MAT16A: Short Calculus

Summer Session 2, 2019

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Class Hours: M,W,F 4:10-5:50 PM
Class Room: Olson Hall 223

Course Description

This course is designed to be an introduction to college level mathematics with an emphasis in social sciences and economics. Calculus is the field of mathematics which studies how systems change or behave at really small or really big scales (what we will call limits) and it has many applications in both social and natural sciences.

This class will cover the subfield called differential calculus, which studies the rates of change of a system as it moves, either through space or through time. We will start this class reviewing some concepts from high school mathematics that will be useful throughout the development of this class. After that, we will develop the concepts and applications of limit and derivative, which will be the main focus of the class.

Required materials

The class will use the textbook Larson and Edwards. Calculus: An Applied Approach, 9th edition. Any other required material will be provided by the instructor.

The text used in this course is available as a low-cost online option through the UC Davis Inclusive Access Program. Use of the online platform to access the text is optional but includes pre-quizzes and sample homework sets you may find useful for self-study. Billed access lasts for the duration of the entire MAT 16 series. Please watch for an email from no-reply@verbasoftware.com with your Inclusive Access portal link. For questions, please email the Inclusive Access Help Desk at inclusiveaccess@ucdavis.edu

Prerequisites

This course requires the Math Placement Exam to be satisified with a minimum score of 30 and a sub-score of 2 or more in Trigonometry. For more information please check https://www.math.ucdavis.edu/undergrad/math_placement/

Important Dates

- August 5: Classes begin
- August 9: Last day to add
- August 13: Last day to drop
- August 23: Midterm
- September 2: Labor day (Holiday)
- September 13: Last day of class (Final)

Course Structure

Class Structure

Lectures will consist on the presentation of topics from the instructor, with an emphasis on developing the intuitive ideas behind each concept and potential applications to topics that may be of interest to the student. These ideas will be reinforced through the assignment of weekly worksheets, which will evaluate both the understanding of the student and will test their ability to solve a problem in a real life scenario using the topics covered in class.

Assessments

The class will have two in-class exams: A midterm and a final. The midterm will cover the material covered until the day of instruction prior to it and the final will cover all the material of the class, with a heavier emphasis on the content not yet evaluated.

Weekly worksheets will be assigned each Friday and will be due in class the following Friday. The only exception to this will be on the final worksheet, which will be due on the Wednesday of that week (Wednesday 11). These worksheets will include a section that evaluates the students' understanding of the concepts and a section that presents a case in which students may face calculus in the setting of a specific, real context.

In total there will be five worksheets. The worksheet with the lowest grade will be dropped.

Grading Rubric

- Midterm 35%
- Final 35%
- Worksheets 30% (7.5% each)

Course Policies

Policies on Incomplete Grades and Late Assignments

Homework will be due at the beginning of class and no late homework will be accepted. In case the student is not able to come to that class, scanned copies of the homework will be accepted. If you plan to scan using a phone, please use software such as Microsoft Lens or CamScanner instead of taking a picture with the regular camera.

Except under special circumstances, no make up midterms cannot be made. Please consult with the instructor what may be considered a special circumstance. In case a student does not attend the midterm and is not made up, their final exam will have a value of 70%. The final exam cannot be postponed. If you have any questions, please consult with the instructor.

Accommodations for Disabilities

In accordance with current law, students with documented disabilities may be entitled to in-class accommodations (i.e. extra time for an exam or a quiet testing space). It is the student's responsibility to request academic accommodations in a reasonable period of time (at least two weeks prior to the test). Contact the Student Disability Center for details on documenting disabilities and other related policies, as well as the services provided through this center. If a student has been certified by the Student Disability Center as having a learning disability, the instructor and the student share the responsibility for the coordination of examination accommodations.

Schedule

The following schedule is subject to change and is based on the schedule found in the Mathematics Department Website.

- August 5: Introduction. Cartesian plane, distance formula, midpoint formula, graphs, intercepts, circles, and lines. Functions, compositions of functions, and inverse.
- August 7: Continuation of functions. Limits.
- August 9: Continuation of limits. Limits to infinity and asymptotes.
- August 12: Continuation of asymptotes. Trigonometry review.
- August 14: Slope of a tangent line. Definition of the derivative, differentiability and continuity.
- August 16: Rules of differentiation.
- August 19: Continuation of rules of differentiation.
- August 21: Derivatives as rates of change. Velocities and marginals.
- August 23: Midterm
- August 26: Higher order derivatives. Implicit differentiation.

- August 28: Related rates. Marginal analysis.
- August 30: Monotonicity of functions and critical points. Relative extrema.
- September 2: Labor day.
- September 4: Optimization. First derivative test. Concavity and second derivative test.
- September 6: Optimization problems.
- September 9: Sketching graphs.
- September 11: Review session.
- September 13: Final.