MATH 16 Course Outline as of Spring 2017

CATALOG INFORMATION

Dept and Nbr: MATH 16   Title: INTRO TO MATH ANALYSIS
Full Title: Introduction to Mathematical Analysis
Last Reviewed: 1/9/2024

Units			Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00		Lecture Scheduled	4.00	17.5	Lecture Scheduled	70.00
Minimum	4.00		Lab Scheduled	0	6	Lab Scheduled	0
			Contact DHR	0		Contact DHR	0
			Contact Total	4.00		Contact Total	70.00
			Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 140.00   Total Student Learning Hours: 210.00

Title 5 Category: AA Degree Applicable
Grading: Grade or P/NP
Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:
Formerly:

Catalog Description:
Presents techniques of calculus with emphasis placed on the application of these concepts to business and management related problems. The applications of derivatives and integrals of functions including polynomials, rational, exponential and logarithmic functions are studied.

Prerequisites/Corequisites:
Course Completion of MATH 154 or Course Completion of MATH 155 or higher

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: Presents techniques of calculus with emphasis placed on the application of these concepts to business and management related problems. The applications of derivatives and integrals of functions including polynomials, rational, exponential and logarithmic functions are studied. (Grade or P/NP)
Prerequisites/Corequisites: Course Completion of MATH 154 or Course Completion of MATH 155 or higher

Recommended:
Limits on Enrollment:
Transfer Credit: CSU;UC.
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	Area		Effective:	Inactive:
	B	Communication and Analytical Thinking	Fall 1981	
	MC	Math Competency		
CSU GE:	Transfer Area		Effective:	Inactive:
	B4	Math/Quantitative Reasoning	Fall 1981	
IGETC:	Transfer Area		Effective:	Inactive:
	2A	Mathematical Concepts & Quantitative Reasoning	Fall 1981	

CSU Transfer:	Transferable	Effective:	Fall 1981	Inactive:
UC Transfer:	Transferable	Effective:	Fall 1981	Inactive:

CID:
CID Descriptor:MATH 140   Business Calculus
SRJC Equivalent Course(s):   MATH16

Certificate/Major Applicable:
Major Applicable Course

COURSE CONTENT

Outcomes and Objectives:
Upon successful completion of the course, students will be able to:
1. Find the derivatives of polynomial, rational, exponential, and logarithmic functions;
2. Find the derivatives of functions involving constants, sums, differences, products, quotients, and the chain rule;
3. 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;
4. Analyze the marginal cost, profit and revenue when given the appropriate function;
5. Determine maxima and minima in optimization problems using the derivative;
6. Use derivatives to find rates of change and tangent lines;
7. Use calculus to analyze revenue, cost, and profit;
8. Find definite and indefinite integrals by using the general integral formulas, integration by substitution, and other integration techniques;
9. Use integration in business and economics applications; and
10. Use concepts in multivariable calculus to solve application problems.

Topics and Scope:

I. Functions and their graphs

A. Definition and characteristics
B. Symbolic, graphical, and numerical representations
C. Operations and composition
D. Modeling with functions
E. Graphical and algebraic solutions of equations
F. Graphs of polynomial, rational, algebraic, exponential and logarithmic functions
II. Limits and intuitive limit definition of derivative
III. Increments, tangent lines, and rate of change
IV. Rules of differentiation
A. Sum, product, and quotient
B. Chain rule
V. Implicit differentiation
VI. Applications of derivatives
A. Marginal analysis
B. Optimization
C. Curve sketching
D. Relative rate of change
E. Elasticity of Demand
VII. Antiderivatives, indefinite and definite integrals
VIII. Multiple techniques of integration
A. Rules of integration including sum and difference, power, and exponential (base e)
B. Substitution
IX. Area between curves
X. Approximating definite integral as a sum
XI. Applications of integration in business and economics, including consumers' surplus
XII. Multivariable Calculus
A. Introduction to functions of two or more variables
B. Partial differentiation
C. Applications

Assignment:

1. Reading outside of class (0-50 pages per week)
2. Homework problem sets (10-30)
3. Exams (3-7) and quizzes (0-30)
4. Projects (e.g. computer exploration or game analysis) (0-2)

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course.	Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problem sets

Problem solving 5 - 20%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None

Skill Demonstrations 0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Objective exams and quizzes

Exams 70 - 95%

Other: Includes any assessment tools that do not logically fit into the above categories.

Projects

Other Category 0 - 10%

Representative Textbooks and Materials:
Calculus With Applications (11th). Lial, Margaret and Greenwell, Raymond and Ritchey, Nathan. Pearson: 2015
Calculus And Its Applications (13th). Goldstein, Larry and Lay, David and Schneider, David. Pearson: 2013