MATH 180: CALCULUS FOR BUSINESS AND SOCIAL SCIENCES

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2024
Credits:	4
Total Contact Hours:	72
Lecture Hours :	72
Lab Hours:	0
Hours Arranged:	0
Outside of Class Hours:	144
Total Student Learning Hours:	216
Prerequisite:	Intermediate algebra or higher or direct placement based on multiple measures.
District General Education:	A3. Mathematics
Transferable to CSU:	Yes
Transferable to UC:	Yes - Approved
Grading Method:	Standard Letter, Pass/No Pass

Catalog Course Description

Concepts of function and limits: applied calculus emphasizing techniques of integration and differentiation with applications in social and life sciences, business administration, economics, and engineering technology. 72 lecture hours.

Course Objectives

- apply the principles of analysis to problems in the areas of biological science, business administration, and economics
- advance in mathematics by being able to apply the principles of calculus to unfamiliar situations
- demonstrate a working knowledge of the material listed under Course Content by analyzing and formulating solutions to associated problems
- advance to subsequent courses in probability and statistics
- define and graph a function
- find the limit of certain elementary algebraic, logarithmic and exponential forms
- state and apply the definition of continuity
- differentiate polynomial functions, products, quotients, exponential and logarithmic functions
- apply the concept of differentiation to problems of growth, rate of change, maximum and minimum, and approximations
- integrate polynomial, exponential and logarithmic functions
- apply the concept of integration to problems of growth, rate of change, approximations, and the determination of consumer and supply surplus

Major Course Content

1. The Theory of Functions and Their Graphs. Functions investigated will be polynomial functions, rational functions, exponential functions, and logarithmic functions Sketch the graph of functions using horizontal and vertical asymptotes, intercepts, and first and second derivatives to determine intervals where the function is increasing and decreasing, maximum and minimum values, intervals of concavity and points of inflection; analyze the marginal cost, profit and revenue when given the appropriate function.
2. The Theory of Limits, both the intuitive idea of a limit and evaluating limits algebraically.
3. The Theory of Continuity
4. Equations of a Straight Line
5. Derivatives and Slope, including intuitive limit definition of derivative, increments and tangent lines, chain rule, implicit differentiation
6. Differentiation of Products and Quotients
7. Related Rates
8. Optimization
9. Use calculus to analyze revenue, cost, and profit
10. The area under a curve, area between curves, and approximating definite integral as a sum.
11. Antiderivatives and Integration. Find definite and indefinite integrals by using the general integral formulas, integration by substitution, and other integration techniques.
12. Theorems on Integration
13. Applications of Integration
14. Outside Assignments on the Topics of the Course Content include Solving Problems that are Similar to Those Demonstrated in Class.
15. Outside Assignments Also include Solving Problems that are Different from Those Presented in Class. Such Problem Solving Requires Students to Apply the Concepts in a New Context.
16. Application Problems are Regularly Assigned. Here Students Learn to Evaluate an Unfamiliar Problem by Recognizing the Calculus Concepts that Apply and Then Using Acquired Calculus Skills to Solve the Problem.

Suggested Reading Other Than Required Textbook

The supplemental OpenStax Calculus I textbook is an excellent resource for the difficult calculus concepts in this course.

Examples of Required Writing Assignments

This class will periodically require students to reflect upon their errors, with a written explanation of why the errors happen and how they are resolved.

Examples of Outside Assignments

Outside assignments consist of problems assigned by the instructor utilizing the MyOpenMath homework system (http://www.myopenmath.com).

Instruction Type(s)

Lecture, Online Education Lecture

IGETC Area 2: Mathematical Concepts and Quantitative Reasoning

Yes