

BIOLOGY 200 (011): CONCEPTS IN BIOLOGY

INSTRUCTORS: Dr. Maria Stanko, mstanko@njit.edu, 340E CKB, Office Hours Please email for appointment

TEACHING

ASSISTANT: Manpreet Kohli, mkk24@njit.edu, Office Hours Please email for appointment

LECTURES: M,W,R: 9:00am- 1:00pm [CKB G08] Ground Floor of CKB

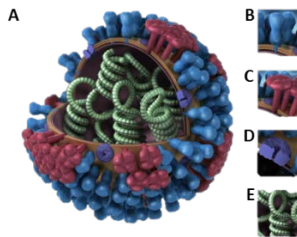


Figure 1 – Influenza Virus. A) 3D illustration of a generic influenza virus. The image has been constructed such that part of the capsid has been removed so that the virus's RNA can be seen. The inset images identify the virion's major protein constituents. B). Hemagglutinin. C). Neuraminidase. D). M2 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 (right) – 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

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.

REQUIRED MATERIALS:

1. **Moodle.** You need to ensure that you can access the course website (<http://njit2.mrooms.net/>) ASAP! Log in with your UCID. Rutgers students, this may require you to set up access.
2. **Textbook.** There is no textbook assigned for this course. Most of the readings will be provided via Moodle, either directly or via links to external websites. If you would like a more comprehensive reference source to help provide additional background, we can help you find an appropriate book to use.
3. **Writing Materials.** You need to have a pen/pencil & loose leaf paper in class. I may assign and collect in class work that you will be completing either on your own or in groups.

“FACTS ARE NOT SCIENCE — AS THE DICTIONARY IS NOT LITERATURE.” - MARTIN H. FISCHER

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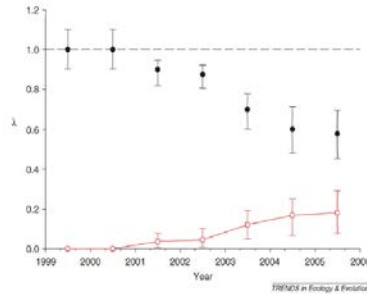


Figure 3 (left) – DFTD. Effect of DFTD on the growth rate of the devil population on the Freycinet Peninsula, Tasmania (black) and the prevalence of DFTD in the total devil population over the same time period (red). From: McCallum. 2008. Trends in Ecology and Evolution 23: 631-637.



Figure 4 (right) - Influenza. Pseudo-colored transmission electron micrograph (TEM) of an influenza virion. CDC Public Health Image Library (PHIL) Photo: Frederick Murphy

COURSE WEBSITE:

This course has no textbook. Course readings and online resources will generally be provided via Moodle: <http://moodle.njit.edu/>, login with UCID. Please ensure you can access the Moodle site as soon as possible!

GRADING POLICY:

Your grade for this course will be based on participation, quizzes, exams, journal, assignments, and two multi-part projects. (the breakdown is below). Grades are not curved, and do not ask for extra credit.

COMPONENT	POINTS
Attendance/Participation	30 points
Quizzes	25 points
Homework Assignments	65 points
Exams	80 points
Projects	80 points
TOTAL	280 points

LETTER GRADE	SCALE
A	> 90%
B+	85 – 90%
B	80 – 85%
C+	75 – 80%
C	70 – 75%
D	60 – 70%
F	< 60%

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 or refer to the [Academic Integrity Code](#)

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SCHEDULE AND COURSE OUTLINE: Please note that this is the proposed schedule. A more detailed schedule will be continually updated via the course Moodle site.

WEEK OF	LECTURE TOPIC	SELECTED ASSIGNMENTS
M May 22	Introduction / What is Science? / Critical Thinking PreQuiz	HW1- Syllabus (5 pts)
W May 24	What is Biology? / Graphing / Interpreting Figures	
Th May 25	Evolution / Natural Selection / Adaptations / Fitness	
M May 29	NO CLASS – Happy Memorial Day!	HW 2 Cave fish selection (10pts)
W May 31	What is flu? / DNA Discovery & Structure	
Th June 1	DNA Replication / Gene Expression: Transcription	Quiz 1 on Moodle Project 1, Part 1
M June 5	Gene Expression: Translation / Mutations	HW4 Bird flu (10pts) Project 1, Part 2
W June 7	Phylogenetic Trees / Bioethics	Project 1, Part 3
Th June 8	Scientific Writing / Review	HW4 Plagiarism (10 pts)
M June 12	Exam 1 / What is DFTD?	Project 1, Part 4
W June 14	Interactions / Predation / Trophic Cascades	HW5 Devil populations (10pts)
Th June 15	Meiosis / Inheritance	Quiz 2 on Moodle Project 2, Part 1
M June 19	Interactions / Predation / Trophic Cascades	HW6 Pedigrees (10 pts) Project 2, Part 2
W June 21	Interaction Networks / Life History Strategies	Quiz 3 on Moodle
Th June 22	Ebola / Review	Project 2, Part 3, HW7 Ebola (10pts)
M June 26	Exam 2	Project 2, Part 4

ATTENDANCE, MAKE-UP, AND LATENESS POLICY:

- ⊕ Lectures and recitations are linked, and attendance at all course sessions is important to doing well in the course.
- ⊕ Discuss making up missed class time or work with the instructor as soon as possible. Please refer to the course syllabus and Moodle site for due dates in the course.
- ⊕ **Late assignments will be deducted 10% of the points available for each 24 hours after the assignment was due.** This is true for ALL assignments. However, every effort to accommodate your valid, excused absences will be made at the discretion of the instructor. If you are struggling or falling behind be sure to communicate your concerns regarding the course, the earlier the better!
- ⊕ Any accommodations needed for a disability should be brought the instructor's attention as soon as possible.

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LEARNING OUTCOMES:

1. Learning How to Learn

- Students will develop personal learning strategies based on recognition of their own learning processes.
- Students will identify their learning style and develop a learning plan that is aligned with that style.
- Students will reflect on the note taking and study process and self-monitor their habits throughout the semester
- Students will develop a plan for their continued learning beyond this course.

2. Application

- Students will develop hypotheses to explain observed phenomena.
- Students will design a basic experiment to test a hypothesis, taking into account the ethical and methodological considerations for proper experimental design.
- Students will 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.
- Students will communicate scientific information effectively:
 - present source material without plagiarizing.
 - convey information in written and graphical form.
 - target delivery appropriately to audience.

3. Integration

- Students will synthesize ideas from multiple areas in order to develop complex concepts.

4. Human Dimension

- Students will feel confident in their ability to apply knowledge to solve problems.
- Students will cooperate with their peers to solve problems as part of a team.
- Students will take responsibility for their learning process and academic success.

5. Caring/Valuing

- Students will get excited about the value of course material within their personal and professional lives.
- Students will commit to being a good learner in this course and beyond.

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.

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Biological Principles Cont'd

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 likely 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 to be posted to Moodle and contained in the lecture slides for that topic.

Evaluation

Assessment of Learning

1. **Participation**- Participation in class discussions is essential to learning and you will be asked to communicate your thinking via several formats (aloud, group work, in class assignments). Attendance and participation will be assessed in both lecture and recitation.
2. **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.
3. **Moodle Quizzes**- Over the course of the semester, there will be 4 quizzes (administered via Moodle) to assess your understanding of concepts that we have covered in class and your ability to apply that knowledge. These are intended to provide practice as part of your preparation for exams and to give you an opportunity to mark your progress.
4. **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.
5. **Exams**- There will be 2 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.

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.