



蘇州大學  
Soochow University

## MAT 200 Calculus and Analytic Geometry III

Summer 2024

**Course Credits:** 4

**Contact Hours:** 56 hours

**Instructor:** TBA

**Email:** TBA

### COURSE OBJECTIVES

---

This advanced course builds upon the concepts introduced in Calculus with Analytic Geometry I and II, delving deeper into multivariable calculus and vector analysis. Students will explore Taylor polynomials and series, three-dimensional vector geometry, and the fundamentals of multivariable differentiation. The course will also cover double integrals in Cartesian and polar coordinates, vectors, curves, and surfaces in space, as well as the calculus of vector-valued functions. Through visualization, numerical, and graphic experiments, students will gain an understanding of calculus and analytic geometry concepts. Additionally, the course will address sequences and series, methods for determining convergence or divergence, including integral tests, comparison tests, alternating series, power series, root tests, and ratio tests. The study of parametric curves and polar coordinates; vector operations such as dot and cross products; and vector functions, including their derivatives and integrals, are also part of the curriculum.

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

1. Apply and extend the principles of calculus to multivariable functions.
2. Evaluate and utilize Taylor series and polynomials in solving real-world problems.
3. Manipulate and analyze vectors in three-dimensional space.
4. Perform differentiation and integration of vector-valued functions.
5. Determine convergence and divergence of sequences and series using various tests.
6. Implement double integrals in both Cartesian and polar coordinates.
7. Visualize complex geometric concepts through graphing software and numerical methods.
8. Solve problems involving parametric curves and polar coordinates.
9. Utilize vector operations such as dot and cross products in problem-solving.



## PREREQUISITES

MAT 180 Calculus and Analytic Geometry I; MAT 190 Calculus and Analytic Geometry II

## GRADING

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

ITEM	POINTS
2 Assignments	20 Points
2 Quizzes	20 Points
Midterm Exam	30 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:**

George Simmons, *Calculus With Analytic Geometry*(2nd ed), 1995, McGraw-Hill Education.

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

None

## COURSE TOPICS

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



Module 1	<b>Topics:</b> Topic 1: Review of Single-Variable Calculus and Introduction to Multivariable Calculus Topic 2: Partial Derivatives Topic 3: Chain Rule in Several Variables Topic 4: Directional Derivatives and the Gradient <b>Assessments:</b> Assignment # 1
Module 2	<b>Topics:</b> Topic 5: Taylor Series and Polynomials Topic 6: Approximation of Functions Topic 7: Lagrange Multipliers Topic 8: Three-Dimensional Coordinate Systems <b>Assessments:</b> Quiz # 1
Module 3	<b>Topics:</b> Topic 9: Vectors in Space and Dot Product and Cross Product Topic 10: Line Integrals and Surface Integrals Topic 11: Green's Theorem and Stokes' Theorem Topic 12: Divergence Theorem and Gauss's Theorem <b>Assessments:</b> Midterm Exam
Module 4	<b>Topics:</b> Topic 13: Vector Fields and Differential Forms Topic 14: Double Integrals in Cartesian Coordinates Topic 15: Double Integrals in Polar Coordinates Topic 16: Sequences and Series <b>Assessments:</b> Assignment # 2
Module 5	<b>Topics:</b> Topic 17: Tests for Convergence: Integral Test Topic 18: Tests for Convergence: Comparison Tests Topic 19: Alternating Series and Absolute Convergence Topic 20: Power Series and Radius of Convergence <b>Assessments:</b> Quiz # 2 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 (e.g., note taking, reading course documents).

## **ACADEMIC INTEGRITY POLICY**

Soochow University highly values the academic integrity and aims to promote the



蘇州大學  
Soochow University

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.