

BIOL 202 (002-008): Foundations in Biology: Cellular & Molecular LAB

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OFFICE HOURS: By Appointment Only(Email)	OFFICE HOURS: By Appointment Only(Email)
OFFICE: 340C Central King Bldg.	COURSE WEBSITE: https://canvas.njit.edu/
OFFICE HOURS: By Appointment Only	COURSE SCHEDULE: Sections 002 - 008
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DESCRIPTION:

Cell chemical components, structure 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 laboratory complements the lecture course 120:201 Foundations of Biology: Cell and Molecular Biology. Both courses 120:201 and 120:202 must be taken concurrently, although they are separate courses with different grades

PREREQUISITES:

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

TEXT AND COURSE WEB PAGE:

A Laboratory Manual is provided to all registered students as a PDF, downloadable from Canvas. Students are required to wear a laboratory coat and bring a scientific laboratory notebook (specifications provided in the laboratory manual). We will use [Canvas](#) in this course. To use Canvas students must have an NJIT UCID. If you are matriculated at NJIT you should already have a UCID. If you are a Rutgers student you can request one here <https://newacct.njit.edu/~accts/cgi-bin/new> or call the NJIT helpdesk for assistance (973-596-2900).

LAB PREPARATION:

For each lab, a lab handout and a lab worksheet will be posted on the course website. Please read through both of these files thoroughly before coming to lab, and be sure to bring a print-out of BOTH files to each lab. Note that for some labs, you will need to bring handouts and worksheets for two labs. Please **obtain a 3-ring binder** to keep your lab handouts and worksheets organized into a lab notebook. Good laboratory notebook keeping is not only part of the skills that you must acquire in this experimental laboratory course. It is also the way to document your activities, results, and thoughts related to your experiments; and, when you eventually work in the laboratory, the clinic, or the field, you must keep track of your data as official records, which are important during corroboration or repetition of your results or for patent purposes.

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LEARNING OUTCOMES:

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

- 1.) the ability to describe the general structure of biomolecules as well as their role in cellular metabolism and the flow of genetic information;
- 2.) information and concepts on bioenergetics and the use of energy by cells;
- 3.) the information on the principles of membrane transport mechanisms and their role in important physiological processes at the organismal level;
- 4.) acquired concepts and general principles on gene expression and its regulation;
- 5.) knowledge on the concepts and general principles on eukaryotic signal transduction;
- 6.) the skills to read, interpret and apply general information in the fields of cell and molecular biology;
- 7.) evaluate contemporary hypotheses on the functional mechanisms of the cell;
- 8.) reinterpret and/or postulate alternative hypotheses or ideas to explain or describe the phenomena studied in the course;
- 9.) 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.

COURSE GRADE:

Your grade for lab will be determined based on quizzes, Canvas assignments, and one written lab report:

- **Quizzes:** You will begin each lab with a quiz. Students arriving late to lab will not be permitted to take the quiz. Make sure you read the lab handout before coming to lab so you're prepared! The quizzes will focus on the current week's lab and will also include some review from previous weeks.
- **Assignments:** Each week, complete the worksheet that accompanies your lab handout. Some of it will be completed during the lab; often, there are analyses or interpretive questions that you'll need to complete on your own time. Please note that while you usually work in groups during the lab and will share data and discuss results with your group, your worksheet and other parts of the assignment must be your own work.
- **Lab Report:** Formatting: Times New Roman, Palatino or a readable serif-font type, single spaced, no longer than 6 pages. Failure to turn in either section of the draft will result in a loss of 25 points. Each person will write their own lab report. Sharing any information other than the raw data is plagiarism and will result in a zero for the assignment. Failure to turn in a draft on time will result in a loss of up to 25 points. Each day that the Draft and Final Report are late will result in a 10% penalty.

% BREAKDOWN		
Attendance/Pre-lab	10%	
Notebook	40%	
Two Lab Reports	20%	TOTAL 100%
Two Exams	30%	

GRADING SCALE			
A	89.5-100%	C	69.5-76.4%
B+	86.5-89.4%	D	59.5-69.4%
B	79.5-86.4%	F	59.4%-0%
C+	76.5-79.4%		

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- **Notes about grading:** Please be advised that you must hand-write your pre-lab and your protocols. Printed and pasted sheets will result in subtracting up to 25 points from that lab grade. If plagiarism is detected and confirmed in a portion of your laboratory notebook, report or assignments, up to 25 points will be subtracted. If the entire report has been plagiarized, you will be given a zero for that laboratory. Please see lab manual for report structure and specific points per item.
- **Attendance, Make-Up, and Lateness Policy:** Attendance at every lab is **required** and necessary to earn a good grade in lab. If you must miss lab for a valid reason you must bring documentation to the Office of the Dean of Student Affairs and arrangements can be made to allow you to take the quiz for that week but you will still be unable to carry out the lab activities. You **MUST** let your TA know if you want to make-up a missed lab
- **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 your TA or refer to the academic integrity code [NJIT Academic Integrity Code](#).

LAB SAFETY: General safety precautions:

- **No eating or drinking in the lab. No Water Bottles!**
- Wear closed-toed shoes to lab.
- Follow the directions for lab procedures and ask your TA if you're unsure about how to operate any equipment. Keep an organized workspace and label all materials.
- Your lab handouts and your TA will alert you to safety concerns specific to a particular lab.

NOTE: You should notify your TA immediately of any injuries, spills, or broken equipment.

LAB SCHEDULE:

Week of	Activity
Feb 3	Lab 1. Bioinformatics Lab assigned online Orientation Session
Feb 10	Lab 2. Titration of the diprotic amino acid glycine Lab 3. Biological buffers
Feb 17	Lab 4. Protein Determination using the Bradford method
Feb 24	Lab 5. Enzyme kinetics
March 2	Lab 6. Bioenergetics: Mitochondria: Assay of cyt c Oxidase
March 9	Laboratory First Exam (Experiments 2 to 6) Lab Notebook Review I
March 16	No Labs-Spring Break (March 15-22)
March 23	Lab 7. Molecular Evolution: SDS-PAGE of Fish Proteins

March 30	Lab 8A. Genetic Fingerprinting I (PCR set up) Lab 9. Molecular Biology of Sickle Cell Anemia
April 6	No Labs- Good Friday
April 13	Lab 8B. Genetic Fingerprinting II (electrophoresis)
April 20	Laboratory Second Exam (Experiments 7 to 9) Lab Notebook Review 2
<u>Finals</u>	DO NOT SCHEDULE TRAVEL DURING FINALS!