



## MATH 30: COURSE SYLLABUS

SPRING 2018

Calculus I:

Calculus of a Single Variable

Updated: 1.4.2018

Instructor: Dr. Jorge Eduardo Basilio

[Jorge\\_Basilio@pitzer.edu](mailto:Jorge_Basilio@pitzer.edu)

Office: Avery 220

Office Phone: 909.607.7961

Office Hours: M 10:30 am – 11:30; W 2:30 pm – 3:30; F 11 am – 12 pm

Course Website: Sakai

### Meeting Times

Mondays, Wednesdays, & Fridays – 9:10 am - 10:30 am

Fletcher Hall – Room 110

### About this course

#### What is this class?

Our existence lies in a perpetual state of change. An apple falls from a tree, clouds move across expansive farmland blocking out the sun for days, meanwhile satellites zip around the Earth transmitting and receiving signals to our cell phones. The calculus was invented to develop a language to accurately describe and study the change we see. The ancient Greeks began a detailed study of change but they were scared to wrestle with the infinite and so it was not until the 17th century that maverick mathematicians, Isaac Newton and Gottfried Leibniz, among others, tamed infinity and gave birth to an extremely successful branch of mathematics called *the Calculus*. Though just a few hundred years old, the Calculus has become an indispensable research tool in both the natural, social sciences and Economics and Business.

The power of calculus lies in its power to reduce complicated problems to simple rules and procedures. While these procedures can be (and often are) taught with little regard to the underlying mathematical concepts or their practical uses, our emphasis will be on understanding all of these: concepts, procedures and uses. We will engage in the full mathematical process, which includes searching for patterns, order and reason; creating models of real world situations to clarify and predict better what happens around us; understanding and explaining ideas clearly; and applying the mathematics we know to solve unfamiliar problems.

## Brief Course Outline

This is broad course outline of the topics covered. I will post a separate document with the entire course schedule of readings on Sakai shortly. Consult our Sakai site for updates.

- Chapter 1: Functions and Models
- Chapter 2: Limits and Derivatives
- Chapter 3: Differentiation Rules
- Chapter 4: Applications of Differentiation
- Chapter 5: Integrals
- Chapter 6: Applications of Integration

## Learning Goals

The students should be able to interpret the concepts of Calculus algebraically, graphically and verbally. More generally, the students will improve their ability to think critically, to analyze a problem and solve it using a wide array of tools. These skills will be invaluable to them in whatever path they choose to follow, be it as a mathematics major or in pursuit of a career in one of the other sciences.

Additional learning goals are to develop an understanding and appreciation of the mathematical concepts and tools in Calculus that provide the ability to model continuously changing quantities. By the end of the semester students will be able to:

- demonstrate proficiency in treating mathematical content at an appropriate level.
- demonstrate competence in the use of numerical, graphical, and algebraic representations of functions.
- demonstrate the ability to interpret data, analyze graphical information, and communicate solutions in written and oral form.
- demonstrate proficiency in the use of mathematics to formulate and solve problems.
- demonstrate proficiency in the use of mathematics to structure their understanding of and investigate questions in the world around them.
- demonstrate proficiency and a deeper theoretical knowledge of polynomial, rational, exponential, logarithmic, trigonometric functions, as well as their applications in applied problems.
- demonstrate proficiency in the concepts of limits and continuity.
- demonstrate proficiency in the concept of a derivative, as well as familiarity with numerous equivalent notations for the same concept.
- demonstrate proficiency in calculating the derivative for various type of functions using the formal definition and rules (shortcuts).
- demonstrate the ability to use the derivative to analyze graph of a function.
- demonstrate the ability to use various applications of the derivative in applied problems.
- demonstrate proficiency in the concept of an anti-derivative and the Fundamental Theorem of Calculus and its applications.
- demonstrate proficiency in the concept of integration to evaluate geometric area and solve other applied problems.

## Who should take this class?

This course is intended for students interested in advanced study in mathematics or science, students preparing for careers in the health sciences or engineering, and any student wishing to broaden and enrich the life of the mind.

## Prerequisites

Completion of Math 25 (or equivalent experience with college-level Precalculus), a suitable score on the mathematics placement exam, or permission of the instructor.

## Required Texts

- Online access to the homework system **WebAssign**.
- *Calculus: Early Transcendentals*, 8th Ed., by James Stewart.
- **Note Bene:** The textbook comes with access to the WebAssign system. So if you are ok with studying from an ebook then you DO NOT have to buy a hard copy of the textbook. I would encourage students who plan to take Calc II,III, or more advanced mathematics courses to purchase a hardcopy of the textbook to keep as a reference.

You can buy an earlier edition for cheaper if you plan to use it as a future reference or resource. Since the HW is done online you will not need the textbook for the homework, only to read the book and study.

### Optional Free resources.

- **Paul's Online Math Notes**.

Comments: Free and online. The notes are simple and to the point. Excellent for extra examples.

- **MIT's OCW Calculus I course** with video lectures and notes.

Comments: Free and online. Haven't really watched the videos so check them out and let me know if you like them.

- **Calculus I**, by Jerrold Marsden and Alan Weinstein.

Comments: Free and online. A more advanced textbook that is geared towards future engineers and physicists. They are excellent but can be very challenging. Some topics and notation choices are unusual.

- *Calculus Made Easy*, by Silvanus Thompson. Can find it free online if you search.

Comments: Can find it free online if you search, or it's cheap on amazon. This book was originally published in 1914 and it is a fun and easy to read supplement to a standard book on calculus.

## Calculator

This is a course of mathematical concepts and techniques, not a course of mechanical computation, so we will have little use for calculators. You may bring a calculator or laptop with you to class if you wish. If you bring a laptop please do not use it to check email or chat with friends, or do any tasks that would disturb your fellow classmates. We will discuss the free programs Desmos, Geogebra, Symbolab, Wolfram Alpha, and SAGE and how it can help in learning. Please note that no calculators of any kind will be allowed during exams.

## Grading Criteria.

Participation .....	2%
Miscellaneous (projects, quizzes, etc) .....	8%
Online HW .....	15%
Exams (3 @15 % each) .....	45%
Final Exam (Comprehensive) .....	30%

## In-class Exams.

Exam 1. Monday, 2/12/2018

Exam 2. Monday, 3/23/2018

Exam 3. Friday, 4/27/2018

*Dates are subject to change.* Exams are scheduled during the end of the class period, approximately 60 minutes long. The first 15 minutes will be reserved for Questions and Answers from students.

## Final Exam.

Date. Monday, May 7  
Time. 9:00 am -12:00 pm  
Room: Fletcher Hall 110

## Missed Exams Policy.

- ★ There are NO make-up or rescheduling of examinations under any circumstances.
- ★ Any student who is absent from an in-class examination will receive a zero for that exam grade.
- ★ Exception: Students who can prove that they could not take the examination **due to an unexpected medical emergency** will have the NEXT exam grade substituted for the missing exam.

## Letter Grades

A .....	90-100 %
B .....	80-89 %
C .....	65-79 %
D .....	50-64 %
F .....	< 50 %

It *may* be the case, depending on how the class does, that the same letter grades might be assigned at slightly lower cutoffs. Finally, students should note that they will be graded on their total weighted score and cannot be given extra credit for additional assignments, dramatic improvement, or other activities.

## Expectations

### Readings

Reading the textbook before class is crucial to learning the material at a deep level. Some suggestions for effectively “actively reading” of mathematical texts are provided at the end of this document.

### Homework

Homework is to be submitted online using [WebAssign](#), and you can monitor the due dates online. Under no exceptions can WebAssign homework be turned in after the posted deadline.

The first 15 minutes of class time will be devoted to solving a few problems from the WebAssign homework. To best use this time, please come to class on time and be ready with questions.

### Attendance & Class Policies

Attendance is crucial to doing well in the course, and correlates strongly with good grades. Therefore, regular attendance is strongly recommended but not mandatory.

I expect everyone to maintain a respectful and mindful learning environment for all, and to be engaged in our class lecture or discussions. To assure this, penalties for disruptive behavior:

- Out of courtesy to the rest of the class, please arrive on time, with cell phones turned off and put away. If I see a cell phone showing during class, and I see it on your desk or lap, the student will have 1% of their participation score removed (EVEN IF THE PHONE IS TURNED OFF).
- Students may also lose 1% of their participation grade **for each instance of distracting behavior**. These include: sleeping, eating (drinks are ok), using a cell-phone, having a conversation which distracts me or other students, doing work from another class, or habitually tardiness.

## Additional Help

I encourage students who are having difficulty with the course material to meet with me for individualized help during office hours. Students are also encouraged to develop and maintain an email dialogue with me so that I may provide more timely assistance with smaller-scale questions.

Students of this course can also access the free services (including free, walk-in tutoring) several nights per week. Hours will be announced as soon as possible.

## Accommodations

If you have a disability that may interfere with your ability to participate in the activities, coursework, or assessment of the objectives of this course, you may be entitled to accommodations. It is imperative that students requesting academic accommodations identify themselves early in the semester. To request academic accommodations due to a disability, please contact Associate Dean/Director of Academic Support Services Gabriella Tempestoso if you are a Pitzer student. She can be contacted via email at [Gabriella\\_Tempestoso@pitzer.edu](mailto:Gabriella_Tempestoso@pitzer.edu) or at (909) 607-3553. If you attend another one of the Claremont Colleges, please contact your home colleges disability officer.

Students who seek special accommodations outside of regular class time will need to schedule to fulfill these at the office of Academic Support Services at least two weeks in advance. For example, if you may receive time and a half on exams, then you will need to schedule to take the exam at their office and not during class.

## Suggestions for Effectively Reading Mathematics

### “Read Actively”

1. When confronted with the task of reading a piece of mathematical text, skim the entire reading first to discern its general outline and to identify its main points and objectives.
2. If necessary, review earlier portions of the textbook (or prior mathematical topics studied) to recall forgotten or unfamiliar vocabulary, techniques or theorems before attempting a thorough reading of the current text.
3. Don't rush! Read slowly! Mathematical writing is typically dense with ideas. Spend as much time as necessary to understand the fully intended meaning of each of the author's arguments and examples.
4. Pay particular attention to the precise statement of new definitions and theorems.
5. Do not immediately skip over a portion of the reading that doesn't make sense in the hope that its meaning will become more apparent later. Because of the linear nature of mathematical writing in which one topic builds from those that precede it, it is very important to fully understand one topic before proceeding to the next.
6. Try to identify the cause of any misunderstanding of the topics being studied. Consider all reasonable methods to resolve the misunderstanding. Whenever possible discuss difficult portions of the text with a friend, study partner, or study group.
7. If all else fails, make sure to mark any portions of the text that remain perplexing so that you may raise these issues subsequently in class.
8. Occasionally authors will intentionally leave some details of arguments or examples to the reader to complete as an exercise. Authors do this for pedagogical reasons and not laziness! As a useful check on your understanding of the material, always fill-in in the details omitted by the author.
9. Always keep pencil and paper handy whenever reading mathematical text. It can be very helpful to highlight important passages, insert marginal notes to yourself (a la Fermat!), and make simple calculations while involved in the reading of the text.
10. Examples in textbooks often come with a moral. Discern the author's main point in providing the example. Make sure you struggle to understand every aspect of the computation, manipulation, or procedure presented in the example.

\*\*\* IMPORTANT ASSIGNMENT – COURSE CONTRACT \*\*\*

★ COURSE CONTRACT ★

Please **hand-write** on a separate piece of paper and print your name, the course title, the course section, AND the following statement. SIGN THIS DOCUMENT and turn it in as soon as you certify that you are able to log into Sakai:

“I certify that I have read the entire contents of the Course Syllabus. I also pledge to regularly check the course Sakai site for updates and hold myself accountable for the information.”