

BIOLOGY 200 (002-004): CONCEPTS IN BIOLOGY

INSTRUCTOR:	Dr. Maria Stanko , mstanko@njit.edu , 340E CKB	OFFICE HOURS:	Mon: 2:30 PM – 4:00 PM Thurs: 10:30AM - 12:00 PM or by appointment
TEACHING ASSISTANT:	Maggie Wisniewska, mw298@njit.edu ,	OFFICE HOURS:	Please email for an appointment
LECTURES:	M,R: 9:00am-10:20am [CKB G08]		
RECITATION (BY SECTION):	1 period (80 mins), 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 NJIT and Rutgers-Newark 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!**

Lectures will be in the **Converged** Instructional Delivery Mode. This course will include some students physically in the classroom and some attending remotely. If you will be attending in person (i.e., physically in the classroom), you must indicate that using the Back2Classroom app: <https://back2classroom.njit.edu>. If you are attending remotely, use the online link posted on the course Canvas page. Regardless of which way you attend, the class will be held synchronously, meaning everyone is expected to attend class either in person or remotely during the scheduled class period. Please note that for the first two weeks of class, all instruction will be synchronous remote. In-person attendance can begin on Feb. 1.

Please see NJIT's Pandemic Recovery Plan for more information and updates: <https://www.njit.edu/pandemicrecovery/>.



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!
- The **Clicker Reef** app is required for this course. <http://iclicker2.wpengine.com/students/apps-and-remotes/apps>



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 - 12%	9.33%	
Participation	5 - 13%	10%	
Quizzes	3 - 10%	6.67%	
Homework	10 - 18%	14.00%	
Projects	22 - 30%	26.67%	
Exams	30 - 38%	33.33%	
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 Grade: Your grade for this course will be based on the components in the table above. You can choose how your grade is calculated by determining the weight of each grade component as a percentage of your total semester grade, within the given ranges. Your final grade will be the highest of two possible grades: the grade that results from your selected weight (Your %) or the one resulting from the standard weight (Standard %).

COURSE POLICIES:

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

- Homework assignments 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, up to a maximum of 50 % off.
- Late submissions (up to 10 days late) of learning journals will receive half credit.
- Review quizzes, and exams cannot be completed late without documentation of an excusable absence from the [Office of the Dean of Students](#).
- 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](#).

COVID-19 SAFETY REQUIREMENTS: All persons physically present in any department facility or classroom shall comply fully with the NJIT COVID-19 safety policy at all times. Masks must be worn before entry to all department facilities, and social distancing guidelines must be followed. Individuals who are unable to wear a face mask due to medical reasons should contact the Office of Disability Services or Human Resources. Students who enter a classroom without wearing a mask properly, or remove their mask, will be cautioned by the instructor. The same is true for students who disregard the seating order or guidelines for social distancing. Students with obvious symptoms of respiratory illness should not come to campus and will be asked to leave. Students who do not comply with a request by a department instructor to adjust their behavior, in accordance with the University Policy, will be subject to disciplinary actions. Instructors have the right to expel the student or terminate the class session at which any student fails to comply with the University Policy.

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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
1/18	Mon - No Lecture Intro: Syllabus, Class Goals	Introduction	NO LECTURE on Mon 1/18 HW 1 Syllabus (5pts)
1/25	What is Biology? Experimentation / Graphing	Interpreting Graphs	HW 2
2/1	Evolution/Natural Selection Adaptation/Fitness	Selection	Review Quiz 1 on Canvas HW3
2/8	What is Flu? DNA / RNA Discovery/Structure	How Diseases spread	HW 4
2/15	DNA Replication Transcription/RNA Processing	Primer Design	HW 5
2/22	Translation Regulation of Gene Expression	Project 1 / T&T Explored	Review Quiz 2 on Canvas Project 1, Part 1
3/1	Mutation Phylogenetic Trees	Project 1 / T&T Explored	Project 1, Part 2
3/8	Exam 1 COVID-19	Project 1	Project 1, Part 3
Mar. 14-21	SPRING BREAK: NO LECTURES OR RECITATIONS THIS WEEK		
3/22	Scientific Writing What is DFTD?	DFTD	HW 6
3/29	Cell Cycle/Mitosis Cancer	NO RECITATIONS	HW 7 Project 1, Part 4
4/5	Meiosis Epigenetics	Cancer Genetics	Review Quiz 3 on Canvas Project 2, Part 1
4/12	Inheritance Population Genetics	Solving pedigrees	Project 2, Part 2
4/19	Interactions / Competition Predation / Trophic Cascades	Project 2/Excel Graphing	
4/26	Interaction Networks Life History Strategies	Project 2	Review Quiz 4 on Canvas Project 2, Part 3
5/3	Future for Tasmanian Devils	No Recitations	Project 2, Part 4 Exam 2 during Final Exam Period
FINALS	FINAL EXAM WEEK: MAY 7-13, 2021		

*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

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.

Participation - Lecture participation (2/3 of participation score) 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. Recitation participation (1/3 of participation score) will be earned by active participation during recitations. Students who contribute to recitation discussions in at least 10 recitations will receive full credit for recitation participation.

Online Quizzes – During the course, there will be 4 quizzes (administered via Canvas) 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.

Homework – There will be several homework assignments throughout the course that will require slightly more in depth work on a topic and application of knowledge. Homework assignments will be discussed during Recitation and completed assignments will be submitted on Canvas.

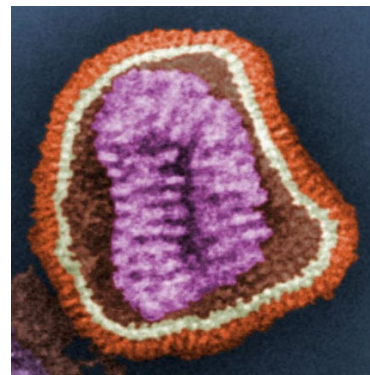
Project – Science often requires pulling together information from multiple sources to arrive at an end result. The course will include two projects that consists of several components that build towards a final goal.

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. Exams will be open-note, open-book exams that must be completed completely independently during the scheduled class time (Exam 1) and the scheduled final exam time (Exam 2).



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.

Disability Statement: Please let me know if you need accommodations for a disability. If you are in need of accommodations due to a disability please contact the Office of Accessibility Resources & Services (OARS), to discuss your specific needs: <https://www.njit.edu/studentsuccess/accessibility>.