MATH 0031S - JUST IN TIME SUPPORT FOR MATH 31 CALCULUS II

Catalog Description

Corequisite: Concurrent enrollment in Math 31
Hours: 36 lecture
Description: Just in time support covering core prerequisite skills, competencies, and concepts from Calculus II. Intended for students who are concurrently enrolled in Math 31. Topics include competencies from foundational skills in algebra, trigonometry, and first semester calculus that are needed to understand the basics of Calculus II. (CSU)

Course Student Learning Outcomes

- CSLO #1: Compute derivatives using differentiation rules and implicit differentiation.
- CSLO #2: Identify antiderivatives and Fundamental Theorem of Calculus to compute integrals.
- CSLO #3: Evaluate the trigonometric functions, inverses, and verify trigonometric identities using valid substitutions.
- CSLO #4: Recognize and evaluate infinite sequences and series.
- CSLO #5: Sketch polar graphs and families of curves.

Effective Term

Fall 2025

Course Type

Credit - Degree-applicable

Contact Hours

36

Outside of Class Hours

72

Total Student Learning Hours

108

Course Objectives

Students will be able to:
1. Solve equations, including polynomial, absolute value, radical, rational, logarithmic, exponential, and trigonometric equations.
2. Solve and evaluate trigonometric functions and verify trigonometric identities.
3. Derivate functions, including polynomial, radical, rational, logarithmic, exponential, and trigonometric functions and their inverses.
4. Integrate functions using antiderivatives and substitution methods.

General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

Articulation Information

- CSU Transferable

Methods of Evaluation

- Classroom Discussions
  - Example: 1. In class, small group collaborative learning activity - Students will be given several trigonometry expressions. They will investigate these expressions to determine which are equivalent and prove so using trigonometry identities. Feedback will be given based on notation used and steps shown. 2. After a mini lecture reviewing the rules of differentiation, students will be given a compound function to determine what rules would be used to derivate the function and will then derivate the function showing each of these rules. Feedback will be given based on how the derivation rules are used and in what order, and the clarity of notation used.
- Problem Solving Examinations
  - Example: 1. Find the derivative and integral of a given polynomial equation. This question is graded based on the clarity, appropriate mathematical vocabulary, and the correctness of the method used. 2. Derivate a trigonometric function, identifying the maximum and minimum values, intervals of increase and decrease, and inflection points. This question is graded based on the clarity, appropriate mathematical vocabulary, and the correctness of the method used.

Repeatable

No

Methods of Instruction

- Lecture/Discussion
- Distance Learning

Lecture:

1. In class, the instructor will form small groups to collaborate learning activity - Students will compare rates of change at different locations on a given function. The instructor will then encourage students to work together to identify extrema, determine the rate of change on either side of the extrema, and make predictions about how the rate of change changes as one gets closer to the extrema. (Objectives 1 & 2)
2. Instructor provides a lecture on the Law of Sines or Cosines. The instructor then divides students into small groups and introduces a collaborative learning activity using the Law of Sines or the Law of Cosines. Students will focus on how to solve a triangular model with missing distances and angles. Students will practice reading scenarios, drawing appropriate diagrams, and developing a solution with peers. (Objectives 3 & 4).

Distance Learning

1. The instructor will form small virtual groups if students to compare rates of change at different locations on a given function. The instructor will then provide questions for the students to guide them on identifying extrema, determining the rate of change on either side

of the extrema, and making predictions about how the rate of change changes as one gets closer to the extrema. (Objectives 1 & 2)

2. Instructor will provide a video lecture on the Law of Sines or Cosines. The instructor then divides students into small virtual groups and introduces a collaborative learning activity using the Law of Sines or the Law of Cosines. Students will focus on how to solve a triangular model with missing distances and angles. Students will practice reading scenarios, drawing appropriate diagrams, and developing a solution with peers. (Objectives 3 & 4).

Typical Out of Class Assignments

Reading Assignments

1. Using mathematical journals found in the library, research the Pythagorean Theorem and its relation to right triangles trigonometry and prepare a presentation about your findings to the class. 2. After reading about Galileo's contribution to astronomy, investigate the projectile motion of an object thrown near the Earth's surface and its curved path under the force of gravity.

Writing, Problem Solving or Performance

1. Build a model of a rectangular playpen using a piece of string of fixed length that represents the perimeter of the playpen (ends tied together, forming a rectangle). Students will then measure the area for different rectangles (adjusting the corners of the playpen). Students will then make a prediction as to when the area will be maximized. 2. Students will write about their understanding of the function called the difference quotient and how it relates to the value called the slope of a line.

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

Required Materials

- Calculus: Early Transcendentals
  - Author: Briggs, Cochran, Gillett and Schulz
  - Publisher: Pearson
  - Publication Date: 2021
  - Text Edition: 3rd
  - Classic Textbook?: No
  - OER Link:
  - OER:
- Calculus: Volume II
  - Author: Strang and Herman
  - Publisher: OpenStax
  - Publication Date: 2024
  - Text Edition:
  - Classic Textbook?: No
  - OER Link:
  - OER: https://openstax.org/details/books/calculus-volume-2/

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