



蘇州大學  
Soochow University

# BIO 203 Principles of Genetics

Winter 2024

**Course Credits:** 4

**Contact Hours:** 56 hours

**Instructor:** TBA

**Email:** TBA

## **COURSE OBJECTIVES**

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This course provides a comprehensive introduction to the field of genetics, covering fundamental concepts, patterns of inheritance, Mendel's laws, molecular structure and replication of the genetic material, molecular properties of genes, and genetic technologies. The course takes an experimental approach to understanding genetics, integrating the scientific method into the exploration of genetic principles. Students will gain a solid foundation in both classical and modern genetics, and explore the applications of genetic knowledge in various fields.

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

1. Understand the basic principles of inheritance and the laws of Mendelian genetics.
2. Describe the molecular structure and properties of genes, including transcription, translation, and post-transcriptional modifications.
3. Understand and apply modern genetic technologies, such as gene editing and next-generation sequencing.
4. Explore the practical applications of genetic knowledge in various fields.
5. Enhance critical thinking skills through the analysis of genetic concepts and experimental design.

## **PREREQUISITES**

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BIO 101 Introduction to Biology I

BIO 102 Introduction to Biology II



## GRADING

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

| ITEM            | POINTS     |
|-----------------|------------|
| Quizzes         | 10 Points  |
| Lab Assignments | 50 Points  |
| Midterm Exam    | 15 Points  |
| Final Exam      | 25 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:

Robert Brooker, *Genetics: Analysis and Principles*, 4th Edition, McGraw-Hill, 2011.

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

None

## COURSE TOPICS

| MODULE   | TASKS  |
|----------|--|
| Module 1 | <b>Topics:</b><br>Topic 1: Overview of Genetics<br>Topic 2: Mendelian Inheritance<br>Topic 3: Reproduction and Chromosome Transmission<br>Topic 4: Extensions of Mendelian Inheritance<br>Lab Session#1<br><b>Assessments:</b><br>Lab Assignment#1<br>Quiz#1 |



|          |   |
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| Module 2 | <p><b>Topics:</b><br/>Topic 5: Non-Mendelian Inheritance<br/>Topic 6: Genetic Linkage and Mapping in Eukaryotes<br/>Topic 7: Genetic Transfer and Mapping in Bacteria and Bacteriophages<br/>Topic 8: Variation in Chromosome Structure and Number<br/>Lab Session#2</p> <p><b>Assessments:</b><br/>Lab Assignment#2<br/>Quiz#2</p> |
| Module 3 | <p><b>Topics:</b><br/>Topic 9: Molecular Structure of DNA and RNA<br/>Topic 10: Chromosome Organization and Molecular Structure<br/>Topic 11: DNA Replication<br/>Topic 12: Gene Transcription and RNA Modification<br/>Lab Session#3</p> <p><b>Assessments:</b><br/>Lab Assignment#3<br/>Midterm Exam</p>                          |
| Module 4 | <p><b>Topics:</b><br/>Topic 13: Translation of mRNA<br/>Topic 14: Gene Regulation in Bacteria and Bacteriophages<br/>Topic 15: Gene Regulation in Eukaryotes<br/>Topic 16: Gene Mutation and DNA Repair<br/>Lab Session#4</p> <p><b>Assessments:</b><br/>Lab Assignment#4</p>   |
| Module 5 | <p><b>Topics:</b><br/>Topic 17: Recombination and Transposition at the Molecular Level<br/>Topic 18: Recombinant DNA Technology<br/>Topic 19: Biotechnology<br/>Topic 20: Genomics<br/>Lab Session#5</p> <p><b>Assessments:</b><br/>Lab Assignment#5<br/>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**

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- 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**

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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 (e.g., note taking, reading course documents).

### **ACADEMIC INTEGRITY POLICY**

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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



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administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

## **DISABILITY ACCOMMODATION**

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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.