

MATH 0220: Analytic Geometry and Calculus 1

Spring, 2023-2024

Classroom: Room 3-104 SCUPI Building

Lectures: Wednesday 8:15-9:00 am, 9:10-9:55 am & Thursday 4:45-5:30 pm, 5:40-6:25 pm.

Instructor: Kunpeng Wang

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Office hours: Tues./Wed. 10-11 am, Tues./Thurs. 1-4 pm, Wed. 1-2 pm.

Office: Room 3-317A SCUPI Building

Course Description

This course offers a self-contained introduction to differential and integral calculus. The topics include functions, limits, differentiation of polynomial, trigonometric, exponential and logarithmic functions, product, quotient and chain rules, applications of differentiation, antiderivatives and definite integrals, integration by substitution, and integrals involving logarithmic, exponential, trigonometric, inverse trigonometric, and hyperbolic functions. Also brief introduction of vectors.

Prerequisites

High school mathematics.

Course Objectives

We will cover most of the material from Chapters 1-5 & part of Chapter 10 in the textbook.

Learning Outcomes

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

1. Comprehend the significance of limits, continuity, differentiability and integrability of functions.
2. Understand the connection between differentiation and integration given by the Fundamental Theorem of Calculus.
3. Know the Intermediate Value Theorem as well as the Mean Value Theorem / Rolle's Theorem.
4. Sketch a reasonably accurate graph of a given function by hand, using calculus.
5. Use calculus to solve optimization and related rates problems.
6. Compute derivatives as well as basic integrals.

Class Structure

Lectures.

Tutorials

Tutorials run by our TA will start in Week 03.

Course Materials

Textbook: Essential Calculus, 2nd Edition, International Metric Edition, by James Stewart.

Blackboard

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

Course Assessment

Biweekly assignments, quizzes, class activities, attendance, tests and final exams.

Schedule of Exams, Assignments and Quizzes

Exams

Date	Time	Component
Week 7	2 hours	Test 1
Week 12	2 hours	Test 2
Final exam week (June 12 to June 16)	2 hours	Final exam

Assignments

Homework assignments will be given out biweekly. They will not be collected or graded. It is the responsibility of the students to complete the homework assignments. Also, questions from the homework assignments will be selected in the class activities. Failing to answer the questions will lead to a penalty in your assignment assessment.

Grading Policy

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

Scheme: Total grade = 5 % Assignments + 20 % Test 1 + 20 % Test 2 + 35 % Final Exam + 10 % Class Activities + 10 % Attendance.

Note: All 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 exam, and at the end of the semester. Each test will base on material that

was taught up until the second last week prior to the test, namely, Test 1 covers Weeks 01-07, Test 2 is based on Weeks 08-13. The final exam will cover all topics taught in this semester.

Week 01, 02/26-03/01

- Cover Sections 1.3 & 1.6
- Course introduction.
- Functions and their representations.
- The limit of a function.

Week 02, 03/04-03/08

- Cover Sections 1.4-1.5.
- Calculating limits.
- Continuity.

Week 03, 03/11-03/15

- Cover Sections 1.6-2.2.
- Limits involving infinity.
- Derivatives.
- Rates of change.

Week 04, 03/18-03/22

- Cover Sections 5.1-5.7.
- Exponential and logarithmic functions.
- Inverse trigonometric functions.

Week 05, 03/25-03/29

- Cover Sections 2.3-2.5.
- The basic differentiation rules.
- The product and quotient rules.
- The chain rule.

Week 06, 04/01-04/05

- Cover Sections 2.6 & 5.6.
- Implicit differentiation.
- Derivatives of inverse trigonometric functions.
- Logarithmic differentiation.

Week 07, 04/08-04/12

- **Test 1.**
- Cover Section 5.5.
- Rates of change.
- Exponential growth and decay.

Week 08, 04/15-04/19

- Cover Sections 2.7-2.8.
- Related rates.
- Linear approximations and differentials.

Week 09, 04/22-04/26

- Cover Section 3.1.
- Extreme values.
- EVT and Fermat's theorem.

Week 10, 04/28-04/30

- Cover Sections 3.2.
- Rolle's theorem.
- Mean value theorem.

Week 11, 05/06-05/10

- Cover Sections 3.3 & 5.8.
- Curve sketching of functions via derivatives.
- Indeterminate forms and L'Hopital's Rule.

Week 12, 05/13-05/17

- **Test 2.**
- Cover Sections 3.5 & 3.7.
- Optimization problems.
- Antiderivatives.

Week 13, 05/20-05/24

- Cover Section 4.1.
- Areas and distances.
- Riemann sums.

Week 14, 05/27-05/31

- Cover Sections 4.2-4.3.
- The definite integral.
- The Fundamental Theorem of Calculus (FTC).

Week 15, 06/03-06/07

- Cover Sections 4.4-4.5.
- The indefinite integral.
- The substitution rule.

Week 16, 06/10-06/14

- Cover Section 10.1-10.3.
- 3D coordinates and vectors.
- Dot and cross products.

Weeks 17- 19, 06/12-06/30 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. Perfect attendance can be given a full mark in attendance. **SCU has announced a very strict policy on class attendance. Consecutive absences for 3 weeks may lead you to an F in this class.**

Class Activities policy

Each week students will be asked to present materials (which will be related the topics introduced in the previous week and assignment questions) in class. Each class activity will last 20-30 minutes depending on weekly progress.

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.