



蘇州大學  
Soochow University

# BIO 371 Molecular Biology Laboratory

Summer 2024

**Course Credits:** 4

**Contact Hours:** 56 hours

**Instructor:** TBA

**Email:** TBA

## **COURSE OBJECTIVES**

The laboratory programme consists of molecular biology experiments divided into five learning modules, along with appropriate lecture material. These include commonly used procedures such as the production, purification and detection of recombinant DNA and proteins, as well as the quantification of stress-induced metabolites and gene expression analysis in multicellular organisms. The course covers topics such as DNA replication, transcription, translation, gene expression and regulation, as well as basic techniques used in molecular biology research. Students will learn the basics of experimental design, data analysis, and how to present their findings in the form of written scientific reports and oral presentations.

Upon completion of this course, students will be able to:

1. Understand the structure and function of DNA and RNA , as well as the regulation of gene expression.
2. Understand the techniques used in molecular biology research
3. Be familiar with molecular biology methodologies. and competent to operate conventional laboratory equipment and procedures commonly used in Molecular Biology research.
4. Perform basic data analysis, including statistics, and understand the results.
5. Express their results in both writing and oral form.

## **PREREQUISITES**

BIO 203 Genetics, BIO 370 Molecular Biology

## **GRADING**



Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
Quizzes	10 Points
Lab Reports	45 Points
Project	15 Points
Final Exam	30 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F$ .

We reserve the right to make adjustments to the overall grading policy.

## COURSE MATERIALS

---

### **Required Texts:**

Joseph Sambrook, David W. Russell. (2001), *Molecular Cloning: A Laboratory Manual*, CSHL Press.

### **Recommended (Optional) Texts or Other Materials:**

1. Bruce Alberts. (2015), *Molecular Biology of the Cell*, 6th Edition, Garland Publishing Inc.
2. Nancy Craig, Rachel Green, Carol Greider, Gisela Storz, Cynthia Wolberger, Orna Cohen-Fix. (2014), *Molecular Biology: Principles of Genome Function*, 3rd Edition, Oxford University Press.

## COURSE TOPICS

---

MODULE	TASKS
--------	-------



Module 1	<p><b>Tasks:</b> Topic 1: Overview of laboratory safety and protocols Topic 2: Isolation and quantification of DNA Topic 3: Quantification of DNA concentration and purity Topic 4: Analysis of DNA</p> <p><b>Assessments:</b> Quiz#1</p>
Module 2	<p><b>Tasks:</b> Topic 5: Introduction of plasmid vector. Topic 6: Cloning and transformation with plasmid vectors. Topic 7: Basic principles and applications of gateway cloning. Topic 8: Disadvantages of gateway cloning and alternative cloning systems.</p> <p><b>Assessments:</b> Lab Report#1 Quiz#2</p>
Module 3	<p><b>Tasks:</b> Topic 9: Introduction to the isolation of total RNA. Topic 10: Quantifying and storing RNA. Topic 11: Extraction, purification, and analysis of RNA from eukaryotic cells. Topic 12: Analysis of RNA by primer extension.</p> <p><b>Assessments:</b> Lab Report#2 Project</p>
Module 4	<p><b>Tasks:</b> Topic 13: Instruments for real-time PCR. Topic 14: PCR setup and optimization. Topic 15: Quantification of DNA and RNA by real-time PCR Topic 16: Analysis and normalization of real-time PCR experimental data</p> <p><b>Assessments:</b> Lab Report#3 Project due</p>
Module 5	<p><b>Tasks:</b> Topic 17: Overview of next-generation sequencing instruments. Topic 18: DNA sequencing. Topic 19: Capillary sequencing. Topic 20: Quality assessment of sequence data.</p> <p><b>Assessments:</b> Final exam</p>

## ATTENDANCE

---



1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

## **LEARNING REQUIREMENTS**

- 1) Late assignments are not acceptable and are subjected to grade deductions.
- 2) Assignments submitted in the wrong format will be counted as not submitted.
- 3) Failure to submit or fulfill any required course component results in failure of the class.
- 4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
- 5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

## **TECHNOLOGY POLICY**

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

## **ACADEMIC INTEGRITY POLICY**



蘇州大學  
Soochow University

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

### **DISABILITY ACCOMMODATION**

---

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.