NJIT BIOLOGY

Course Syllabus

FALL 2025

BIOLOGY 356 Molecular Biology

FACE-to-FACE CLASS

INSTRUCTORS:	Dr. Mary Konsolaki	**EMAIL:**	mary.konsolaki@njit.edu
OFFICE:	CKB 340D 973-642-4975	**OFFICE HOURS:**	Tue 1:00-3:00pm (F2F) or by appointment (virtual)
COURSE SCHEDULE:	Wed-Fri 10:00-11:20am FMH 108	**COURSE WEBSITE:**	https://njit.instructure.com/courses/51932

ATTENDANCE

Attendance is mandatory for this class and will be monitored through short in-class quizzes online. Attendance of 85% of lectures earns full attendance credit for the course. You will need to have a computer or a cell phone in order to complete attendance quizzes online. If you expect to miss a class for a valid reason, please email the DoS office, provide documentation and if excused, ask them to email Dr. Konsolaki (mary.konsolaki@njit.edu)

COURSE DESCRIPTION: A detailed study of molecular mechanisms that take place in bacterial and eukaryotic cells and govern the transmission of information from DNA, to RNA, to protein, and DNA transposition. Emphasis will be placed on engaging in case studies and reading primary literature in order to understand the methods that are used to discover current findings in biological and biomedical research. Students will be able to distinguish and describe techniques that are used to answer basic questions in Molecular Biology.

PREREQUISITES:

BIOL 201 and BIOL 202 or R21:120:201 and R:21:120:202 and BIOL 205 and BIOL 206 or R21:120:205 and R21:120:206.
CHEM 125 (or R21:160:115) and CHEM 126 (or R21:160:115)

OBJECTIVES: To provide the student with: (1) knowledge of terms, concepts and theories of how biological information is flowing in cells (2) the ability to integrate the material from multiple sources and research (3) improved critical thinking skills and the opportunity to apply molecular biology concepts in everyday biology-related applications

INSTRUCTIONAL MATERIALS:

New material will be provided in the form of readings from the primary literature. Students who want a resource to refresh their background knowledge can use either their existing textbook from BIOL 201 (Alberts' "Molecular Biology of the Cell") or free textbooks from NCBI https://www.ncbi.nlm.nih.gov/guide/literature/ or an OER textbook such as Fundamentals of Cell Biology (https://open.oregonstate.education/cellbiology/). Primary research literature and case studies will be posted by the instructor. Lecture slides have been adapted from the edX-MITx 7.28.2x online course.

SUPPLEMENTAL MATERIALS: Any additional materials required for class would either be provided through Canvas (UCID required), or via web link.

CODE OF STUDENT CONDUCT: Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

REASONABLE ACCOMMODATION: If you have a special need that may require an accommodation or assistance, please inform us 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

COURSE EVALUATION PROCEDURES:

GRADING	POINTS
Exam 1	15% (75pts)
Exam 2	15% (75pts)
Exam 3 (Final)	20% (100pts)
Homework	15% (75pts)
Classwork	10% (50pts)
Group Presentations	20% (100 pts)
Attendance & Participation	5% (25pts)
TOTAL	**100% (500pts)**

GRADING SCALE	
A	90-100
B+	85-89
B	80-84
C	65-74
D	50-64
F	0-49

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

The topics to be covered will include:

- Bacterial transcription
- Bacterial RNA polymerases and promoters
- Assays used to analyze bacterial transcription
- Bacterial mechanisms of transcription
- Histones and nucleosomes
- Nucleosomal packaging of DNA
- Histone modifications and transcriptional regulation
- Mechanisms of eukaryotic transctiption
- Eukaryotic RNA polymerases, DNA elements
- Inititiation and Elongation of eukaryotic transcription
- Termination of eukaryotic transcription
- DNA binding regulators of eukaryotic transcription
- Mechanisms of Transposition
- Assays for transposition

Late work: Work submitted late will be penalized with a 10% per day reduction.

COURSE SCHEDULE

The class will meet twice per week. During Lectures, students will be expected to answer questions on quizzes that will be posted on Canvas. Students will also do 3 presentations during the semester. In these presentations, students will work in teams to present and explain the results of assigned peer reviewed literature, pertaining to the topics covered in recent lectures.

Week of	Lecture Topic	Assignments Due
9/2	Introduction to Molecular Biology/Mechanisms of transcription and assays	
9/9	Bacterial transcription / Bacterial RNA polymerases and promoters	HW1 (Canvas)
9/16	Assays review / Short quiz / Peer reviewed paper analysis	HW2 (Canvas)
9/23	Student presentations	Review Quiz 1 on Canvas
9/30	Bacterial mechanisms of transcription and assays-II / Exam 1	HW3 (Canvas)
10/7	Histones and nucleosomes in transcription/ Nucleosomal packaging of DNA	HW4 (Canvas)
10/14	Histone modifications and transcriptional regulation	HW5 (Canvas)
10/21	Student presentations of primary literature	HW6 (Canvas)
10/28	Mechanisms of Eukaryotic transcription / RNA polymerases / DNA elements	HW7 (Canvas)
11/4	Initiation and Elongation	HW8 (Canvas)
11/11	Student presentations of primary literature	Review Quiz 2 on Canvas
11/18	Exam 2 / Regulation of transcription / Termination	HW9 (Canvas)
11/25	Database exploration (Online) /Thanksgiving	HW10 (Canvas)
12/2	DNA binding regulators of eukaryotic transcription/ Mechanisms of Transposition	Review Quiz 3 on Canvas
12/9	Assays for transposition	No HW
12/16	Final Exam - During Final Exam Period	Final Exam Schedule will be posted here: http://www5.njit.edu/registrar/exams/