



蘇州大學
Soochow University

MAT 271 Mathematics for Engineering

Summer 2024

Course Credits: 4

Contact Hours: 56 hours

Instructor: TBA

Email: TBA

COURSE OBJECTIVES

This course introduces essential mathematical techniques for scientific and engineering applications. Topics include calculus, linear algebra, differential equations, and complex analysis. Through theoretical discussions and practical exercises, students develop proficiency in mathematical modeling and problem-solving, preparing them for success in scientific research and engineering practice.

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

1. Master series solutions to ordinary differential equations, including Legendre and Bessel functions, allow for the examination of a wide range of physical events.
2. Utilize Fourier series to represent periodic functions, facilitating the analysis of signals and systems in engineering and physics.
3. Understand the fundamentals of partial differential equations and their applications in a variety of scientific and engineering disciplines.
4. Apply mathematical concepts acquired to model and solve real-world issues in physics, engineering, and other scientific fields, displaying mathematical modeling and problem-solving abilities.

PREREQUISITES

N/A

GRADING

Grades will be determined by accumulating points, with 100 points being the



maximum, as follows:

| ITEM | POINTS |
|---------------------|------------|
| Class Participation | 15 Points |
| Quizzes | 15 Points |
| Project | 20 Points |
| Midterm | 20 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:

Selcuk S. Bayin, *Essentials of Mathematical Methods in Science and Engineering*, 2nd Edition, Wiley, 2019.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

| MODULE | TASKS |
|----------|--|
| Module 1 | Topics: Topic 1: Functional Analysis Topic 2: Vector Analysis Topic 3: Orthogonal Generalized Coordinates Topic 4: Determinants and Matrices Assessments: Quiz#1 |



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|----------|---|
| Module 2 | Topics: Topic 5: Linear Algebra Topic 6: Practical Linear Algebra Topic 7: Applications of Linear Algebra Topic 8: Sequences and Series Assessments: Quiz#2 Project |
| Module 3 | Topics: Topic 9: Complex Numbers and Functions Topic 10: Complex Analysis Topic 11: Ordinary Differential Equations Topic 12: Second-Order Differential Equations and Special Functions Assessments: Midterm Project |
| Module 4 | Topics: Topic 13: Legendre Equation Topic 14: Bessel's Equation and Bessel Functions Topic 15: Partial Differential Equations and Separation of Variables Topic 16: Fourier Series Assessments: Quiz#3 Project due |
| Module 5 | Topics: Topic 17: Differential Equations and Laplace Transforms Topic 18: Calculus of Variations Topic 19: Probability Theory and Distributions Topic 20: Information Theory Assessments: 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).

ACADEMIC 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.



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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.