BIOLOGY 200: Concepts in Biology  Fall 2017

Course Description
This course will introduce students to the study of biology at the beginning of their course of study. Central ideas in the biological sciences will be highlighted, with an emphasis on the process of scientific discovery and investigation. The course will provide the basis for more advanced coursework and learning experiences in biological sciences as students delve into the curriculum of study. This is a required course for all NJIT and Rutgers-Newark Biology majors.

“Facts are not science — as the dictionary is not literature.” - Martin H. Fischer

Instructor
Dr. Maria Stanko
CKB 340E
mstanko@njit.edu

Office Hours
Tuesdays 11:00-1:00 OR
Please email for appointment

Recitation Instructors:
Sahil Wadhwa
swadhwa@scarletmail.rutgers.edu

Maggie Wisniewska
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Class Meetings
Lecture:  Monday & Wednesday 11:30am-12:55pm  CKB G08
Recitation:  
  Section 001: Thursday 8:30-9:55am  CKB 220
  Section 003: Thursday 10:00-11:25am  CKB 220
  Section 005: Thursday 1:00-2:25pm  CKB 220
  Section 007: Thursday 2:30-3:55pm  CKB 212

See moodle for additional options if you need to make up a recitation.

Recitation Policies:  Recitation is an essential part of the course, in which you will meet in smaller groups to discuss class concepts and work together to solve biological problems. Points will be earned each week from a combination of attendance, participation, and a weekly quiz assessing whether you have read the week’s materials. Recitation materials (available on moodle) must be printed or downloaded to a laptop or tablet. A phone is not an acceptable format for viewing recitation materials. Your recitation instructor may have additional policies.

Discuss making up missed class time or work with your instructors as soon as possible. We provide numerous reminders of course deadlines and expect you to be responsible for meeting them; late assignments will be deducted 10% of the points available for each 24 hours after the assignment was due. However, we will make every effort to accommodate your valid, excused absences and are happy to work with you if you are struggling or falling behind. Be sure to communicate with us about your concerns regarding the course, the earlier the better! We are here to help. Please let us know if you need accommodations for a disability.

Figure 1 – Influenza Virus. A) 3D illustration of a generic influenza virus. The image has been constructed such that part of the capsid has be removed so that the virus’s RNA can be seen. The inset images identify the virion’s major protein constituents. B) Hemagglutinin. C) Neuraminidase. D) M2 Ion Channel. E) RNA strands that make up the genome. CDC Public Health Image Library (PHIL) ID 11826 Illustrator: Dan Higgins Provider: Douglas Jordan 2009

Figure 2 – Devil Facial Tumor Disease. Image of Tasmanian Devil suffering from a large tumor on its snout. Note that the tumor is obstructing the range of vision in one eye and likely causing difficulty in eating. Photo: Rodrigue Hamende
Assessment of Learning

1. **Learning Journal** – Every week, you will have an assigned prompt asking you to reflect on your own learning and progress in the course, to which you must respond via your personal forum on Moodle. Journal entries are assigned over the weekend. Only instructors can see your entries, and points are awarded (2 pts per weekly entry) for complete, thoughtful responses.

2. **Preparation/participation** – Participation in class discussions is essential to learning and you will be asked to communicate your thinking via several formats (aloud, iClickers, group work, in class assignments). Attendance and participation will be assessed in both lecture and recitation. Reading prep quizzes are used to ensure students arrive to class prepared, having completed the required reading.

3. **iClicker Questions** – Lecture will include at least a couple clicker questions every day in order to track your understanding while we discuss topics.

4. **Homework** – There will be several homework assignments throughout the semester that will require slightly more in depth work on a topic, beginning the discovery and application of knowledge.

5. **Moodle Quizzes** – Over the course of the semester, there will be 3 quizzes (administered via Moodle) to assess your understanding of concepts that we have covered in class and your ability to apply that knowledge. You can also earn points for completing a Pre- and Post-Quiz.

6. **Projects** – Science often requires pulling together information from multiple sources to arrive at an end result. The course will include two projects that consist of several components that build towards a final goal.

7. **Exams** – There will be two exams that cover the application and understanding of the material covered in the course. These exams will also require you to apply the skills that we have emphasized.

Course Grade

Your grade for this course will be based on participation, quizzes, exams, journal, assignments, and two multi-part projects.

**Point Breakdown**

- Recitation attendance / participation: 65 pts
- Reading prep quizzes: 20 pts
- Lecture participation: 35 pts
- Moodle Quizzes & Journal: 65 pts
- Homework Assignments: 80 pts
- Exams: 80 pts
- Projects: 80 pts

**Total: 400 pts**

Grades will be determined by the percentage of the possible points earned, following the standard grade scale below.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>&gt; 90%</td>
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<tr>
<td>B+</td>
<td>85-90%</td>
</tr>
<tr>
<td>B</td>
<td>80-85%</td>
</tr>
<tr>
<td>C+</td>
<td>75-80%</td>
</tr>
<tr>
<td>C</td>
<td>70-75%*</td>
</tr>
<tr>
<td>D</td>
<td>60-70%</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 60%</td>
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</tbody>
</table>

Grades are not curved, and do not ask for extra credit.

*You must earn a C or better in order to progress within the Biology major.

Academic Dishonesty: The course has a zero tolerance policy for academic dishonesty, including plagiarism and cheating. Instances of dishonesty will be punished by a zero on the assignment and consultation with the office of the Dean of Students to determine if further action is required. If you have any questions about what constitutes plagiarism or cheating, please ask us or refer to the academic integrity code: [www.njit.edu/academics/integrity.php](http://www.njit.edu/academics/integrity.php).
Learning Outcomes

A. Biological Principles
Students will:

1. Identify mechanisms of evolutionary change and explain how they lead to genetic change in populations through time.
2. Describe the structural characteristics of nucleotides (DNA/RNA) and explain how they are related to the functions of these molecules.
3. Identify the basic steps involved in gene expression and describe ways that gene expression can be regulated so that different cells produce different proteins.
4. Be able to transcribe information from DNA to RNA and to translate mRNA into amino acid sequences.
5. Interpret information depicted on a phylogenetic tree.
6. Outline the stages of cell division (mitosis and meiosis), explain what occurs during each stage, and describe how the nuclear DNA of daughter cells compares to that of the original cell.
7. Be able to utilize a Punnett square to predict the potential genotype/phenotype of offspring.
8. Define and give some examples of interspecific interactions and describe how different types of interactions affect the population sizes of the species involved.
9. Identify the different trophic levels in a community and explain how energy moves through them.
10. Explain traits related to an organism’s life history and what influences the evolution of different life history strategies.

Individual class sessions will have more specific content outcomes, based on what is being discussed that week and how it relates to the larger goals of the course. Look for those in the lecture slides for each topic.

B. Learning, Reasoning, and Problem-Solving Skills
Students will:

1. Learning How to Learn
   - Develop personal learning strategies based on recognition of their own learning processes.
   - Identify their learning style and develop a learning plan that is aligned with that style.
   - Reflect on the note taking and study process and self-monitor their habits throughout the semester.
   - Develop a plan for their continued learning beyond this course.

2. Application
   - Develop hypotheses to explain observed phenomena.
   - Design a basic experiment to test a hypothesis, taking into account the ethical and methodological considerations for proper experimental design.
   - Read and evaluate data critically:
     - identify and describe patterns in raw data.
     - interpret statistical analysis of others’ results.
     - draw conclusions based on graphical presentation of data.
   - Communicate scientific information effectively:
     - present source material without plagiarizing.
     - convey information in written and graphical form.
     - target delivery appropriately to audience.

3. Integration
   - Synthesize ideas from multiple areas in order develop complex concepts.

4. Human Dimension
   - Feel confident in their ability to apply knowledge to solve problems.
   - Cooperate with their peers to solve problems as part of a team.
   - Take responsibility for their learning process and academic success.

5. Caring/Valuing
   - Get excited about the value of course material within their personal and professional lives.
   - Commit to being a good learner in this course and beyond.

Succeeding in Biol 200

Learning is an active process, and it requires actively thinking, discussing and writing. Being successful at this process necessitates you understanding how you best learn biology. That requires thinking about more than just what you are learning, but how you are learning it. This is referred to as metacognition. Practicing this process will make you more efficient learners and better able to learn and integrate new material.

1. Be Present. You need to show up to class, but that means more than just being physically present in the room. Texting, sleeping, idly chatting with your neighbors, and surfing the internet all mean that you probably aren’t really involved in class. Engagement in class activities means that you will learn more and struggle less when you work on your own later.

2. Be Proactive. This applies to a number of contexts. For example, cramming for an exam is something that students love to do, and sometimes it even feels vaguely successful—especially when memorization of something for short-term recall is the goal. Memorization of facts is not the point of this course though, so that strategy is even less likely to work here. Being proactive also means that you need to think about how you are doing and make an effort to improve. In other words, don’t wait until you see your final grade posted online to care about how you are doing in the course.

3. Talk. Talking through an idea can help with your understanding. Discussion will be the focus of this course, so we will make you discuss things with your classmates, but talking things through shouldn’t end when you walk out of class. Form study groups. Meet and talk about the class.

4. Look at the Learning Outcomes. We have provided our overall goals for you just above this section, and will include more specific ones throughout the semester. These are posted for your benefit to help guide your studying and illustrate what we think is important.

5. Test Yourself. Take some time to think about the material that has been covered in class. Potentially, ask yourself (or your classmates) questions like:
   - What were the main topics from this class session? (Objectives? Questions?)
   - What do I need to know in order to understand that concept, question or problem?
   - Can I break the topic into smaller parts? What parts can I explain in a manner that makes sense to me?
   - What parts are unclear or don’t make sense yet?
   - How does today’s class session relate to the larger goals of the course?

Clues to the answers to several of these questions will be found in the specific learning outcomes emphasized for each class/topic.

We want you to do well in this course. (Honest!) In fact, we want to help you develop skills in this course that will help you do well in every course you take from this point forward. So, don’t treat these things as a chore you just have to do for this course. These are all suggestions that can be helpful in any class that you take.
### Course Schedule

**Schedule:** Dates listed by week; lectures will meet twice every week and recitation will meet every week, unless otherwise noted. Please note that this is the proposed schedule and is subject to change. A more detailed schedule will be continually updated via the course Moodle site.

<table>
<thead>
<tr>
<th>Week of</th>
<th>Lecture Topic</th>
<th>Recitation</th>
<th>Assignments Due</th>
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</thead>
<tbody>
<tr>
<td>9/4</td>
<td>Mon - No Lecture Intro: Learning Styles, Class purpose, Goals</td>
<td>Discussion on Intelligence</td>
<td>HW 1 Syllabus (5pts)</td>
</tr>
<tr>
<td>9/11</td>
<td>What is Biology? Graphing/Numbers &amp; Figures</td>
<td>White nose syndrome graphing</td>
<td>PreQuiz on Moodle Finish graph for recitation</td>
</tr>
<tr>
<td>9/18</td>
<td>Evolution/Natural Selection Adaptation/Fitness</td>
<td>Selection: dogs and peacocks</td>
<td>HW 2 Selection assignment (10pts)</td>
</tr>
<tr>
<td>9/25</td>
<td>What is flu? DNA Discovery/Structure</td>
<td>Disease spread</td>
<td>Quiz 1 on Moodle</td>
</tr>
<tr>
<td>10/2</td>
<td>DNA Replication Transcription/RNA processing</td>
<td>Copying DNA (PCR)</td>
<td>HW3 Bird flu (10 pts)</td>
</tr>
<tr>
<td>10/9</td>
<td>Translation/Gene Expression Mutations</td>
<td>Decoding the flu</td>
<td>Project 1, Part 1</td>
</tr>
<tr>
<td>10/16</td>
<td>Phylogenetic Trees Bioethics</td>
<td>SARS</td>
<td>HW4 Plagiarism (10pts) Project 1, Part 2</td>
</tr>
<tr>
<td>10/23</td>
<td>Exam 1 Scientific Writing</td>
<td>Discuss Exam 1</td>
<td>Project 1, Part 3</td>
</tr>
<tr>
<td>10/30</td>
<td>What is DFTD? Cell Cycle/Mitosis</td>
<td>DFTD</td>
<td>HW 5 Graphing population changes (10pts)</td>
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<tr>
<td>11/6</td>
<td>Cancer Meiosis</td>
<td>Cancer exercise</td>
<td>Quiz 2 on Moodle Project 1, Part 4</td>
</tr>
<tr>
<td>11/13</td>
<td>Inheritance Population Genetics</td>
<td>Pedigree Worksheet</td>
<td>Project 2, Part 1</td>
</tr>
<tr>
<td>11/20</td>
<td>Interactions / Competition Wed: NO CLASS</td>
<td>NO Recitations – Happy Thanksgiving!</td>
<td>HW 6 Pedigrees (10 pts)</td>
</tr>
<tr>
<td>11/27</td>
<td>Predation / Trophic Cascades Mutualism / Parasitism</td>
<td>Tasmanian food web</td>
<td>Project 2, Part 2</td>
</tr>
<tr>
<td>12/4</td>
<td>Interaction Networks Life History Strategies</td>
<td>Tasmanian devil life history</td>
<td>Project 2, Part 3 Quiz 3 on Moodle</td>
</tr>
<tr>
<td>12/11</td>
<td>Other examples: Ebola Review</td>
<td>NO Recitations</td>
<td>HW 7 Ebola readings questions (10 pts) PostQuiz on Moodle Project 2, Part 4</td>
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<tr>
<td>12/15-21</td>
<td>Exam 2 - During Final Exam Period*</td>
<td></td>
<td>Final Exam Schedule will be posted here: <a href="http://www5.njit.edu/registrar/exams/">http://www5.njit.edu/registrar/exams/</a></td>
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*Do not schedule travel during the final exam period until after the NJIT final exam schedule has been announced.

"The scientist is not a person who gives the right answers, he's one who asks the right questions."
- Claude Lévi-Strauss