

BIOLOGY 200 (002-004): CONCEPTS IN BIOLOGY

INSTRUCTOR:	Dr. Maria Stanko , mstanko@njit.edu , 340E CKB, Office Hours Thurs: 11:30am -2:30 pm or by appointment
TEACHING ASSISTANT:	Maggie Wisniewska, mw298@njit.edu , For Office Hours Please email for an appointment
LECTURES:	M,W: 10:00am-11:20am [CKB 124]
RECITATION (BY SECTION):	1 period (80 mins), Thurs OR Fri , please see course schedule for time and location: https://uisnetpr01.njit.edu/courseschedule/

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 Biology majors.

COURSE WEBSITE:

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

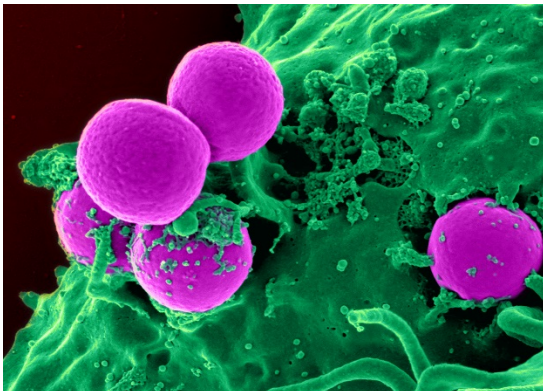


Figure 1 (left) – Human neutrophil (pseudo-colored green) engulfing *S. aureus* bacteria (pseudo-colored purple).

Image source
http://upload.wikimedia.org/wikipedia/commons/0/01/Human_neutrophil_ingesting_MRSA.jpg

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REQUIRED MATERIALS:

- We will use the FREE online textbook Opex Stax Biology 2e: <https://openstax.org/details/biology-2e> , supplemented with additional readings. All readings will be provided via links on the course website, but you may find it useful to download (free) the OpenStax Biology 2e text. Please ensure you can access the Canvas site as soon as possible!
- An **iClicker** is required for this course. You can purchase one from the NJIT bookstore. Any version of an iClicker brand device is acceptable, but I do not accept the iclicker/REEF smartphone app

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



GRADING POLICY:

Your grade for this course will be determined based on a number of components (the breakdown is below).

COMPONENT	% Range	STANDARD %	YOUR %
Learning journal	5 - 10%	7.50%	
Lecture Participation	5 - 10%	8.75%	
Recitation preparation/ participation	10 - 18%	16.25%	
Homework / Quizzes	25 - 30%	27.50%	
Projects	15 - 30%	20%	
Exams	10 - 20%	20%	
TOTAL		100%	

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

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COURSE POLICIES:

All course materials (including recordings of lectures) are for students' own use only (no sharing or posting anywhere).

- Homework and projects may be submitted late, but 10% of the points available for each 24 hours after the assignment was due will be deducted from late submissions.
- Late submissions (up to 10 days late) of journals will receive half credit.
- Review quizzes, reading prep quizzes, and exams cannot be completed late without documentation of an excusable absence.
- Each student is expected to do his or her own work independently. (See Academic Dishonesty statement below).

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 participation and a weekly practice quiz. Recitation materials (available on Canvas) 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.

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](#).

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.
- Attendance at recitations is **required**. If you must miss recitation for a valid reason, please discuss making up the missed material with your recitation instructor as soon as possible.
- Attendance and participation in lecture will be assessed using the iClickers. Be sure you bring your iClicker to every lecture!
- 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.

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SCHEDULE AND COURSE OUTLINE: 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 Canvas site.

WEEK OF	LECTURE TOPIC	RECITATION	SELECTED ASSIGNMENTS
1/20	Mon - No Lecture Intro: Class purpose, Goals	Introduction / Pre-Quiz	HW 1 Syllabus (5pts)
1/27	What is Biology? Interpreting Graphs	Interpreting graphs	
2/3	Evolution/Natural Selection Adaptation/Fitness	Selection: dogs and peacocks	Review Quiz 1 on Canvas HW2 Selection assignment (10pts)
2/10	What is Flu? DNA Discovery/Structure	Disease spread	Finish graph for recitation
2/17	DNA Replication Transcription/RNA Processing	Copying DNA (PCR)	HW3 Bird Flu (10 pts)
2/24	Translation Gene Expression	Decoding the flu	Review Quiz 2 on Canvas Project 1, Part 1
3/2	Mutation Phylogenetic Trees	SARS	Project 1, Part 2
3/9	Exam 1 Scientific Writing	Discuss Exam 1	Project 1, Part 3
Mar. 15-22	SPRING BREAK: NO LECTURES OR RECITATIONS THIS WEEK		
3/23	What is DFTD? Cell Cycle/Mitosis	DFTD	HW4 Plagiarism (10pts)
3/30	Cancer Meiosis	Cancer genetics	Review Quiz 3 on Canvas Project 1, Part 4
4/6	Epigenetics Inheritance	No Recitations- GOOD FRIDAY 4/10	HW5 Graphing devils (10pts) Project 2, Part 1
4/13	Population Genetics Interactions/Competition	Solving pedigrees	HW 6 Pedigrees (10pts)
4/20	Predation/Trophic Cascades Interaction Networks	Tasmanian food web	Project 2, Part 2
4/27	Life History Strategies Tasmanian Devil Life History	Scientific posters	Review Quiz 4 on Canvas Project 2, Part 3
5/4	Other examples: Ebola Wed: No Class	No Recitations	HW 7 Ebola readings questions (10 pts) Project 2, Part 4 Post Quiz on Canvas during Final Exam Period
FINALS	FINAL EXAM WEEK: MAY 8-14, 2020		

*Do not schedule travel during the final exam period until after the NJIT final exam schedule has been announced.

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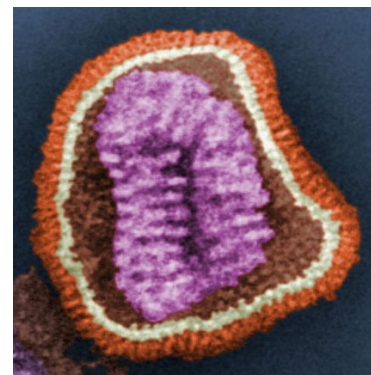
Assessment of Learning – Components

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 Canvas. 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. **Lecture Participation**- Lecture participation will be assessed using iClicker questions. Each lecture will include at least a couple clicker questions. You must answer (correct or not) at least 80% of the questions to receive full credit for this component; lower response rates are scaled accordingly.
3. **Recitation Preparation / Participation**- Practice questions are given at the beginning of each recitation. Students are expected to arrive on time with the required materials. Students also receive credit for participation in recitation discussions.
4. **Homework**- There will be several homework assignments throughout the semester that will provide opportunities to practice skills and apply knowledge learned in class.
5. **Quizzes**- Over the course of the semester, there will be weekly Reading Prep quizzes and 4 Review quizzes (administered via Canvas) 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 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.



Figure 3 (left) – *Borrelia burgdorferi*, the bacterium responsible for causing Lyme disease in humans. Image source: http://www.3d4medical.com/Lyme-disease-bacteria-46-image_RM4612.html.

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



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Learning Outcomes:

A. Biological Principles

Students will be able to....

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. 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. Utilize principles of inheritance 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.

B. Learning, Reasoning, and Problem-Solving Skills

Students will be able to...

1. Monitor and adapt their personal learning strategies throughout the semester.
2. Develop a plan for their continued learning beyond this course.
3. Propose hypotheses to explain observed phenomena.
4. Design a basic experiment to test a hypothesis, taking into account the ethical and methodological considerations for proper experimental design.
5. Identify and describe patterns in data and interpret statistical analysis of others' results.
6. Communicate scientific information effectively in written and graphical form.
7. Attribute primary sources for scientific writing using proper citation format.
8. Synthesize concepts from multiple biological scales.
9. Apply knowledge to solve problems in biology.
10. Cooperate with their peers to solve problems as part of a team.