MATH A185: CALCULUS 2

Item	Value
Curriculum Committee Approval Date	12/08/2022
Top Code	170100 - Mathematics, General
Units	5 Total Units
Hours	90 Total Hours (Lecture Hours 90)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)
Associate Arts Local General Education (GE)	• OC Comm/Analytical Thinking - AA (OA2)
Associate Science Local General Education (GE)	• OCC Comm/AnalyticalThinking-AS (OAS2) • OCC Mathematics (OMTH)
California General Education Transfer Curriculum (Cal-GETC)	• Cal-GETC 2A Math Concepts (2A)
Intersegmental General Education Transfer Curriculum (IGETC)	• IGETC 2A Math Concepts (2A)
California State University General Education Breadth (CSU GE-Breadth)	• CSU B4 Math/Quant.Reasoning (B4)

Course Description

This is the second course in the calculus sequence. It satisfies the sequence for majors in mathematics, science, or engineering. Topics include techniques and some applications of integration, calculus applied to parametric curves and polar curves, analytic geometry, sequences, series, and an introduction to differential equations. Enrollment Limitation: MATH A185H; students who complete MATH A185 may not enroll in or receive credit for MATH A185H. PREREQUISITE: MATH A180, MATH A180H, or MATH A182H. Transfer Credit: CSU; UC: Credit Limitation: MATH A182H and MATH A185, MATH A185H combined: maximum credit, 1 course; MATH A180/H, MATH A185/H combined are equivalent to MATH A182H. C-ID: MATH 220.**C-ID:** MATH 220.

Course Level Student Learning Outcome(s)

1. Evaluate definite integrals using the fundamental theorem of calculus.
2. Use numerical methods to estimate the value of definite integrals.
3. Use techniques of integration to evaluate definite and indefinite integrals.
4. Find limits of sequences.
5. Determine whether series diverge, converge conditionally, or converge absolutely, find or estimate sums of series and find the approved intervals of convergence.
6. Interpret and solve certain types of differential equations, including separable and first order linear.

Course Objectives

- 1. Calculate definite and indefinite integrals using simple substitutions, integrating by parts, trigonometric substitutions and partial fractions.
- 2. Use integration to solve a variety of applications including areas, volumes of revolution, surface areas of revolution, lengths of curves and centers of mass.
- 3. Graph, calculate derivatives and compute integrals to solve applications given by functions in polar or parametric form.
- 4. Compute limits of sequences.
- 5. Apply tests for convergence or divergence of series, distinguishing among divergence, absolute convergence and conditional convergence.
- 6. Construct and analyze Taylor and Maclaurin series.
- 7. Solve simple first order differential equations.
- 8. Evaluate Improper Integrals

Lecture Content

Techniques of Integration Computing definite and indefinite integrals using integration by parts Computing definite and indefinite integrals of products and powers of trig functions Computing definite and indefinite integrals using the method of trigonometric substitutions Computing definite and indefinite integrals of rational functions using the method of partial fractions Computing definite and indefinite integrals using a rationalizing substitution Approximating definite integrals using the trapezoid rule and Simpsons rule and the accompanying analysis of bounds for the errors in these approximations Computing improper integrals with infinite limits of integration Computing improper integrals with discontinuous integrands More Applications of Integration Computing the length of a curve Computing the area of a surface of revolution Moments and centers of mass in one and two dimensions Differential Equations Solving separable differential equations with or without initial conditions Solving first order homogeneous differential equations Solving first order linear differential equations using the integrating factor method Parametric Equations and Polar Coordinates Standard parameterizations of simple conics and cycloids Graphing simple parametric curves Computing first and second derivative of y with respect to x for curves given parametrically Computing the length of a curve given parametrically Computing the surface area of revolution for a parametric curve revolved about a horizontal or vertical line Graphing in polar coordinates Finding tangents to polar curves Computing areas and curve length in polar coordinates Conic sections in Cartesian form > Infinite Sequences and Series Computing limits of sequences using properties of same Discussion of the definitions of limits of sequences Discussion of monotone sequences and bounds for sequences Definition of a series as the limit of its sequence of partial sums Computing with geometric series Discussion of properties of convergent series Discussion and use of the Nth Term Test and p-series Discussion and use of the Comparison Test, the Integral Test and the Limit Comparison Test for series with non-negative terms Discussion of absolute convergence and conditional convergence for series Discussion and use of the Alternating Series Test and truncation errors Discussion and use of the Nth Root Test and the Ratio Test for series Discussion of power series and the interval of convergence Differentiation and integration of power series Constructing Taylor Series and Maclaurin Series Discussion of Taylors Formula and using Taylor and Maclaurin

Series for approximations to functions, complete with the accompanying error analysis Discussion and use of binomial series

Method(s) of Instruction

- Lecture (02)

Instructional Techniques

The primary mode of instruction is the lecture/demonstration method. Some sections may utilize graphing calculators.

Reading Assignments

As assigned from text. 1 hour

Writing Assignments

Proofs of theorems and problem solving exercises commonly appear on exams or quizzes. These require written responses of the students. Critical thinking is an integral part of a calculus course. 1 hour

Out-of-class Assignments

As assigned from instructor. 6 hours

Demonstration of Critical Thinking

Grades are determined by performance on quizzes and exams. Some instructors may also include grades on homework, cooperative assignments or participation in cooperative learning sessions. A comprehensive final exam is part of this course.

Required Writing, Problem Solving, Skills Demonstration

Proofs of theorems and problem solving exercises commonly appear on exams or quizzes. These require written responses of the students. Critical thinking is an integral part of a calculus course.

Eligible Disciplines

Mathematics: Masters degree in mathematics or applied mathematics OR bachelors degree in either of the above AND masters degree in statistics, physics, or mathematics education OR the equivalent. Masters degree required.

Textbooks Resources

1. Required Stewart, James. Calculus, Early Transcendentals , 9th ed. Cengage, 2019 Rationale: -

Other Resources

1. Other appropriate textbook as selected by faculty.