MATH G185: CALCULUS 2

Item	Value
Curriculum Committee Approval Date	12/07/2021
Top Code	170100 - Mathematics, General
Units	4 Total Units
Hours	72 Total Hours (Lecture Hours 72)
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)
Local General Education (GE)	• GWC Mathematic Competency (GB2)
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 course is the second course in a three-course sequence designed for mathematics, science, and engineering majors. The topics covered in this course include methods of integration, applications of the definite integral, polar and parametric functions, improper integrals, convergence and divergence of sequences and series including power series, and conic sections. (The student should plan to complete the first three semesters of calculus at Golden West College to maintain continuity). PREREQUISITE: MATH G180. Transfer Credit: CSU; UC. C-ID: MATH 221, MATH 900S. **C-ID:** MATH 221, MATH 900S.

Course Level Student Learning Outcome(s)

1. Course Outcomes
2. Solve applications of integration including areas, volumes, work, surface areas of revolution, and arc length.
3. Determine whether a series is convergent or divergent using an appropriate test for convergence.
4. Apply techniques of integration to evaluate definite and indefinite integrals.

Course Objectives

- 1. Apply various techniques in the evaluation of indefinite and definite integrals, including improper integrals.
- 2. Solve a variety of applications of integration including areas, volumes, work, growth and decay, surface areas of revolution, arc lengths, moments and center of mass.
- 3. Determine whether a sequence or series is convergent or divergent.
- 4. Classify a convergent series as absolutely convergent or conditionally convergent.
- 5. Graph and write equations for all conic sections.
- 6. Graph and write equations in polar and parametric coordinates.
- 7. Solve first-order differential equations.
- 8. Construct and analyze Taylor and Maclaurin series.
- 9. Graph, differentiate and integrate functions in polar and parametric form.
- 10. Solve differential equations including separable and linear equations.
- 11. Find the radius of convergence and the interval of convergence of power series.

Lecture Content

Applications of the Definite Integral Area between two curves Volumes by slicing, disks and washers Volumes by cylindrical shells Length of a plane curves Area of a surface of revolution Work, growth, and decay Moments and centers of mass in one and two dimensions Techniques of Integration Integration by parts Trigonometric integrals Trigonometric substitutions Integrating rational functions by partial fractions Numerical Integration Trapezoidal and Simpsons Rule Improper integrals Mathematical Modeling with Differential Equations First-order differential equations Applications of first-order differential equations Slope fields Infinite Sequences and Series Sequences Infinite series including alternating series, geometric series, binomial series, etc Convergence tests such as comparison, ratio, root, alternating series, integral tests, etc Absolute and conditional convergence Maclaurin and Taylor polynomials Maclaurin and Taylor series Taylor series expansion of functions Power series Differentiating and integrating power series Applications of series Analytic Geometry in Calculus Polar coordinates Tangent lines for parametric and polar curves Arc length for parametric and polar curves Area of the surface of revolution for parametric and polar curves Area in polar coordinates

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)

Instructional Techniques

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

Reading Assignments

Course textbook which provides explanations, worked examples, and problems to be solved.

Writing Assignments

Homework, quizzes, and examinations covering topics presented in the course.

Out-of-class Assignments

Homework assignments as given by instructor.

Demonstration of Critical Thinking

Students will demonstrate critical thinking and problem-solving skills by using logic, in conjunction with past mathematical solving techniques, to solve and interpret a variety of applications not previously seen. Demonstrations will be shown by completing assignments, participating in discussions, and completing required exams and quizzes.

Required Writing, Problem Solving, Skills Demonstration

Tests, examinations, homework or projects where students demonstrate their mastery of the learning objectives and their ability to devise, organize and present complete solutions to problems.

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 James Stewart. Calculus, 9th ed. Cengage, 2020 2. Required Strang, Gilbert Herman, Edwin. Calculus Volume 2 , ed. OpenStax (OER) (latest), 2016 Rationale: Text published March 30th, 2016 with most recent web version update December 21st, 2020.