Biology 390, Molecular Techniques, Spring 2025

Biology 390, 2.0 credits (1-3)
Hybrid format: Pre-lab is online, In-lab is Mondays from 1:30-4:20 PM
ISC 304 for in-lab activities
Prerequisites: Biology 300 (Cell Biology) and an extra laboratory course (see catalog)

Instructor

Dr. Kevin T. Militello (Dr. M.)
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Office hours: Mondays from 8:15-9:15 AM, Wednesdays from 10:30-11:30 AM, Thursdays from 8:15-9:15 AM, or by appointment

Course Description (from the undergraduate bulletin)

An introduction to basic techniques commonly used in biotechnology. Laboratory exercises include DNA, RNA, and protein manipulations, web-based sequence analysis, and the use of associated apparatus. Lectures cover background information of the techniques and their applications.

End of Course Learning Objectives

At the conclusion of the course…….

- students will understand the theory behind molecular biology techniques.
- students will be able to design, execute, and interpret experiments dealing with modern questions in molecular biology.
- students will be able to properly use modern equipment in molecular biology.
- students will be able to communicate the results and interpretation of molecular biology experiments.

Textbook

There is not a required textbook for the course. Appropriate resources will be posted on Brightspace.

Supplies

*A computer running Windows or MAC OS is required.
*A calculator with scientific notation is required.
*A laboratory coat is required.
*A sharpie marker is required (permanent ultra-fine point recommended).

Grading

Fourteen pre-labs @ 4 points each (online)	10%
fourteen quizzes @ 10 points each (drop 1)	70%
four lab reports @ 20 points each	20%
	100%

• Pre-lab assignments will be available on Brightspace and need to be completed on Brightspace by the start of the laboratory each week. Late pre-lab assignments will not be accepted in order to expedite answer key release.
• Each laboratory exercise should be brought to the laboratory. Paper form is recommended, but an electronic form will suffice.
• Quizzes will be given every week at the start of the laboratory except for week 1 and spring break. Quiz material will come from the previous laboratory, current laboratory, assigned readings, and solutions and dilutions questions.
• Several laboratory reports will be prepared during the course. Late laboratory reports will be penalized by a 10% deduction per day.

The following scale (minimum averages) will be used to calculate final grades based on the percentage of total points obtained. There is no plan to curve the grades as the instructor plans to have fair assessments and some opportunities to repeat work. With that said, the instructor reserves the right to lower grade cut-offs.

A, 94; A-, 90
B+, 87; B, 84; B-, 80
C+, 77; C, 74; C-, 70
D, 65; E, < 65

Students With Disabilities

SUNY Geneseo will make reasonable accommodations for persons with documented physical, emotional or learning disabilities. Students should consult with the Office of Accessibility (Erwin 22, access@geneseo.edu) and their individual faculty (Dr. M.) regarding any needed accommodations as early as possible in the semester.

Academic Honesty and Plagiarism

All students are expected to follow the specific rules of academic honesty and plagiarism for SUNY Geneseo. Please refer to the 2024-2025 Undergraduate Bulletin for more details.

Week 1: 1/27/2025	**Pre-lab: online** **Quiz: No** **Laboratory: Safety, Solutions and Dilutions, Pipetting tutorial** **Required reading: documents above**
Week 2: 2/3/2025 **DNA 1**	**Pre-lab: online** **Quiz: Yes** **Laboratory: Isolation of *E. coli* DNA** **Required reading: lab exercise**
Week 3: 2/10/2025 **DNA 2**	**Pre-lab: online** **Quiz: Yes** **Laboratory: DNA methylation analysis 1** **Required reading: lab exercise (week 1), Kerfeld and Scott article**
Week 4: 2/17/2035 **DNA 3**	**Pre-lab: online** **Quiz: Yes** **Laboratory: DNA methylation analysis 2** **Required reading: lab exercise (week 2)**
Week 5: 2/24/2025 **RNA 1**	**Pre-lab: online** **Quiz: Yes** **Laboratory: RNA-seq 1: RNA Isolation** **Required reading: lab exercise** **Extra: report 1 due**
Week 6: 3/3/2025 **RNA 2**	**Pre-lab: online** **Quiz: Yes** **Laboratory: RNA-seq 2: Data Analysis** **Required reading: lab exercise, Deshepande article**
Week 7: 3/10/2025 **RNA 3**	**Pre-lab: online** **Quiz: Yes** **Laboratory: RNA-seq 3: cDNA synthesis** **Required reading: lab exercise** **Extra: report 2 due**
Week 8: 3/17/2025	**SPRING BREAK, GET WARM!**
Week 9: 3/24/2024 **RNA 4**	**Pre-lab: online** **Quiz: Yes** **Laboratory: RNA-seq 4: qRT-PCR** **Required reading: lab exercise**
Week 10: 3/31/2024 **RNA 5**	**Pre-lab: online** **Quiz: yes** **Laboratory: RNA-seq 5: qRT-PCR data analysis** **Required reading: lab exercise**

Week 11: 4/7/2025 **Protein 1**	**Pre-lab: online** **Quiz: Yes** **Laboratory: Recombinant Protein Production 1: SDS-PAGE Analysis** **Required reading: None** **Extra: report 3 due**
Week 12: 4/14/2025 **Protein 2**	**Pre-lab: none** **Quiz: online** **Laboratory: Recombinant, tagged proteins analysis (online)** **Required reading: SGC article**
Week 13: 4/21/2025 **Protein 3**	**Pre-lab: online** **Quiz: Yes** **Laboratory: Recombinant Protein Production 2: Purification** **Required reading: lab exercise**
Week 14: 4/28/2025 **Protein 4**	**Pre-lab: online** **Quiz: Yes** **Laboratory: Recombinant Protein Production 3: Western Blot Transfer** **Required Reading: lab exercise, Western blotting: A beginner's guide (Abcam)** **Extra: report 4 due**
Week 15: 5/5/2025 **Protein 5**	**Pre-lab: online** **Quiz: Yes** **Laboratory: Recombinant Protein Production 4: Western Blot Detection** **Required reading: lab exercise**