# MAT 213 Mathematics II

## Summer 2024

**Course Credits:** 4
**Contact Hours:** 56 hours
**Instructor:** TBA
**Email:**TBA

## COURSE OBJECTIVES

Built upon the foundational concepts introduced in Mathematics I, this course aims to equip students with a comprehensive understanding of mathematical principles and their practical applications in various fields. Students will explore topics such as linear equations and linear algebra, vector spaces, matrices, systems of equations, linear programming, functions, integral and multivariate calculus. Emphasis will be placed on developing a strong theoretical foundation and applying mathematical techniques to real-world problems.

Upon Completion of this Course, students will be able to:

1. Gain a deeper understanding of fundamental mathematical concepts, including functions, algebra, calculus, and differential equations.
2. Solve systems of linear equations using matrix methods and Gaussian elimination.
3. Solve ordinary and partial differential equations using appropriate techniques.
4. Develop logical reasoning skills essential for advanced mathematical study and interdisciplinary applications.
5. Apply mathematical techniques to analyze and solve problems in real-world scenarios.

## PREREQUISITES

MAT 113 Mathematics I

## GRADING

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

| ITEM | POINTS |
|---|---|
| 3 Homework | 30 Points |
| 4 Case Studies | 20 Points |
| Midterm | 20 Points |
| Final Report | 10 Points |
| Final Exam | 20 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:**

***Linear Algebra and Its Applications***, David C. Lay, Pearson, 2011.

***Mathematics with Applications in the Management, Natural, and Social Sciences***, 12th edition, Holcomb, John P.; Hungerford, Thomas W. etc., Pearson, 2021.

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

None

## COURSE TOPICS

| MODULE | TASKS |
|---|---|

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|---|---|
| Module 1 | **Topics:**<br>Topic 1: Linear Equations and Linear Algebra<br>Topic 2: Linear Models in Economics and Engineering<br>Topic 3: Matrix Algebra<br>Topic 4: Determinants<br>Topic 5: Vector Spaces<br>**Assessments:**<br>Homework#1<br>Case Study#1 |
| Module 2 | **Topics:**<br>Topic 6: Eigenvalues and Eigenvectors<br>Topic 7: Orthogonality and Least Squares<br>Topic 8: Symmetric Matrices and Quadratic Forms<br>Topic 9: The Geometry of Vector Spaces<br>Topic 10: Optimization<br>**Assessments:**<br>Homework#2<br>Case Study#2 |
| Module 3 | **Topics:**<br>Topic 11: Linear Programming<br>Topic 12: Finite-State Markov Chains<br>Topic 13: Graphs, Lines, and Inequalities<br>Topic 14: Applications of Linear Functions<br>Topic 15: Applications of Exponential Functions<br>**Assessments:**<br>Case Study#3<br>Midterm |
| Module 4 | **Topics:**<br>Topic 16: Mathematics of Finance<br>Topic 17: Applications of Systems of Linear Equations<br>Topic 18: Sets and Probability<br>Topic 19: Counting, Probability Distributions, and Further Topics in Probability<br>Topic 20: Introduction to Statistics<br>**Assessments:**<br>Homework#3<br>Case Study#4 |
| Module 5 | **Topics:**<br>Topic 21: Differential Calculus<br>Topic 22: Applications of the Derivative<br>Topic 23: Integral Calculus<br>Topic 24: Multivariate Calculus |

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|---|---|
| | Topic 25: Functions of Several Variables<br>**Assessments:**<br>Final Report<br>Final Exam |

## 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).

## ACEDEMIC INTEGRITY POLICY

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.