

FUNDAMENTALS OF BIOTECHNIQUES

Course ID: SCB252

Course Title: Fundamentals of Biotechniques

Department: Natural Sciences

Discipline: SCB-Biology

Course Credits: 3 credits 3 hours (lecture and laboratory combined)

Course Instructor: Dr. Na Xu (nxu@lagcc.cuny.edu, naxulgcc@gmail.com), Professor in Biology, Biology Program Co-director

Course Time:

Lab Location: M-245

Office hours:

Textbooks (Recommended): Asking Questions in Biology, Chris Barnard, Francis Gilbert & Peter Mcgregor, 5th Edition, 2017, ISBN# 9780273734680

Journal of Visualized Experiments: Basic Methods in Cellular and Molecular Biology and General Laboratory Techniques

OER Resources: SCB 252 Fundamentals of Biotechniques Lab Manual, Na Xu & Hanqi Ye, 2022.

Course Description: Students will participate in authentic undergraduate research experiences to learn techniques commonly performed in a biological laboratory, such as micro pipetting, isolation and quantification of nucleic acids and proteins, Polymerase Chain Reaction (PCR), immunodetection, and gel electrophoresis. Students will also learn about data analysis, responsible conduct of research, communication science, and reflect on the impact of biotechniques on society.

Prerequisite: ENG101, MAT115, SCC201, SCB201

Grading:

10 assignments	40%
Lab notebook	10%
Biotechnology reflection	10%
Oral presentation	10%
Data analysis	10%
Final Exam	20%
Total	100%

PERFORMANCE OBJECTIVES

1. Demonstrate research integrity and responsible conduct of research.
2. Interpret scientific literature.
3. Effectively report scientific concepts through oral and written communication.
4. Analyze existing datasets and student-generated experimental data.
5. Utilize mathematical and chemistry concepts in performing laboratory work.
6. Describe the theoretical aspects and perform the practical aspects of techniques utilized in a biological laboratory to study macromolecules, such as nucleic acids and proteins.
7. Illustrate the impact of biotechniques on society.

ARTIFACT ASSESSMENT

This class will be depositing student work for this semester. Students will deposit an assignment for the Global Learning competency and Oral Communication ability. For a tutorial on how to deposit student work, go to: <http://eportfolio.lagcc.cuny.edu/support/tutorials.htm> and find the section called, "Assessment for Students." Click on the adobe flash button for "Depositing Assessment Artifact in Digication Instructions for Students." You will see a brief video on how to deposit.

COURSE OUTLINE

Dates	Topics	Assignments
Week 1	Lab 1 Lab Safety, Research Integrity, Responsible Conduct of Research. (Lecture only)	
Week 2	Lab 2 Introduction to Use Drosophila as a Model System for Scientific Research	Assignment 1 due
Week 3	Lab 3 Classic Drosophila Mutations and Their Phenotypes	Assignment 2 due
Week 4	Lab 4 Isolating Genomic DNA from Fly	Assignment 3 due
Week 5	Lab 5 Genetic Crosses and Introduction to Bioinformatics/ Computer Lab	Assignment 4 due
Week 6	Lab 6 Gene annotation and sequence analysis/ Computer Lab	Assignment 5 due
Week 7	Lab7 Primer design and validation/ Computer Lab	Assignment 6 due
Week 8	Lab 8 Scientific Methods, Biotechnology and Society & Research Project (Lecture Only)	Assignment 7 due
Week 9	Lab 9 Introduction to Scientific Literature & Research Project	Assignment 8 due

Week 10	Lab 10 Methodology, Data Analysis, and Results of Research Papers, Biotechnology and Society & Research Project (Continued)	Assignment 9 due
Week 11	Lab 11 Protein Analysis Using ELISA	Assignment 10 due Oral Presentation due
Week 12	Lab 12 Discussion Sessions of Research Papers & Research Project (Continued)	Lab notebooks due, biotechnology reflection due & data analysis due on 12/13
Final Week	Final Exam	