NJIT BIOLOGY

Course Syllabus

FALL 2025

BIOL 201 Foundations of Biology - Cellular/Molecular Biology

INSTRUCTOR:	Dr. John Yarotsky	**EMAIL:**	yarotsky@njit.edu
OFFICE:	CKB 340C ■ 973-642-7976	**OFFICE HOURS:**	**MONDAY 3-6 PM** or by appt
COURSE SCHEDULE:	Tues & Fri 1-2:20 ECEC 100	**COURSE WEBSITE:**	https://njit.instructure.com/courses/38439

COURSE DESCRIPTION: This course surveys the chemical components and structure of the cell and methods of study; thermodynamics and metabolism; membrane biology, energy utilization and transfer; protein and nucleic acid structure and function; transcription, translation, and genetic regulation. This course is complemented by the laboratory course 120:202 Foundations of Biology: Cell and Molecular Biology: Laboratory. Both courses 120:201 and 120:202 must be taken concurrently, although they are separate courses with their own grades.

PREREQUISITES:
21:120:200 Concepts in Biology, and 21:160:115 General Chemistry.

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LEARNING OBJECTIVES
Through selected readings, lectures, discussions and occasional group activities, students are encouraged to learn on their own about the main processes taking place in the cell from a molecular perspective. After successfully completing the course, students will have

- ✓ the ability to describe the general structure of biomolecules as well as their role in cellular metabolism and the flow of genetic information;
- ✓ information and concepts on bioenergetics and the use of energy by cells;
- ✓ the information on the principles of membrane transport mechanisms and their role in important physiological processes at the organismal level;
- ✓ acquired concepts and general principles on gene expression and its regulation;
- ✓ knowledge on the concepts and general principles on eukaryotic signal transduction;
- ✓ the skills to read, interpret and apply general information in the fields of cell and molecular biology;
- ✓ evaluate contemporary hypotheses on the functional mechanisms of the cell;
- ✓ reinterpret and/or postulate alternative hypotheses or ideas to explain or describe the phenomena studied in the course;
- ✓ the opportunity to explore the topics covered in the course in higher level classes which require Foundations 201/202 as pre-requisites in the biology major and minor.

INSTRUCTIONAL MATERIALS: Alberts, Hopkin, Johnson, Morgan, Raff, Roberts, Walter ***Essential Cell Biology*, 5th Edition**, W.W. Norton & Company, NY. ISBN: 978-0393680362

https://wwnorton.com/books/9780393680362

Some additional reading may be occasionally assigned from the following online resources (free text):

1. Scitable by Nature education http://www.nature.com/scitable/topic/genetics-5
2. Pubmed eBook https://www.ncbi.nlm.nih.gov/books/NBK21475/?term=Cell%20biology

SUPPLEMENTAL MATERIALS: iClicker (please bring to every class), 3x5 notecards (in-class assignments will be handed in most classes. They must be 3x5 to stack correctly, no paper ripping). A couple different colors of pen or pencil are sometimes helpful in diagramming problems.

Any additional materials required for class would either be provided through Canvas (UCID required), handed out in class, or via web link.

CODE OF STUDENT CONDUCT: Be aware of the rules set forth in the University Code on Academic Integrity. In brief, the instructor will not allow cheating or plagiarism.

REASONABLE ACCOMMODATION: If you have a special need that may require an accommodation or assistance, please inform me of that fact as soon as possible and no later than the end of the second class meeting. Students with disabilities who require accommodations must contact Dr. Phyllis Bolling, Center for Counseling and Psychological Services (C-CAPS), Campbell Hall, (entry level), room 205, (973) 596-3420

Attendance: Students are expected to attend all meetings of the course.

- **Assignments:** There are no make-ups for in class assignments **EXCEPT** for an excused absence from the Dean of Student Affairs. Homework assignments will be posted on Canvas, and are a student's responsibility to check for. In order for an absence to be excused, students must contact the Office of the Dean of Student Affairs as soon as possible, following their knowing that they will be missing a class. For example: This means if you wake up in the morning and are too ill to come to class, you should email them immediately. Arrangements can then be made by that office. Documentation of your absence should then be provided to the Office of the Dean of Student Affairs (Doctors note, court notice etc...). Under no circumstances are you to contact the instructor or provide them with details of the reason you missed class or an assignment. It is your right to keep that information private and should only be detailed to the Office of the Dean of Student Affairs. **Unexcused late work will receive a 10% penalty for every day late.**

COURSE EVALUATION PROCEDURES:

Two Lecture Exams each worth	25%
Homework and other assignments	10%
Quizzes (3)	15%
Final Exam	25%
TOTAL	**100%**

Note: There are three lecture exams. Only your highest 2 will count. You will drop the lowest of your three lecture exams.

GRADING SCALE			
A	90-100	C	70-74
B+	85-89	D	65-69
B	80-84	F	64-0
C+	75-79		

Extra Credit: There will be no individualized opportunities for extra credit. There may be opportunities for the entire class during the course.

COURSE SCHEDULE

Schedule: Dates listed by week; lectures will meet twice every week, unless otherwise noted. Homework assignments will be due on Tuesdays or Fridays before class, on Canvas. 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	Lecture Topic	Readings	Assignments Due
9/1	Lecture 1: Units of Life/ Lecture 2: Chemical bonds	Chapter 1 Chapter 2	No HW
9/8	Lecture 3: Small Molecules-Macromolecules/Lecture 4: Energy, catalysis	Chapter 2 Chapter 3	Pre-test (in class)/HW1 (Canvas)
9/15	Lecture 5: Biosynthesis/Lecture 6: Protein Structure and Function	Chapter 3 Chapter 4	HW2 (Canvas)
9/22	Lecture 7: How are proteins controlled and studied/ Exam 1	Chapter 4	Quiz 1 (Canvas)
9/29	Lecture 8: Structure of DNA and chromosomes/Lecture 9: Regulation of chromosome structure	Chapter 5 Chapter 6	HW3 (Canvas)
10/6	Lecture 10: DNA replication and repair/ Lecture 11: From DNA to protein/	Chapter 6 Chapter 7	HW4 (Canvas)
10/13	Lecture 12: Control of gene expression – I/ Lecture 13: Control of gene expression – II	Chapter 8	HW5 (Canvas)
10/20	Lecture 14: Evolution of Genes and Genomes/ Lecture 15: Mobile Genetic Elements	Chapter 9	Quiz 2 Canvas)
10/27	Exam 2/ Lecture 16: Membrane structure and function	Chapter 11	HW6 (Canvas)
11/3	Lecture 17: Transport Across Cell Membranes / Lecture 18: Intracellular Compartments and Protein Transport	Chapter 12 Chapter 15	HW7 (Canvas)
11/10	Lecture 19: Cell Signaling/ Lecture 20: Cell Signaling and G Proteins	Chapter 16	HW8 (Canvas)
11/17	Lecture 21: Cytoskeleton Lecture 22: Extracellular Matrix and Cell Junctions Mitochondria/Chloroplasts	Chapter 17 Chapter 20	HW9 (Canvas)
11/24	Lecture 23: Cell Cycle No Friday Class (Thanksgiving)	Chapter 18	HW10 (Canvas)
12/1	Lecture 24: Stem cells, cancer	Chapter 20	Quiz 3 (Canvas)
12/8	Exam 3		No HW

12/15	Final Exam Period*		Final Exam Schedule: http://www5.njit.edu/registrar/exams/