MATH 0240: Analytic Geometry and Calculus 3

Fall, 2021-2022

Classroom: Room 3-102 SCUPI Building

Lectures: Monday & Thursday 4:45-5:30 pm, 5:40-6:25 pm

Instructor: Kunpeng Wang

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Office hours: Mon./Thur. 1:30-4:30 pm, Tues. 1:30-4:00 pm

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Tutorials: TBA

Course Description

Topics include review of parametric equations, polar coordinates, conic sections, coordinate systems and vectors, dot product and cross product, vector functions, derivatives and integrals of vector functions, arc length and curvature, functions of several variables and partial derivatives, directional derivatives and double and triple integrals, multiple integrals and changes of variables, and vector calculus, with an emphasis on Green's and Stokes' theorems.

Prerequisites

MATH 0220 & 0235 Analytic Geometry and Calculus 1 & 2

Course Objectives

At the completion of this course, students will be able to:

1. Extend many of the concepts learned in MATH 0220/0235 to three dimensions.

2. Have a clear understanding of vector fields, and how they apply to geometric and physical problems.

3. Understand what is meant by the partial derivative of a function of several variables, and be able to apply this to the concept of maximum and minimum points.

4. Set up and compute double and triple integrals over general regions.

5. Learn about generalizations of the Fundamental Theorem of Calculus and how to employ them in applications.

Course Content

We will cover most of the material from Chapters 10-14 in the textbook.

Class Structure

Lectures.

Tutorials

Tutorials run by our TA will start in Week 03.

Course Materials

Textbook: Calculus, Early Transcendentals, 2nd Edition, Pearson, by Briggs, Cochran and Gillett.

Blackboard

Please regularly log on and check https://learn.scupi.cn/. We will upload there lecture notes, assignments, projects, announcements and your grades.

Course Assessment

Weekly assignments, quizzes, class activities, tests and the final exam.

Schedule of Exams, Assignments and Quizzes

Exams

Date	Time	Component
Week 05	2 hours	Test 1
Week 10	2 hours	Test 2
Week 14	2 hours	Test 3
Final exam week (January 3 to January 7)	TBA	Final exam

Assignments

Homework assignments will be given out weekly. They will be due by the following week on Friday at the beginning of the class at 8:15 am. Plagiarism will not be tolerated. However, discussions of the assignment problems will be permited. Please also note each student must submit his/her individual assignment.

Quizzes

Students will be asked to complete a quiz in tutorials each week. Normally, a quiz will consist of 1-2 short questions.

Grading Policy

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

Scheme: Total grade = 15 % Assignments + 15 % Test 1 + 15 % Test 2 + 15 % Test 3 + 30 % Final Exam + 10 % Quizzes, Class Activities and Attendance.
Note: The tests and final exam will be closed-book.

Conversion of Numerical Grades to Final Letter Grades Follows the SCUPI Common Grade

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 $(60, 0)$

Schedule and weekly learning goals

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 each test and the final exam. The tests will be based on the material that was taught up until week prior to the test, that is, Test 1 covers Weeks 01-04, Test 2 is based on Weeks 05-09 and Test 3 is for Weeks 10-13. The final exam will cover all topics taught in this semester.

Week 01, 08/30-09/03

- Cover Sections 10.1-10.3 Overview.

- Parametric equations and polar coordinates.

- Vectors in 2D & 3D space.

Week 02, 09/06-09/10

- Cover Sections 11.1-11.3.

- Dot and cross products.

Week 03, 09/13-09/18

- Cover Sections 11.4-11.6 & part of 11.7.

- Lines and curves in space.

- Vector-valued functions and motion in space.

Week 04, 09/22-09/24

- Cover Section 11.8.

- Arclength.

Week 05, 09/26-09/30 Test 1

- Test 1.

- Cover Sections 12.1. & 12.2

- Planes and surfaces.

- Functions of two variables.

Week 06, 10/08-10/09

- National Day Holiday.

Week 07, 10/11-10/15

- Cover Sections 12.3-12.5, & 12.7.

- Partial derivatives and tangent planes.

- The multivariate chain rule.

Week 08, 10/18-10/22

- Cover Sections 12.6, 12.8-12.9.

- Extrema and Lagrange multipliers.

Week 09, 10/25-10/29

- Cover Section 13.1.

- Double integrals over rectangular regions.

Week 10, 11/01-11/05 Test 2

- Test 2.

- Cover Sections 13.2-13.3.

- Double integrals over general regions and in polar coordinates.

Week 11, 11/08-11/12

- Cover Sections 13.4-13.5.

- Triple integrals.

Week 12, 11/15-11/19

- Cover Sections 13.7.

- Change of variables in multiple integrals.

Week 13, 11/22-11/26

- Cover Section 14.1.

- Vector fields.

Week 14, 11/29-12/03 Test 3

- Test 3.

- Cover Section 14.2-14.3.

- Line integrals and conservative vector fields.

Week 15, 12/06-12/10

- Cover Sections 14.4-14.5.

- Green's Theorem as well as divergence and curl.

Week 16, 12/13-12/17

- Cover Sections 14.6-14.7

- Surface integrals.

- Stoke's Theorem.

Week 17, 12/20-12/24

- Cover Section 14.7.

- Divergence Theorem.

Week 18, 12/27-12/31 Review session

- **Review Session**.

Week 19, 01/03-01/07

- **Final Exam Week**.

Course Policies

There will be no special treatments for any students in this course! For example, if you have a heavy course load, you should expect a steep learning curve and be prepared for it. You will not be exempted from any assignments.

During Class

Computers may be allowed in class for the electronic recording of notes. But 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. 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 start their homework assignments immediately after the assignments are given, and DO NOT wait until the last minute to meet the deadlines. **Late assignments will be NOT accepted except for emergencies and health issues. Any other late assignments handed in will be marked but will be given 0**. At most **Two** extensions for assignments will be given in this course. All assignments 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.

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.