam 1</strong></td>
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<td><strong>Module 2: Information Flow</strong></td>
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<tr>
<td>11</td>
<td>T,  Feb 12</td>
<td>DNA Replication</td>
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<td>12</td>
<td>H,  Feb 14</td>
<td>Transcription</td>
</tr>
<tr>
<td>12</td>
<td>T,  Feb 14</td>
<td>Quiz 2 + Translation</td>
</tr>
<tr>
<td>13</td>
<td>H,  Feb 21</td>
<td>Connect concepts</td>
</tr>
<tr>
<td>14</td>
<td>T,  Feb 26</td>
<td>Cell cycle and Mitosis</td>
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<tr>
<td>15</td>
<td>H,  Feb 28</td>
<td>Meiosis</td>
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<tr>
<td>16</td>
<td>T,  March 5</td>
<td>Mendelian Genetics</td>
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<td>17</td>
<td>H,  March 7</td>
<td>Quiz 3 + Mendelian Genetics</td>
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<td><strong>March 10-17 Spring Break</strong></td>
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<tr>
<td>18</td>
<td>T,  March 19</td>
<td><strong>Module 2: Capstone</strong></td>
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<td>19</td>
<td>H,  March 21</td>
<td><strong>Exam 2</strong></td>
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<td><strong>Module 3: Energy use and conversion</strong></td>
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<tr>
<td>20</td>
<td>T,  March 26</td>
<td>Lipids and Membrane transport</td>
</tr>
<tr>
<td>21</td>
<td>H,  March 28</td>
<td>Fundamentals of energy conversion</td>
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<tr>
<td>22</td>
<td>T,  April 2</td>
<td>Quiz 4 + Capturing energy from light: Photosynthesis</td>
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<tr>
<td>23</td>
<td>H,  April 4</td>
<td>Energy Production from Carbohydrate Oxidation: Respiration</td>
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<tr>
<td>24</td>
<td>T,  April 9</td>
<td>Connect Ideas</td>
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<tr>
<td>25</td>
<td>H,  April 11</td>
<td><strong>Module 3: Capstone</strong></td>
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<td><strong>Module 4: Multicellularity and Development</strong></td>
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<tr>
<td>26</td>
<td>T,  April 16</td>
<td>Cell-Cell communication</td>
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<tr>
<td>27</td>
<td>H,  April 18</td>
<td>Development of multicellular organisms</td>
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<tr>
<td>28</td>
<td>T,  April 23</td>
<td>Quiz 5 +Course Capstone</td>
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<tr>
<td></td>
<td>W,  May 1</td>
<td>Final Exam (10:30 am -12:30pm) COMPREHENSIVE</td>
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**Expected Learning Outcomes**

After this course students should be able to…

- Recall and describe the four major classes of biomolecules and their relationships to cellular structures and functions.
- Explain the cellular and molecular basis of energy use and conversion.
- Apply the principles of genetics to explain how information is stored, transmitted and used.
- Provide examples of how multicellular organisms are complex cellular networks that integrate and respond to information.
- Read and interpret scientific literature, graphs and data.
- Communicate scientific concepts through individual and group activities.
• Evaluate interactions between biology and society.

Broad Learning Objectives for Core Concepts in Biology

• **Evolution.** Students will be able to apply the principles of natural selection and mechanisms of genetic change, including trait variation and heritability, to explain the observed diversity of life that has arisen over long-term as well as recent evolutionary time frames.

• **Transmission, flow and interpretation of biological information.** Students will be able to apply a knowledge of genetics, gene expression, growth and development, signal perception and transduction, and physiological regulation to explain how information is stored, transmitted and utilized in biological contexts.

• **Structure and function.** Students will be able to apply knowledge of molecular, cellular, and organismal structures to explain the diverse set of functions – ranging from the sub cellular to behavioral to ecological – that underlie the remarkable diversity of individual organisms as well as communities of organisms.

• **Systems.** Students will be able to explain how biological units interact to give rise to emergent properties at multiple levels of biological organization. These interactions range from the cycling of matter and energy at the subcellular to organismal to biogeochemical scales to the interaction and interdependency of organisms, including humans, with their environment.

• **Ability to apply the process of science.** Students will be able to apply the process of science to identify knowledge gaps, formulate hypotheses, and test them against experimental and observational data to advance an understanding of the natural world.

• **Ability to use quantitative reasoning.** Students will be able to use mathematical and computational methods and tools to describe living systems and be able to apply quantitative approaches, such as statistics, quantitative analysis of dynamic systems, or mathematical modeling.

• **Ability to participate in the interdisciplinary nature of science** through clear communication and collaboration with other disciplines. Students will be able to apply concepts and sub disciplinary knowledge from within and outside of biology in order to interpret biological phenomena, communicate with clear written and oral arguments, and work collaboratively to solve problems.

• **Ability to explain the relationship between science and society, and engage.** Students will be able to evaluate the interactions between biology and society, including the societal impacts of biological research as well as public perception and decision making about science, and clearly communicate biological concepts and their implications to broad audiences.

Course Policies

**Missed assignments:** Generously, three grade drops are provided for all assignments (except exams and quizzes) to accommodate low scores or assignments missed due to unexpected issues. There will be absolutely no make ups for any missed assignments.

**Rescheduling exams:** You can arrange to take make-up exams or quizzes ONLY under EXTENUATING circumstances, for example if you are extremely sick, injured or are under arrest. In all circumstances, makeup exams require official documentation, and instructor permission. IF you have an unplanned medical or legal emergency and are unable to make it to an exam, contact your instructor immediately (within 24 hours). Plan ahead so there is time to call a friend or take the bus if you have an unreliable car.

**Regrading exams:** Do NOT write ANYTHING on your exam after return until you have checked for errors! Exams will not be re-scored if they were taken in pencil or have been altered in any way (a random subset of exams are always photocopied before being returned to students). If you believe the exam has an error, write a
complete explanation, attach it to the exam, and return it to the instructor within 7 days of the exam being returned. Be specific and use sound scientific reasoning to explain why your answer should have been awarded more points.

Attendance & Punctuality: The University and your instructors expect all students to attend all class meetings. Students are expected to acquaint themselves and satisfy the entire range of academic objectives and requirements as defined by this syllabus.

Electronic Devices in Class: Students are encouraged to bring their primary electronic devices (laptops/tablets) to access course content. Devices may only be used for course-related material during class, and the instructor holds the right to ask you to leave the classroom for such behavior.

Equipment Failure: It is your responsibility to maintain your electronic equipment for participation in the course assignments.

Computer and canvas literacy expectations: Students are expected to be computer and internet literate to take this course, including canvas navigation skills. For Canvas orientation, see https://utahtacc.zendesk.com/hc/en-us/articles/205654094. Call 581-4000 for CIS help or bring your laptop to Knowledge Commons on second floor of Marriott Library for help. As will be explained in class, sometimes more than one browser is needed for Launchpad assignments. Post your technical issues to the class discussion board and we will crowd source solutions as issues arise.

Online Classroom equivalency: Discussion threads, emails, Launchpad and canvas are all considered equivalent to classrooms, and student behavior within those environments shall conform to the student code. Specifically:
1. Posting photos or comments off topic in a classroom are still off-topic in an online class forum.
2. Off color language and photos are NEVER appropriate.
3. Using angry or abusive language is called flaming and is not acceptable and will be dealt with according to the student code.
4. Do not use ALL CAPS, except for titles since it is an equivalent of shouting online, as is overuse of punctuation marks such as exclamations!!!!! And question marks?????
5. Course e-mails and other online course communications are part of the classroom and as such are University property and subject to the Student Code. Privacy regarding these communications between correspondents must not be assumed and should be mutually agreed upon in advance, in writing.

University of Utah Policies

Drop, Withdrawal or Incomplete: The University of Utah drop and withdrawal dates are on the class schedule. Also see http://registrar.utah.edu/academic-calendars/index.php. University policy allows assignment of a grade of incomplete (I) if 80% or more of the course work has been completed. I will consider assigning an “incomplete (I)” only under EXCEPTIONAL circumstances unrelated to academic performance, and only if a student is passing the course with a C or better when the “Incomplete” is requested.

Disability accommodations: The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, (801) 581-5020. CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in an alternative format with prior notification to the Center for Disability Services. *If you would like to request academic accommodations due to a disability, please contact Disabled Student Services. If you have a letter from Disabled Student Services indicating you have a disability that requires academic accommodations, please present the letter to me so we can discuss the accommodations you might need for class.
Discrimination and Harassment policies: The University of Utah has zero tolerance for any discriminatory or harassing behavior. Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran’s status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS). For support and confidential consultation, contact Student Wellness 426 SSB, 801-581-7776.

Academic misconduct: All suspected cases of academic misconduct including cheating, answering clicker questions for someone else, and plagiarizing will be dealt with according to rules in the student code, University policy 6-400(V). Please know that looking into someone else’s exam is cheating and will be dealt with seriously as stated above. By accepting admission to the University you have agreed to abide by the University rules provided to you in the student handbook. Take note of B 2 a, b, and c Cheating and plagiarism are serious offenses and can result in getting a zero on the assignment, failing a class, a note in your record or being expelled. Here is the link http://www.admin.utah.edu/ppmanual/8/8-10.html

Wellness: Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness; www.wellness.utah.edu; 801-581-7776.Code of Student’s Rights and Responsibility: http://www.regulations.utah.edu/academics/6-400.html

Note: This syllabus is meant to serve as an outline and guide for this course, and might be modified in response to the needs of the class. All changes will be announced in class and posted on Canvas under Announcements.