Calculus 1 Sec 2
Course Syllabus

Fall 2023

Catalog Description

This is the first of a sequence of three basic calculus courses. It covers the derivative and integral of functions of one variable and their applications.

Schedule

Lecture/Studio, Teaching Building 1 Room A420

Mondays and Wednesdays 08:15 – 09:55

Tutorial Session

Please plan on attending additional hours of tutorial sessions outside of class per week to be held by our TA with possible quizzes given, location and hour to be determined.

Instructors

Prof. Tony Ho zh_ho01@scupi.cn

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When emailing the instructors, include "MATH" in the subject field of your message. Use your university email account (student_number@stu.scu.edu.cn); mail from other accounts such as qq.com and 163.com will be stopped by the SCU spam filter.

Textbook

Essential Calculus, Metric Version, 2nd International Edition, by James Stewart (published by CENGAGE Learning).

We will cover approximately two or three sections per week. Textbook reading assignments will be posted to the class website. Read the assigned chapter BEFORE class.

Software

We will use a powerful software tool, Matlab, to perform calculations and draw graphs. Matlab is installed on the class computers, and you will also need a copy for your own computer.

Matlab is a potent tool, used worldwide by engineering and science professionals in many fields. The effort you put in to master it will repay you many times over in this class and others. To make learning it easier, there is a wealth of information, examples, and documentation available within the program and on the web. Learn to tap into these resources so you can make the best use of the program.

Web Site

This course uses the Blackboard system; the web site is

https://pibb.scu.edu.cn/

(Note: the **https** is important, otherwise it may not load.) There you will find the course syllabus, studio and homework assignments, and other materials. Current announcements and assignments will be posted on the home page. All assignments will be uploaded through the Blackboard system. Please check the class page frequently.

Class Format and Studio Assignments

When you enter a university, you are transitioning from a cocoon to a beautiful butterfly. The difference between a high school education and a university education is that in a university setting, we prepare you to start learning independently. So, it is my belief that the sooner you start taking ownership and an active role for your own mathematics education, the better off you will be.

In case you wonder about my role, I disclose to you that I offer guidance. Calculus courses are just like any other mathematics courses that we have ever taken before. But perhaps some of us have always waited for our teacher to show us how to make calculations. Perhaps some of us have not realized that learning mathematics is just like riding a bicycle. We cannot say that we have learned how to make mathematics calculations once we have watched someone else make calculations.

The way I ask you to take ownership and to take an active role for your own mathematics education is simple. I ask that you study the examples given in the textbook, and I will also ask you to figure out how to make calculations for problems like the examples in the textbook. These are our studio assignments. I will come by to visit and to see your progress. After each mathematical calculation, you will exchange your paper with someone else sitting close to you. If there is no agreement on any solution, let me know, and the whole class can collaborate on finding the correct solution.

Class Participation

As members of an academic community, all students are expected to actively participate in and contribute to class discussions. You are expected to engage with the class during the lecture/studio time, and to be prepared to think and answer questions on your feet. There is no penalty for not knowing the answer to a question, but you need to be able to "think out loud" and demonstrate the procedure you will follow to arrive at a solution. So, if you're asked a question in class, be prepared to figure out the answer.

It is imperative that you spend the class time finding out what you do not understand. My expectation is that you will ask questions once you find out that you do not understand something. Since there is no way for me to tell whether you are spending time finding out what you do not understand, or whether you even ask questions about what you do not understand, we will, occasionally, give a 10-minute quiz. These quiz scores will count as studio assignments and class participation.

Homework Assignments

Homework assignments are most of the exercise problems at the end of each section we cover and will be assigned every week. We will begin each lecture by looking at some of the exercise problems at the end of each section to discover what we can or cannot do yet. Working on homework assignments is the key to getting a good grade.

Exams and Grading

We are planning on three 90-minute major exams, tentatively scheduled on October 21st, November 25th, and December 30th, from 13:30 – 15:30, and a comprehensive final examination at the end of the semester. Each major exam will be cumulative with more emphasis on the material since the previous test.

There will be **no make-up exams or quizzes**. We will replace your lowest major exam score with the final exam score, but your lowest score does **not** include any 0-score due to simply not taking any major exam(s). You may provide a doctor's note or a legitimate reason, like attending a university competition, to replace a 0-score.

Your grade will be based on homework assignments (5%), class participation / quizzes (20%), major exams (50%), final examination (25%), and playing games during class (-10).

The final letter grade is determined from the following table:

A: [90 – 100]	A−: [85 – 89]	B+: [80 – 84]	B: [76 – 79]	B−: [73 – 75]
C+: [70 – 72]	C: [66 – 69]	C−: [63 – 65]	D: [61 – 62]	F: < 60

You must retrieve your own exam and quiz papers. For any exam or quiz, you only have one week to request for a score correction. No score correction will be made one week after the test papers have been returned in class.

Office Hours

If you do not understand something, and talking to your classmates does not help, then you should be seeking help from me or your TA. My office is 3-317A.

Office hours are times we have specifically set aside to be available to students. During office hours, you can come to my office; you do not need an appointment. I am usually in my office after lunch Tuesday through Friday. I am also available at other times; please email to schedule a time.

I will also ask you to come to my office if you do not do well on your exams.

Plagiarism and Academic Misconduct

Collaboration on studio problems and homework assignments is permitted and encouraged. Collaboration on exams is not.

Plagiarism, copying, and any other form of academic misconduct or dishonesty will not be tolerated. Cite all references, including books, technical reports, and web sites you have used. You may discuss the homework with other people currently taking this class, the instructors, and teaching assistants.

Examples of disallowed sources include websites that offer homework help; course documents from previous semesters; people or agencies that do your work for you.

You are not to share materials distributed in class with people outside the University. Uploading of course materials, including homework, handouts, tests, and test solutions, etc. to the web is prohibited.

To reiterate: use of homework or test solutions from previous semesters or the web is not allowed. Getting homework help from the instructors and fellow students in the class is okay; looking up things on Google, Baidu, and Wikipedia is okay; getting help from websites offering homework help and problem solutions is NOT okay.

If you have any questions about referencing material, or the boundaries of acceptable collaboration, please talk to me.

Phones and Laptops

Out of respect for your fellow students, please mute and put away your phones, and close your laptops when class begins. Web surfing, emailing, text messaging, and the like during lectures is distracting to other students and the instructor and is likely to result in your missing some important information. Don't do it. If caught playing games on phones, we will deduct points.

Although restroom breaks are allowed during exams, you are not allowed to take any phone(s) or laptop(s) with you.

Other Useful Information

Although there are no formal prerequisites for this class, you are expected to know how, or learn how, to do the following:

- Use your newly acquired knowledge to make calculations instead of hanging onto using your older knowledge. It is a strong indication of whether you understand the materials or not.
- Use an internet browser to find things on the web.
- Use MATLAB to evaluate numerical results, make graphs, and do multistep calculations.
- Open, read, and print Acrobat pdf files.
- Be proficient in basic pre-calculus mathematics, including plane geometry, trigonometry, and algebra.

For most of you, this will be your first introduction to calculus with analytic geometry where I ask you to take a more active role in learning. You are not going to have an instructor showing you how to make mathematical calculations all your life. At times, you might not even be able to find a textbook showing you how to solve problems.

By virtue of your being admitted to SCUPI, we know that you are smart, capable, and hardworking. You may find this course challenging and demanding and might even wonder if you've made a mistake coming here. Fear not! You will do okay if keep a few things in mind:

- This and other classes at SCUPI are being taught using a Western-style approach. This involves a lot of questioning and interaction with the instructor, probably much more than you are used to.
- It's okay to be frustrated. You will be learning a lot of new things, at a fast pace, in a language you're still getting comfortable with. The best way to learn is to ask lots of questions. If you don't understand something in class, ASK! Remember that if you're unsure about something, there is a good chance that many of the people sitting around you are also unsure.
- Develop a good studying habit. Don't fall behind on your course material.
- When working with equations, use variables to denote the quantities and parameters specific to the problem. Delay substituting numerical values for as long as possible; this will make it easier to check your work and find errors.

An important skill to acquire is the art of baloney detection (also known as BS detection). Statements are called baloney (or BS) when they are unsupported by facts and are often used to deceive unwary people. For example, a salesperson might make unjustified claims regarding the performance of a system or product to make a sale; as a mathematics student, you need to learn how to be skeptical about unsupported claims. To acquire this skill, you need to always be questioning: how do you know a calculation is correct? Do you understand why it is true? Are there counterexamples that show it is not true?
When you get your graded quizzes and exams back, you should go over any problems you did not do well on. Solutions will be distributed, and you may contact me or your teaching assistant if you need help in understanding where you went wrong.

Course Goals

Students will develop a good understanding of three-dimensional vectors, the geometry of space. Students will acquire basic skills needed to apply integration techniques to solve a wide range of integration problems. Students will develop a basic understanding of infinite series and their applications. Evaluation of students will be determined by in-Class presentation, quizzes, homework, and exams.

Learning Outcomes for This Course

- Students will develop a basic understanding of limits, derivatives, and antiderivatives.
- Students will learn various techniques of getting limits and derivatives of various functions.
- Students will be able to apply differentiation techniques to solve a range of applied problems, including optimization problems, related rates problems, and applications from physics and other disciplines.
- Students will develop a deep understanding of the fundamental theorem of calculus.
- Students will understand basic skills for finding integrals.

Approximate Schedule

Tentative sequence of the sections covered in this class is:

Week	Contents	Descriptions
3 (09/18)	10.1 – 10.3	Three-dimensional Coordinate Systems, Vectors, The Dot Product
4 (09/25)	10.4 – 10.5	The Cross Product, Equations of Lines and Planes
5 (10/02)	1.1 – 1.3	Functions and Their Representations, A Catalog of Essential Functions, The Limit of a Function
6 (10/09)	1.4 – 1.5	Calculating Limits, Continuity, Mid-Autumn Festival
7 (10/16)	1.6 – 2.1	Limits Involving Infinity, Derivatives and Rates of Change
8 (10/23)	2.2 – 2.4	The Derivative as a Function, Basic Differentiation Formulas
9 (10/30)	2.4 – 2.6	Product & Quotient Rules, Chain Rule, Implicit Differentiation
10 (11/06)	2.6 – 2.8	Implicit Differentiation, Related Rates, Linear Approximations & Differentials
11 (11/13)	2.8 – 3.1	Linear Approximations & Differentials, Maximum and Minimum Values
12 (11/20)	3.2 – 3.4	The Mean Value Theorem, Derivatives and Shapes of Graphs, Curve Sketching
13 (11/27)	3.5, 3.7, 4.1	Optimization Problems, Antiderivatives, Areas and Distances
14 (12/04)	4.1 – 4.2	Areas and Distances, The Definite Integral
15 (12/11)	4.3 – 4.4	Evaluating Definite Integrals, The Fundamental Theorem of Calculus
16 (12/18)	4.5, 5.1	The Substitution Rule, Inverse Functions
17 (12/25)	5.2 – 5.3	The Natural Logarithmic Function, The Natural Exponential Function
18 (01/01)	5.6, 5.8	Inverse Trigonometric Functions, Indeterminate Forms & L'Hospital's Rule
19 (01/08)		Final Exam Week
20 (01/15)		Final Exam Week