Biology 14L Organisms and Populations – Syllabus spring 2016

<table>
<thead>
<tr>
<th>Class Meetings – Cohen Auditorium</th>
<th>Recitation (optional but STRONGLY RECOMMENDED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday 9:30-10:20am</td>
<td>Barnum 008 Monday 4:30-5:20pm</td>
</tr>
<tr>
<td>Tuesday 10:30-11:20 am</td>
<td></td>
</tr>
<tr>
<td>Thursday 10:30-11:20 am</td>
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</tbody>
</table>

Course Professors
Dr. Harry Bernheim (course coordinator 2016) email harry.bernheim@tufts.edu
Dr. Francie Chew email fchew@tufts.edu
Dr. George Ellmore email george.ellmore@tufts.edu

Laboratory Coordinator
Dr. Julia Gouvea email julia.gouvea@tufts.edu

Textbook (author Scott Freeman et al): Biological Science 5th edition. It is strongly recommended that students read the assigned material prior to coming to lecture. Read primarily for concepts and vocabulary; lectures will be the primary source of exam material. Note: The publisher (Pearson) uses different images for the textbook cover – the book you will find at the Tufts bookstore has a lizard on the cover. If you buy it elsewhere, it might have a different cover image. A few copies of the text will be on 3-hour closed reserve at Tisch. We will not use Mastering Biology this semester; instead problem sets will be available on Trunk.

In addition “A Short Guide to Writing about Biology (8th Edition)” by Professor Jan Pechenik (available at the bookstore) is recommended.

Laboratory sessions begin the week of January 25, 2016. If you know you will need to miss a lab (to observe a religious holiday), you MUST get permission from the Lab Coordinator to switch to a different lab at least one week (preferably 2 weeks) prior to the scheduled lab date. YOU MUST PASS THE LAB IN ORDER TO PASS THIS COURSE. The laboratory emphasizes higher-level thinking, often requiring students to design experiments and evaluate their results. For written assignments the internet-based originality-verification system Turn-It-In will be required.

Course goals and objectives: Students will be examined on their knowledge and understanding of material covered in lectures and laboratory activities as well as their ability to solve problems that are relevant to the course content. Upon completing this course, you should be able to:

✓ Understand and explain the basic principles regarding organismal structure and function, and population processes including evolutionary changes. This background serves as a firm basis for more advanced Biology courses for which this course is a prerequisite.
✓ Work independently and in collaboration with others to compile, analyze, interpret, and communicate scientific data and ideas.
✓ Use critical thinking skills developed throughout the semester in both lecture and laboratory. In Trunk problem sets, you will have an opportunity for formative assessment to track your own learning and understanding. In summative assessments (exams, lab reports and quizzes), many of the questions require students to apply information and principles to new situation.
### BIO 14 Lecture & Exam Schedule Spring 2016

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Topic</th>
<th>Prof</th>
<th>Text Assigned*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/21</td>
<td>Th</td>
<td>Course introduction</td>
<td>HB</td>
<td></td>
</tr>
<tr>
<td>1/25</td>
<td>M</td>
<td>Population growth &amp; genetic change in populations</td>
<td>FC</td>
<td>444-462; 1107-1109</td>
</tr>
<tr>
<td>1/26</td>
<td>Tu</td>
<td>Genetic variation &amp; its consequences</td>
<td>FC</td>
<td>48, 269-278; 1132</td>
</tr>
<tr>
<td>1/28</td>
<td>Th</td>
<td>Genetic change between generations</td>
<td>FC</td>
<td>465-472</td>
</tr>
<tr>
<td>2/1</td>
<td>M</td>
<td>Evolutionary processes</td>
<td>FC</td>
<td>472-486; 593-595</td>
</tr>
<tr>
<td>2/2</td>
<td>Tu</td>
<td>Evolutionary processes, case studies</td>
<td>FC</td>
<td>647; 1127-1130</td>
</tr>
<tr>
<td>2/4</td>
<td>Th</td>
<td>Evolutionary processes, case studies, cont’d.</td>
<td>FC</td>
<td>1132-1135</td>
</tr>
<tr>
<td>2/8</td>
<td>M</td>
<td>Speciation 1, isolation &amp; divergence</td>
<td>FC</td>
<td>490-495; 499-501; 1127-1128</td>
</tr>
<tr>
<td>2/9</td>
<td>Tu</td>
<td>Speciation 2: sympatric processes</td>
<td>FC</td>
<td>223; 238-241; 496-497</td>
</tr>
<tr>
<td>2/11</td>
<td>Th</td>
<td>Speciation 3: chromosomal processes</td>
<td>FC</td>
<td>497-499</td>
</tr>
<tr>
<td>2/15</td>
<td>M</td>
<td>No Class President’s Day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2/16</td>
<td>Tu</td>
<td>Evolutionary pathways: plant defenses as case study</td>
<td>FC</td>
<td>115; 506-507</td>
</tr>
<tr>
<td>2/18</td>
<td>Th</td>
<td>EXAM 1 9:30 am (material from 1/25 through 2/16) Check TRUNK for location details Tufts Monday!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2/22</td>
<td>M</td>
<td>Global Carbon through Geological Time</td>
<td>GE</td>
<td>176-189; 659</td>
</tr>
<tr>
<td>2/23</td>
<td>Tu</td>
<td>Photosynthetic adaptation, climate change</td>
<td>GE</td>
<td>190-195; 513</td>
</tr>
<tr>
<td>2/25</td>
<td>Th</td>
<td>Water movement in plants</td>
<td>GE</td>
<td>754-764</td>
</tr>
<tr>
<td>2/29</td>
<td>M</td>
<td>Drying without dying: push-back against climate change</td>
<td>GE</td>
<td>765-766; 810-811</td>
</tr>
<tr>
<td>3/1</td>
<td>Tu</td>
<td>Sucrose is king: phloem as <em>el camino real</em></td>
<td>GE</td>
<td>766-768</td>
</tr>
<tr>
<td>3/3</td>
<td>Th</td>
<td>Sucrose economy: sources and sinks</td>
<td>GE</td>
<td>766-768</td>
</tr>
<tr>
<td>3/7</td>
<td>M</td>
<td>Environmental plasticity; auxin signaling</td>
<td>GE</td>
<td>797-800</td>
</tr>
<tr>
<td>3/8</td>
<td>Tu</td>
<td>Flowering: evidence for signal transduction</td>
<td>GE</td>
<td>802-803</td>
</tr>
<tr>
<td>3/10</td>
<td>Th</td>
<td>Fruit growth &amp; ripening: sugarspots in fields of gold</td>
<td>GE</td>
<td>812-813</td>
</tr>
<tr>
<td>3/14</td>
<td>M</td>
<td>Ethylene and Blue Apple sponges</td>
<td>GE</td>
<td>812-813</td>
</tr>
<tr>
<td>3/15</td>
<td>Tu</td>
<td>Homeostasis/Introduction to respiration</td>
<td>HB</td>
<td>853-854; 902-906</td>
</tr>
<tr>
<td>3/17</td>
<td>Th</td>
<td>EXAM 2 (material from 2/22 through 3/14) Check TRUNK for location details</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/28</td>
<td>M</td>
<td>Respiration—Mechanics 1</td>
<td>HB</td>
<td>909-911</td>
</tr>
<tr>
<td>3/29</td>
<td>Tu</td>
<td>Respiration—Mechanics 2</td>
<td>HB</td>
<td>809-911</td>
</tr>
<tr>
<td>3/31</td>
<td>Th</td>
<td>Respiration—carrying of O2 and CO2</td>
<td>HB</td>
<td>912-916</td>
</tr>
<tr>
<td>4/4</td>
<td>M</td>
<td>Respiratory control/Intro to circulatory system</td>
<td>HB</td>
<td>911-912; 916-919</td>
</tr>
<tr>
<td>4/5</td>
<td>Tu</td>
<td>Electrical excitation of heart/heart cycle</td>
<td>HB</td>
<td>920-923</td>
</tr>
<tr>
<td>4/7</td>
<td>Th</td>
<td>Vasculature</td>
<td>HB</td>
<td>Lecture only</td>
</tr>
<tr>
<td>4/11</td>
<td>M</td>
<td>Blood pressure control</td>
<td>HB</td>
<td>923-925</td>
</tr>
<tr>
<td>4/12</td>
<td>Tu</td>
<td>Exercise Part 1</td>
<td>HB</td>
<td>Lecture only</td>
</tr>
<tr>
<td>4/14</td>
<td>Th</td>
<td>Exercise Part 2</td>
<td>HB</td>
<td>Lecture only</td>
</tr>
<tr>
<td>4/18</td>
<td>M</td>
<td>Patriot’s Day- No Class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4/19</td>
<td>Tu</td>
<td>Renal physiology-Introduction</td>
<td>HB</td>
<td>861-866; 871-873</td>
</tr>
<tr>
<td>4/21</td>
<td>Th</td>
<td>EXAM 3 (material from 3/15 through 4/14) Check TRUNK for location details</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4/25</td>
<td>M</td>
<td>Renal Physiology-Filtration</td>
<td>HB</td>
<td>873-874</td>
</tr>
<tr>
<td>4/26</td>
<td>Tu</td>
<td>Renal physiology—reabsorption, dilute urine</td>
<td>HB</td>
<td>874-879</td>
</tr>
<tr>
<td>4/28</td>
<td>Th</td>
<td>Renal physiology—concentrated urine</td>
<td>HB</td>
<td>874-879</td>
</tr>
<tr>
<td>5/2</td>
<td>M</td>
<td>Renal Physiology- concentrate urine</td>
<td>HB</td>
<td>874-879</td>
</tr>
<tr>
<td>5/9</td>
<td></td>
<td>CUMULATIVE FINAL EXAM 7-9 pm Check Trunk for location details</td>
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*Tentative Lab Schedule 2016*

**Monday - Thursday afternoon**
1:20-4:20 pm

**Monday - Wednesday Night**
6:00-9:00 pm

All lab sections will run for the full three hours. Please plan to be in your lab section for the duration of this scheduled time.

Lab sections A,C,E,H,I,K meet in Barnum 200
Lab sections B,D,F,G,J,L meet in Barnum 216

*Schedule subject to change. Please check TRUNK for most up-to-date schedule.

**Snow Policy:** If campus is closed, labs will not meet. If a lab section does not meet it will be rescheduled into one of the make-up slots that have been built into the schedule. If campus is closed for multiple days it is likely that the whole week of labs will be rescheduled to a make-up week. If we do not need to reschedule any labs, no sections will be held during the make-up week (i.e. these weeks will not be used for individuals to make up labs. Policies pertaining to individuals absences are described on the lab website.)

<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOPIC</th>
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</thead>
<tbody>
<tr>
<td>Jan 25</td>
<td>Section I: Lab 1</td>
</tr>
<tr>
<td>Feb 1</td>
<td>Section I: Lab 2</td>
</tr>
<tr>
<td>Feb 8</td>
<td>Section I: Lab 3</td>
</tr>
<tr>
<td>Feb 15</td>
<td>President’s Week Make-up</td>
</tr>
<tr>
<td></td>
<td>(for Mon., Tues., Wed., sections only – Feb 18. is a Tufts Mon.)</td>
</tr>
<tr>
<td>Feb 22</td>
<td>Lab Report 1 Workshop</td>
</tr>
<tr>
<td>Feb 29</td>
<td>Section II: Lab 1</td>
</tr>
<tr>
<td>Mar 7</td>
<td>Section II: Lab 2</td>
</tr>
<tr>
<td>Mar 14</td>
<td>Section II: Lab 3</td>
</tr>
<tr>
<td>Mar 21</td>
<td>Spring Break – No labs scheduled</td>
</tr>
<tr>
<td>Mar 28</td>
<td>Section III: Lab 1</td>
</tr>
<tr>
<td>Apr 4</td>
<td>Section III: Lab 2</td>
</tr>
<tr>
<td>Apr 11</td>
<td>Section III: Lab 3</td>
</tr>
<tr>
<td>April 18</td>
<td>Patriot’s Week Make-up</td>
</tr>
<tr>
<td></td>
<td>(for Tues., Wed., Thurs. sections only)</td>
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<tr>
<td>April 25</td>
<td>Make-up Week</td>
</tr>
<tr>
<td></td>
<td>(for all sections)</td>
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ADDITIONAL IMPORTANT RESOURCES FOR BIO 14 STUDENTS

1. Exam Dates and Exam Policies- There will be three 50-minute multiple choice exams given during the semester on Thursday February 18th, March 17th AND April 21st (worth 100 points each) and a cumulative final on May 9th worth 120 points. There will be no make up exams given. If you are too ill to take an exam you must send a personal e-mail as well as a letter from health services to Professor Bernheim as soon as possible informing him about the situation. If you need extended time to take an exam you must submit to Professor Bernheim a letter from the Office of Disabilities verifying this situation by January 29th, 2016. All exams (which are given on Thursdays-see above) will be graded via a Scantron format, with scores posted by the following Monday after the exam. You will have 72 hours after the scores are posted to send an e-mail to Professor Bernheim that you believe an error in scoring has occurred. A one point deduction in your score will occur if a regrade is requested and no machine error is found. Additionally, a one point deduction in your score will occur for an incorrectly written or illegible name, wrong exam number or extraneous marks that require hand grading or regrading.

2. TRUNK website: Announcements are posted at this site and pdfs for lecture slides are available the evening before the lecture under “Course Tools, Resources”. To gain access to this site you must be enrolled in this course BIO 14L (Spring 2016) Organisms & Populations. The site will be shown under “My Sites” when you login at https://trunk.tufts.edu/library/skin/trunkskin/search.html

3. TRUNK Problem sets
Problem Sets are designed to be formative assessments—that is, they enable you to track yourself and see how you are doing. It makes most sense to work in your study group to understand concepts, and then work the problem set on your own, so you will be assured that your results reflect your personal understanding. Problem sets for the upcoming week’s lectures will generally be posted on TRUNK on Mondays at 11:00 am. To access TRUNK Problem Sets, you must be registered in this course. The BIO 14 Website will automatically show up in your TRUNK account under “My Sites” when you are registered.

Up to eleven problem sets will be posted. You will get 15 points if you submit eight of the eleven problem sets. Questions are focused on the lecture material for that week, so you will not be able to answer some questions until after Thursday’s lecture. Many of the questions are taken from recent exams, so we do not publish past exams. You may access the problem sets freely after they are assigned and you will draw different questions each time. You will be able to access the correct answers to the specific questions you drew after you submit your problem set answers electronically. Problem set scores do NOT contribute to your grade only your participation!

Tentative List of Problem Set Postings.
Assignment	Assigned
Problem Set 1 (FC) M 1/25, 11am
Problem Set 2 (FC) M 2/1, 11am
Problem Set 3 (FC) M 2/8, 11am
(Exam 1 2/18, material from 1/15 -2/16) Problem Set 4 (GE) M 2/22, 11am
Problem Set 5 (GE) M 2/29, 11am
Problem Set 6 (GE) M 3/7, 11am
(Exam 2 3/17 material from 2/22-3/14) Problem Set 7 (HB) M 3/28, 11am
Problem Set 8 (HB) M 4/4, 11am
In-Class Questions: You are expected to actively participate in this course. You will learn by engaging with the material and your peers; therefore, your participation in this course is extremely important for everyone’s learning.

We will be using Learning Catalytics (https://learningcatalytics.com/), an automated classroom response system to provide an opportunity for you to answer questions in class using a web-enabled device. Questions will be presented during class, and each individual will be able to choose an answer that will be recorded by my computer. Your participation in these exercises (not whether or not you get the correct answer) will contribute towards your final grade. You are required to complete 80% of the questions asked in class from January 26 to the end of the semester to receive the full 15 points (given that you only need to answer 80% of the questions, credit will not be given for absence due to illness or personal reasons). You cannot make-up missed questions. Learning Catalytics will be used in every class, and you are responsible for bringing your device to each class.

To use this system in class, students can use any modern web-enabled device that you have – laptop, smartphone, or tablet. If you don’t have one of these devices to use in class this semester, please email us the first week of class (harry.bernheim@tufts.edu) and an in-class device will be provided for you to use. To create a Learning Catalytics account do the following:

1. Go to https://learningcatalytics.com/users/sign_up
2. You can purchase a 6 month ($12) or 12 month ($20) license.
3. Click “I Accept” on the Pearson License Agreement Policy page
4. Follow the instructions on the subsequent pages to complete creating your account profile. Please use your Tufts email address.
5. Click “Log In Now” under Learning Catalytics on the confirmation page. You will be taken to the Learning Catalytics homepage. Click on the “Log in” button on the right hand side of the navigation bar. You should see the Welcome page and that you are logged in on the upper right hand corner of the screen. Click on “Log out” to log out of the Learning Catalytics website. A session ID will be provided on the first day of class.

If you have any problems, please contact Pearson 24/7 Technical Support directly at https://learningcatalytics.com/pages/support.

Lecture Capture: Sometimes it is helpful to go back to a specific portion of a class and view it a second time. Therefore, as a courtesy, we try to provide a “lecture capture” for each class. However, since technology doesn’t always work – having each lecture available for viewing is not guaranteed. It is highly recommended that students attend class and only use lecture capture as a back-up. You will not be able to answer in-class questions outside of class for credit. A lecture-capture link for each class meeting will be posted on Trunk under Class Materials. Links will direct students to the Echo360 server which requires students sign in using their Tufts UTLN and password.
The lecture captures will be available approximately 24 hours after class. Thank you in advance for your patience.

6. **Weekly faculty-led review/recitation session:** starting February 1 and ending May 2nd, on Mondays 4:30-5:20, Barnum 008, faculty will hold a question-answer session in Barnum 008. (There will be one final review, TBA) These sessions are driven by student questions, so bring yours.

7. **Weekly office hours:** Both faculty and graduate laboratory instructors hold office hours (see p. 4 of this syllabus for faculty office hours). If you have questions, meeting with faculty (lecture) and your lab instructor (lab) can often help clarify things.

8. **ARC Peer Tutors:** (Academic Resource Center, Dowling Hall, Subject.Tutoring@tufts.edu). If you seek a tutor or are more comfortable working with other students, the ARC Peer Tutors are an excellent option. They cannot help you with problem sets but will assist you to understand concepts and problem solving in Bio 14. One-on-one tutoring appointments are available though the TutorFinder on WebCenter (https://webcenter.studentservices.tufts.edu/login.aspx). Additionally, Resident/Head Tutors will hold drop-in hours on campus throughout the week. The ARC also holds tutor-led review sessions before exams, times and locations to be posted on the BIO 14 Trunk site.

9. **BIO 14 Study Groups:**
   You are encouraged to form a peer study group that meets each week for 1 to 1.5 hours to review, discuss, and apply material to studying for exams. A limited number of students will be able to enroll in small-group sessions run by ARC Peer Tutors on a first-come, first-serve basis. An online application link will be emailed to all students registered in Bio 14 during the first full week of classes. These sessions will meet weekly for 1.5 hours. **If you sign up for a study group, you are expected to attend each week!**

10. **Laboratory grading:**
   All materials, polices, and assignments pertaining to the laboratory portion of this course will be made available through TRUNK.

11. **Course grading:**

<table>
<thead>
<tr>
<th></th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td>In-class EXAM 1 (Th Feb 18 9:30 am)</td>
<td>100 pts</td>
</tr>
<tr>
<td>In-class EXAM 2 (Th Mar 17, 10:30am)</td>
<td>100 pts</td>
</tr>
<tr>
<td>In-class EXAM 3 (Th April 21, 10:30am)</td>
<td>100 pts</td>
</tr>
<tr>
<td>Final Cumulative Exam (Monday May 9th 7-9 pm)</td>
<td>120 pts</td>
</tr>
<tr>
<td>Learning Catalytics 80% participation</td>
<td>15 pts</td>
</tr>
<tr>
<td>Weekly Trunk Problem Sets (Minimum of eight)</td>
<td>15 pts</td>
</tr>
<tr>
<td>Laboratory Note: You MUST pass the lab component in order to pass BIO 14L</td>
<td>150 pts</td>
</tr>
<tr>
<td><strong>TOTAL POINTS</strong> (to be fair to all students, no extra credit assignments are allowed for this course)</td>
<td><strong>600 pts</strong></td>
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</tbody>
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12. **Need assistance?**
   **General questions about BIO 14?**
   Dr. Harry Bernheim (course coordinator), email: harry.bernheim@tufts.edu
   Office: Barnum 107
General questions about BIO 14 laboratory?
Dr. Julia Gouvea (lab coordinator) email: julia.gouvea@tufts.edu
Office: 201 Paige Hall

13. Specific questions about the course material?

Please bring questions to the Monday Recitation 4:30-5:20pm, Barnum 008 or contact the lecturer who taught the material (see item number 14 below).


<table>
<thead>
<tr>
<th>Professor/Unit taught</th>
<th>Office</th>
<th>Email address</th>
<th>Office Hours S’15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Francie Chew (unit 1)</td>
<td>Barnum 107</td>
<td><a href="mailto:fchew@tufts.edu">fchew@tufts.edu</a></td>
<td>Mon 1:45-4:00 pm; Tu 8:45-9:45 am; 11:45-12:45 pm; Wed 1:30-3:00 pm; Th 8:45-9:45 am and by appointment</td>
</tr>
<tr>
<td></td>
<td>Barnum 107</td>
<td>(note the office hours to the right are only for January 21st through February 25th!)</td>
<td></td>
</tr>
<tr>
<td>Dr. George Ellmore (unit 2)</td>
<td>Barnum 205</td>
<td><a href="mailto:george.ellmore@tufts.edu">george.ellmore@tufts.edu</a></td>
<td>Tu 3:00-5:00 pm and by appointment</td>
</tr>
<tr>
<td>Dr. Harry Bernheim (unit 3)</td>
<td>Barnum 105</td>
<td><a href="mailto:harry.bernheim@tufts.edu">harry.bernheim@tufts.edu</a></td>
<td>Tu and Wed 3:00-5:00 pm and by appointment</td>
</tr>
<tr>
<td>Dr. Julia Gouvea (laboratory coordinator)</td>
<td>Paige 201</td>
<td><a href="mailto:julia.gouvea@tufts.edu">julia.gouvea@tufts.edu</a></td>
<td>Fri 2:00-3:30 pm</td>
</tr>
</tbody>
</table>

15. Important dates for Spring 2016

February 25th is the last day to drop a course without record of enrollment for Sophomores, Juniors, and Seniors and April 7th is the last day to drop a course without record of enrollment for First Year Students.

16. Academic Integrity: All students at Tufts University are expected to live up to the highest standards of academic honesty. This applies to laboratory reports in which we expect students to do their own work. Please refer to the laboratory manual for specifics about the policy concerning what is and what is not your own work. Remember, there are severe indelible penalties for violating these standards.