SCUPI
Sichuan University - Pittsburgh Institute

Calculus 2 Sec 1 Spring 2020

Course Syllabus

Catalog Description

An enriched version of MATH 0230. Course will cover same topics but in greater depth and with more challenging problems, computer experimentation and applications using maple. This course is intended for honors students.

Schedule

Lecture/Studio, Room 3-104

Mondays & Thursdays 08:15 – 09:55

Instructors

Prof. Tony Ho tonyho@scu.edu.cn

Teaching Assistants:

Chelsea Huang 1137981787@qq.com
QQ Group 913106806

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

Calculus, Early Transcendentals, 2nd Edition, by William L. Briggs, Lyle Cochran, and Bernard Gillett (published by Pearson).

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://learn.scupi.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

You often give me an impression that the reason you are taking courses at a university is to learn and to try to get as close to a 4.0 grade point average as you possibly can. Of course, a good grade point average can help you further your career up to a point. Early on, institutions can look at your past grade point average to determine whether they would admit you into their organizations.

But, of what is a good grade point average an indication? One can say that those of you, who have a great grade point average, can learn very well the materials given to you. Is

this your goal for coming to a university, to let the world know that you can learn very well the materials given to you? If that is the case, can you see where our world is going?

And what do you think how our world sees you? Do you believe that everyone in our world only wishes that they can find someone who can learn well and no more than that? Perhaps this is true for a trade like plumbing. But, were you coming to a university because you want to learn a trade?

I would like to supplement the idea of showing the world how good you are at learning. I would also like you to think that coming to a university is finding out what we do not currently know how to do, and we would like you to try to figure out how you may change our world by your imagination and your intelligence. Once you understand the materials given to you, can you imagine something that is far better than anyone has ever thought of before? That is the goal that I would like you to set for yourself. So, during our class, do not be afraid to explore the endless possibilities that are out there in our world. As it is quoted by Shakespeare, "The world is your oyster." Therefore, let us begin with the famous Daoist-inspired sayings: "I hear, I forget. I see, I remember. I do, I understand."

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.

You are also expected to follow and critique the presentations of your classmates and provide useful feedback to them so they can learn from the experience.

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, I will, occasionally, give a 10-minute quiz. These quiz scores will count as studio assignments and class participation.

Presentations

Whenever two or more classmates find it difficult to agree on a solution, you can volunteer to come up to the board to present a solution for which you believe to be correct. Priorities will be given to harder problems and whoever has not volunteered as many times as before.

When you are selected to present, follow these guidelines:

- Introduce yourself.
- Succinctly state the problem and the appropriate definition(s), theorem(s) or principle(s), etc. you used to solve the problem.
- Describe your solution as if your audience is unfamiliar with the problem.
- Describe how you verified your solution if necessary.
- Speak as LOUDLY and clearly as possible or use the microphone. The people at the back of the room must hear and understand every word.

If I do not see that you are working toward a solution, I will ask you to step down.

Following the presentation, however, the entire class will critique your presentation. Five minutes can be allotted for questions and discussions following your presentation, although we may continue past five minutes if necessary. Here are our evaluation criteria: (1) Use of English: 30% (2) Preparation of the presentation: 30%, (3) Correctness: 20%, (4) Time limit: 20%. Good presentations that help more people understand will earn extra credits towards your total score. **Please also make sure to turn in a copy of your presentation on paper afterwards for possible extra credit.**

Homework Assignments

Homework problems will be assigned every week. We will use Pearson's MyLab & Mastering:

LOGIN INFO:

(1) Go to the website: **www.pearsonmylabandmastering.com/global/**

(2) If you have not registered for this course, click on Student's "Register". After that you follow the instructions to register

(3) You will need our COURSE ID: ho83213

(4) You will need your email address

(5) Please use the same last name (surname) and first name as they appear on the roster

(6) Set your Password

These are to be solved and submitted by the indicated date and time in MyLab & Mastering. Your homework score will be your correct percentage multiplied by 100.

If you are sick or have a compelling emergency that prevents you from turning in the homework on time, email me.

If you believe an error has been made in the grading of an assignment, bring it to either my or your TA's attention within ONE WEEK of its submission.

Exams and Grading

There will, tentatively, be three 90-minute major exams tentative scheduled during the weeks of March 23, April 27, and June 1, 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.

Your grade will be based on studio assignments and class participation / quizzes (10%), homework (10%), major exams (50%), final examination (30%). Here is an example: if a student's scores are: quiz total (80), homework (85), presentation extra credit (5), exams (70, 75, 80), and final (85), then the adjusted exam scores will be 75, 83. Thus the student grade determination is $80 \times 10\% + 85 \times 10\% + 5 + (70+75+80)/3 \times 50\% + 85 \times 30\% \approx 79$. There is NO makeup for all the quizzes and exams.

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	D: 60	F: < 60

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 3-324.

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 in the afternoons after lunch from Monday through Thursday. We are also available at other times; please email to schedule a time.

Plagiarism and Academic Misconduct

Collaboration on studio problems and homework assignments is permitted and encouraged. Collaboration on exams are 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, homework 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 the Google, Baidu, and the 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 lecture is distracting to other students and the instructor, and is likely to result in your missing some important information. Don't do it.

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 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 your 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 if 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 homework back, you should go over any problems you did not do well on. Homework solutions will not be distributed, but you may contact your teaching assistant if you need help in understanding where you went wrong.

You should be having fun and learning mathematics because figuring out something in mathematics is fun.

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 test.

Learning Outcomes for This Course

- Students will develop a basic understanding of two and three-dimensional vectors, the geometry of the three-dimensional space, equations of lines and planes in three dimensions, and be able to apply these concepts when working applied problems.
- Students will learn various techniques of integration.
- Students will be able to apply integration techniques to solve a range of applied problems, including volume problems and applications from physics and other disciplines.
- Students will develop a basic understanding of infinite series and their applications.

Approximate Schedule

Tentative sequence of the sections covered in this class is:

Week	Contents	Descriptions
1 (2/24)	6.1 – 6.3	Velocity and Net Change, Regions Between Curves, Volume by Slicing
2 (3/2)	6.4 – 6.5	Volumes by Shells, Length of Curves
3 (3/9)	6.6 – 6.7	Surface Area, Physical Applications
4 (3/16)	6.8 – 6.9	Logarithmic and Exponential Functions Revisited, Exponential Models
5 (3/23)	7.1	Exam 1, Basic Approaches
6 (3/30)	7.2 – 7.3	Integration by Parts, Trigonometric Integrals
7 (4/6)	7.4 – 7.5	Trigonometric Substitutions, Partial Fractions
8 (4/13)	7.7 – 7.8	Numerical Integration, Improper Integrals
9 (4/20)	7.9 – 8.1	Introduction to Differential Equations, An Overview
10 (4/27)	8.1 – 8.2	Exam 2, Sequences,
11 (5/4)	8.3 – 8.4	Infinite Series, The Divergence and Integral Tests
12 (5/11)	8.5 – 8.6	The Ratio, Root, and Comparison Tests, Alternating Series
13 (5/18)	9.1 – 9.2	Approximating Functions with Polynomials
14 (5/25)	9.2 – 9.3	Properties of Power Series, Taylor Series
15 (6/1)	9.4	Working with Taylor Series, Exam 3
16 (6/8)	10.1 – 10.2	Parametric Equations, Polar Coordinates
17 (6/15)	10.3 – 10.4	Calculus in Polar Coordinates, Conic Sections