Soochow University

MAT 316 Advanced Calculus II

Summer 2023

Course Credits: 4
Contact Hours: 55 hours
Instructor: TBA
Email:TBA

COURSE OBJECTIVES

This course is an in-depth course that builds upon the foundational knowledge of calculus. The course focuses on advanced topics in calculus, including multivariable calculus, vector calculus, and integration techniques. It aims to develop students' understanding of the theoretical aspects of calculus and their ability to apply advanced techniques to solve complex problems. Through rigorous mathematical analysis and problem-solving exercises, students will enhance their analytical thinking and mathematical reasoning skills.

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

1. Demonstrate a deep understanding of multivariable calculus concepts, including limits, continuity, differentiability, and partial derivatives in the context of functions of several variables

2. Apply advanced techniques of multivariable calculus, such as optimization with constraints and multiple integrals, to solve real-world problems in various fields

3. Comprehend the principles of vector calculus, including vector functions, line and surface integrals, and the fundamental theorems of vector calculus

4. Solve complex problems involving conservative vector fields, potential functions, and applications of vector calculus in physics and engineering

5. Employ integration techniques, such as integration by parts, trigonometric substitution, and partial fractions, to evaluate definite and indefinite integrals of various functions

PREREQUISITES

N/A

GRADING

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

ITEM	POINTS
Quizzes	20 Points
Midterm 1	20 Points
Midterm 2	20 Points
Final Exam	40 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 ≥ 90 > B ≥ 80 > C ≥ 70 > D ≥ 60 > F.

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

COURSE MATERIALS

Required Texts:

Multivariable Calculus (9th Edition), by James Stewart, Daniel Clegg, and Saleem Watson.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	**Topics**: Topic 1: Precise Definitions in Multivariable Calculus Topic 2: Limits, Continuity, and Differentiability of Multivariable Functions Topic 3: Partial Derivatives and their Applications Topic 4: The Chain Rule and Implicit Differentiation Assessments: Quiz#1
Module 2	Topics: Topic 5: Geometry of Smooth Curves Topic 6: Parametric Equations and Vector-valued Functions Topic 7: Tangent Vectors, Arc Length, and Curvature of Curves Topic 8: Applications of Smooth Curves in Physics and Engineering Assessments: Quiz#2
Module 3	Topics: Topic 9: Nonlinear Systems of Equations Topic 10: Solving Nonlinear Systems using Numerical and Algebraic Techniques Topic 11: Stability analysis of equilibrium Points Topic 12: Local Behavior of Multivariable Functions Assessments: Midterm#1
Module 4	Topics: Topic 13: Linear Transformations and Eigenvalues Topic 14: The Hessian Matrix and Critical Points Topic 15: Calculus of Variation Topic 16: Functionals, Euler-Lagrange equations, and Necessary Conditions Assessments: Midterm#2
Module 5	Topics: Topic 17: Isoperimetric Problems and Applications Topic 18: Fourier Series Topic 19: Orthogonal Functions and Fourier Series Expansion Topic 20: Fourier Series Convergence and Applications 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).

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.