

MATH 0031 - ANALYTICAL GEOMETRY AND CALCULUS II

Catalog Description

Prerequisite: Completion of MATH 30 with grade of "C" or better
Hours: 72 lecture

Description: Continuation of MATH 30. Content includes techniques of integration, improper integrals, applications of integration, infinite series, parametric equations and polar coordinates. (C-ID MATH 220) (combined with MATH 30, C-ID MATH 900S) (CSU, UC-with unit limitation)

Course Student Learning Outcomes

- CSLO #1: Integrate algebraic and transcendental functions.
- CSLO #2: Construct and interpret graphs of parametric and polar equations applying appropriate calculus techniques.
- CSLO #3: Translate, model, and solve applied problems utilizing differentiation, integration, and infinite series.
- CSLO #4: Demonstrate knowledge and theory of infinite series by applying appropriate theorems to determine convergence and divergence.
- CSLO #5: Logically present clear, complete, accurate, and sufficiently detailed solutions to communicate reasoning and demonstrate the method of solving problems.

Effective Term

Fall 2022

Course Type

Credit - Degree-applicable

Contact Hours

72

Outside of Class Hours

144

Total Student Learning Hours

216

Course Objectives

1. Evaluate definite and indefinite integrals using a variety of integration formulas and techniques;
2. Apply integration to areas and volumes, and other applications such as work and length of a curve;
3. Evaluate improper integrals;
4. Apply convergence tests to sequences and series;
5. Represent functions as power series; and
6. Graph, differentiate and integrate functions in polar and parametric form.

General Education Information

- Approved College Associate Degree GE Applicability
 - AA/AS - Comm & Analyt Thinking
 - AA/AS - Mathematical Skills
- CSU GE Applicability (Recommended-requires CSU approval)
 - CSUGE - B4 Math/Quantitative Reasoning
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)
 - IGETC - 2A Math/Quan Reasoning

Articulation Information

- CSU Transferable
- UC Transferable

Methods of Evaluation

- Problem Solving Examinations
 - Example: 1. Find the volume generated when the region bounded by the curves $y = \cos x$ and $y = (\cos x)^2$ for values of x between $x = 0$ and $x = \pi$, is revolved about the y axis. This problem is graded for correct method and accuracy. 2. Use Taylor's Inequality to determine the number of terms of the Maclaurin series for e^x that should be used to estimate $e^{0.1}$ to within 0.0001. This problem is graded for method and accuracy.

Repeatable

No

Methods of Instruction

- Lecture/Discussion
- Distance Learning

Lecture:

1. Interactive lecture format to develop the concept of finding a power series representation of a variety of functions. For each type of function, the instructor will incorporate algebraic derivation and visual analysis through graphing. Students will participate verbally and will work several examples. (Objective 5)
2. Following an instructor lecture on methods of integration, students will get in small groups for collaborative learning activities that will focus on determining which methods of integration to use for a variety of problems. Students will practice recognizing which method to try, testing their conjectures, and developing solutions with peers. (Objective 1)

Distance Learning

1. Video lectures develop the concept of finding a power series representation of a variety of functions. For each type of function, the instructor will incorporate algebraic derivation and visual analysis through graphing. Students will participate in discussions and will post work from several examples for peer review. (Objective 5)
2. Following an instructor video lecture on methods of integration, students will get in small virtual groups and create a wiki-page that will focus on determining which methods of integration to use for a variety of problems. Students will practice recognizing which method to try, testing their conjectures, and developing solutions to post for peer review.(Objective 1)

Typical Out of Class Assignments

Reading Assignments

1. Read in your textbook about 2 methods for calculating the volume of a solid of revolution and be prepared for class discussion. 2. Research online the history of Newton's discovery of the Binomial Series in preparation for a written report.

Writing, Problem Solving or Performance

1. Students will write a 3 - 5 paragraph report on Newton's discovery of the binomial series. 2. Calculate areas bounded by polar graphs. Example: Find the area enclosed inside the cardioid $r = 5\cos(t)$ and outside the rose $r = 2\sin(3t)$.

Other (Term projects, research papers, portfolios, etc.)

Required Materials

- Calculus Early Transcendentals
 - Author: Briggs, Cochran, Gillett, Schulz
 - Publisher: Pearson
 - Publication Date: 2019
 - Text Edition: 3rd
 - Classic Textbook?: No
 - OER Link:
 - OER:
- Calculus Early Transcendentals
 - Author: James Stewart
 - Publisher: Cengage
 - Publication Date: 2016
 - Text Edition: 8th
 - Classic Textbook?: No
 - OER Link:
 - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.