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Fall 2021

CHEM 475-101: Biochemistry Lab I

Yongick Kim

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Chemistry: *Fall 2021 Course Syllabus*

NJIT Academic Integrity Code: All Students should be aware that the Department of Chemistry & Environmental Science (CES) takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor.

COURSE INFORMATION

Course Description: This course will offer the chemistry and related (chemical engineering, biology, bioinformatics, bioengineering) students fundamental laboratory approaches for biochemistry and biotechnology. These experiments will reinforce concepts learned in biochemistry lecture classes.

Number of Credits: 2

Prerequisites: CHEM 244 or CHEM 473 with a grade of C or better.

Course-Section and Instructors

| Course-Section | Instructor |
|----------------|-------------|
| CHEM 475-101 | Yongick Kim |
| | |

Office Hours for All Chemistry & Environmental Science Instructors:

Email: ykim@njit.edu

Office Hours: Mon and Tue from 10:00-11:00AM in Tiernan 370 or by appointment

Required Textbook:

| | |
|------------------|---------------------------------|
| Title | FREE Open Educational Resources |
| Author | |
| Edition | |
| Publisher | |
| ISBN # | |

University-wide Withdrawal Date: Follow the NJIT academic calendar. It will be strictly enforced.

Learning Outcomes: Students can design and perform the research in Biochemistry

POLICIES

All CES students must familiarize themselves with, and adhere to, all official university-wide student policies. CES takes these policies very seriously and enforces them strictly.

Grading Policy: The final grade in this course will be determined as follows:

| | |
|------------------------------|-----|
| Lab Reports | 40% |
| Attendance and participation | 20% |
| Safety | 10% |
| Midterm Exam | 15% |
| Final Exam | 15% |

Your final letter grade in this course will be based on the following tentative curve:

| | | | |
|----|----------|---|---------|
| A | 90 - 100 | C | 70 - 74 |
| B+ | 85 - 89 | D | 60 - 69 |
| B | 80 - 84 | F | 0 - 50 |
| C+ | 75 - 79 | | |

Attendance Policy: Attendance at classes will be recorded and is **mandatory**. Each class is a learning experience that cannot be replicated through simply “getting the notes.”

Lab report Policy: Lab report is an expectation of the course and will be used in the determination of the final letter grade as described above. The Lab report should be written by your words with the style of the scientific article. All structures of chemicals used in the lab should be included in the method part. Submission due is every Sunday 11:59PM by email (No hard copy submission is accepted).

Exams: There will be one midterm exam held in class during the semester and one comprehensive final exam. The following exam periods are tentative and therefore possibly subject to change:

| | |
|-------------------|-------------------|
| Midterm Exam | November 1, 2021 |
| Final Exam Period | December 13, 2021 |

The final exam will test your knowledge of all the course material taught in the entire course.

Makeup Exam Policy: There will normally be **NO MAKE-UP QUIZZES OR EXAMS** during the semester. In the event that a student has a legitimate reason for missing a quiz or exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, e.g., a doctor's note, police report, court notice, etc. clearly stating the date AND time of the mitigating problem. The student must also notify the CES Department Office/Instructor that the exam will be missed so that appropriate steps can be taken to make up the grade.

Cellular Phones: All cellular phones and other electronic devices must be switched off during all class times. Such devices must be stowed in bags during exams or quizzes.

ADDITIONAL RESOURCES

Chemistry Tutoring Center: Located in the Central King Building, Lower Level, Rm. G12. Hours of operation are Monday - Friday 10:00 am - 6:00 pm. For further information please click [here](#).

Accommodation of Disabilities: Office of Accessibility Resources and Services (*formerly known as Disability Support Services*) offers long term and temporary accommodations for undergraduate,

graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please contact Chantonette Lyles, Associate Director at the Office of Accessibility Resources and Services at [973-596-5417](tel:973-596-5417) or via email at lyles@njit.edu. The office is located in Fenster Hall Room 260. A Letter of Accommodation Eligibility from the Office of Accessibility Resources Services office authorizing your accommodations will be required.

For further information regarding self-identification, the submission of medical documentation and additional support services provided please visit the Accessibility Resources and Services (OARS) website at:

- <http://www5.njit.edu/studentsuccess/disability-support-services/>

Important Dates (See: Fall 2020 Academic Calendar, Registrar)

Course Outline

| Lecture | Date | Topic | Assignment |
|---------|-------------|--|------------|
| 1 | 09/08 (Wed) | Introduction: Check-in and safety in the biochemistry laboratory | |
| 2 | 09/13 (Mon) | Spectrophotometry: Create a standard curve and determine concentration of unknown using spectrophotometer | Lab report |
| 3 | 09/20 | Quantification of protein concentration: Determine the concentration of a protein using the Bradford assay | Lab report |
| 4 | 09/27 | Chromatography: Separate a mixture of biomolecules based on size using gel filtration chromatography | Lab report |
| 5 | 10/04 | Protein isolation: Purify a single protein from a complex mixture of proteins | Lab report |
| 6 | 10/11 | SDS-PAGE: Determine the purity of the isolated protein | Lab report |
| 7 | 10/18 | FPLC: Automated protein purification | Lab report |
| 8 | 10/25 | Enzyme kinetics: Determine the kinetic parameters (K_{cat} and K_M) of an enzyme | Lab report |
| 9 | 11/01 | Midterm Exam | |
| 10 | 11/08 | Polymerase chain reaction technology: Amplify DNA using PCR | Lab report |
| 11 | 11/15 | Agarose gel: Determine the size of the DNA fragment | Lab report |
| 12 | 11/22 | Miniprep: Isolate and characterize a plasmid. | Lab report |
| 13 | 11/29 | Transformation: Insert DNA into E. coli and select positive cells | Lab report |
| 14 | 12/06 | Bioinformatics: Use the internet to search databases and visualize molecular structures | Lab report |
| 15 | 12/13 | Final Exam | |