MATH 0240: Analytic Geometry and Calculus 3

Section 2 & Section 4

Fall, 2023

General Information

Instructor	Dawei Sun
	dawei.sun@scupi.cn
	Office: Room 3-317-B
	Office Hours: Tueday & Friday 13:30am-16:30am
Teaching Assistants	Penglin Jiang: 2021141520184@stu.scu.edu.cn
	Yifan Wu: 1223276948@qq.com
	Tutorial Sessions: **M & Th 12:40 pm-1:25 pm**
	Location: 3-101
	QQ Group: 905126825
Class	Room 3-103
	Section 2 Tuesday & Friday 8:15 am-9:55 am
	Section 4 Tuesday & Friday 10:15 am-11:55am

Course Description

This course is focused on multivariate calculus, which extends the calculus for real-valued functions defined on real numbers. Topics include equations for lines, planes, and quadratic surfaces, derivatives and integrals of vector functions for parametrized motions, arc length and curvature, real-valued functions with several variables, partial and directional derivatives, the multivariable chain rule, double and triple integrals, multiple integrals and changes of variables, vector fields, line and surface integrals, Green's and Stokes' theorem, and the divergence theorem.

Course Objectives

1. Know the parametric curves and equations for lines, planes and quadric surfaces in three dimensional space, and understand the geometric significance of these equations.
2. Understand the relationship between vector functions and parametrized motion, and know how to calculate velocity, acceleration, arc length and curvature.
3. Know the meaning of partial derivatives and how to calculate them. Know the multivariable chain rule
4. Know the meaning of the gradient, how to calculate it, and how to apply it for computing directional derivatives and maximum and minimum values.
5. Understand the meaning of double and triple integrals; know how to compute them and how to apply them.
6. Understand the meaning of vector fields and line integrals. Know Green's theorem and be able to apply it.
7. Understand the meaning of surface integrals and know how to calculate them. Know Stokes' theorem and divergence theorem.

Prerequisites

MATH 0220 & 0235: Analytic Geometry and Calculus 1 & 2

Textbook

Essential Calculus, 2nd Edition, International Metric Edition, by James Stewart. We will cover most of the materials from Chapters 9-13 in the textbook.

Course Assessment

The final grade will be computed based on the score of weekly assignments, quizzes, midterm and final exams.

Exams

Two midterm exams and a final exam will be given in the semester. **All exams are closed-book, and cheating is not tolerated. No electronic devices will be permitted during exams.** Note that the final exam is comprehensive.

Exam	Data	Duration	Range
Midterm Exam 1	Week 10	2 hours	TBD
Midterm Exam 2	Week 15	2 hours	TBD
Final Exam	Final Week	2 hours	Comprehensive

Assignments

Homeworks will be assigned on Friday every week approximately, and they will be due by the following week at Friday noon. **Homework should be submitted on Blackboard. No late homework is accepted, and plagiarism is not tolerated**. The lowest grade of the assignment will be dropped when computing the final grade. Discussions of the assignment problems are encouraged, but each student must submit a individual work. **Each homework must include Name, Student ID, and Assignment Title.** Homework must be done in a structured, logical, and orderly manner enabling grader to readily verify steps, equations, and methods used. Headers such as "Given", "Required" and "Solution" are recommended.

Quizzes

In-class quiz will be given in some lecture and tutorial sessions. The lowest grade will be dropped.

Final Grade

The final grade will be computed according to the following scheme:

Scheme: Total grade = 10 % Assignments +25 % Test 1 + 25 % Test 2 + 30 % Final Exam + 10 % Quizzes and Attendance.

Cutoffs

A $[90, 100]$ A- $[85, 90)$ B+ $[80, 85)$ B $[76, 80)$ B- $[73, 76)$ C+ $[70, 73)$ C $[66, 70)$
C- $[63, 66)$ D+ $[61, 63)$ D $[60, 61)$ F $(60, 0)$

Course Schedule

The schedule is tentative and subject to change. The listed objects below should be viewed as the key concepts you should grasp after each week, and also as a study guide before exams.

Week 01, 09/04-09/08	Course introduction
	Sections 9.1-9.2
	Parametric equations
	Calculus with parametric curves
Week 02, 09/11-09/15	Sections 9.3-9.4
	Polar coordinates
	Areas and length in polar coordinates
Week 03, 09/18-09/22	Sections 10.1-10.5
	The dot and cross product
	Equations of lines and planes
Week 04, 09/25-09/29	Section 10.6
	Cylinders and quadratic surfaces
	National Day Holiday
Week 05, 10/02-10/06	National Day Holiday
	Section 10.7
	Vector-valued functions
Week 06, 10/09-10/13	Sections 10.8-10.9
	Calculus of Vector-valued functions
	Arc length and curvature
Week 07, 10/08-10/20	Sections 11.1-11.2
	Functions of several variables
	Limits and continuities
Week 08, 10/23-10/27	Sections 11.3-11.4
	Partial derivatives
	The tangent plane and linear approximation
Week 09, 10/30-11/03	Sections 11.5-11.6
	Chain rule
	Directional derivatives and the gradient vector
Week 10, 11/06-11/10	**Midterm Exam 1**
	Section 11.7
	Maximum and minimum values

Week 11, 11/13-11/17	Section 11.8
	Lagrange multipliers
Week 12, 11/20-11/24	Sections 12.1-12.2
	Double integrals over rectangular regions
	Double integrals over general regions
Week 13, 11/27-12/01	Sections 12.3-12.5
	Double integrals in polar coordinates
	Triple integrals
Week 14, 12/04-12/08	Sections 12.6-12.7
	Triple integrals in cylindrical coordinates
	Triple integrals in spherical coordinates
Week 15, 12/11-12/15	**Midterm Exam 2**
	Sections 13.1-13.2
	Vector fields
	Line integrals
Week 16, 12/18-12/22	Sections 13.3-13.4
	The fundamental theorem for line integrals
	Green's Theorem
Week 17, 12/25-12/29	Sections 13.5-13.6
	Curl and divergence
	Parametric surfaces and their area
Week 18, 01/01-01/05	Sections 13.7-9
	Surface area
	Stoke's theorem
	Divergence theorem
Week 19-20, 01/08-01/19	**Final Exam Week**

Course Policies

During Class

Computers may be allowed in class for the electronic recording of notes. Please refrain from using computers for any activities that are unrelated to the course. Phones are prohibited as they are rarely useful for anything in the course. Eating and drinking are allowed in class but please keep from it affecting the course.

Attendance Policy

Attendance is expected in all lectures and tutorial sessions. Valid excuses for absence will be accepted before class. In extenuating circumstances, valid excuses with proof will be accepted after class.

Policies on Late Assignments and Exams

Students should attempt to solve the homework problems immediately after the homework is assigned. DO NOT wait until the last minute to meet the deadlines, and note that **no late homework is accepted**. All assignments except for the one with lowest grade will be counted in your total grade. **Late submission for previous assignments during the final exam period will NOT be accepted in any form for any excuses**.
All tests and the final exam are mandatory. There will be absolutely **no makeup exam for each test**. If you miss the final, a makeup exam may be given for the final exam if the student has the approval from the instructor or emergencies and health issues **with a valid proof**. I will not accept the student deceleration for absence form for the final exam. For each exam, please remember to bring your ID with you. Any form of cheating is not accepted.

Emails

If you have questions regarding to class materials, homework problems, or grading issues, etc., you are highly encouraged to attend office hours. Unless you cannot make it, you may send a email to TAs or me. **Please allow 24 to 48 hours for any response to e-mails. The subject of each email must include "[MA0240]".** For example, if your have a question regarding to a homework problem, the subject of the email could be

[MA0240] Question about Problem X of Assignment X

Please make sure that you sign off with your official name (the one that appears in Blackboard). The email without obeying the above rules may not be replied.

Academic Integrity

At Sichuan University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of the work you do.
Everyone at SCUPI is expected to treat others with dignity and respect. The Code of Student Conduct allows Sichuan University to take disciplinary action if students don't follow this community expectation.