



COURSE OUTLINE OF RECORD

Number: MATH A280H

TITLE: Calculus 3 Honors

ORIGINATOR: Tab Livingston

EFF TERM: Fall 2015

FORMERLY KNOWN AS:

DATE OF

OUTLINE/REVIEW: 03-04-2016

CROSS LISTED COURSE:

TOP NO: 1701.00

CID:

SEMESTER UNITS: 5.0

HRS LEC: 108.0

HRS LAB: 0.0

HRS OTHER: 0.0

CONTACT HRS TOTAL: 108.0

STUDY/NON-CONTACT HRS RECOMMENDED: 162.0

CATALOG DESCRIPTION:

Mathematics A280H is a regular section with an additional one hour per week of honors material. Multivariable calculus including vectors, vector-valued functions, functions of several variables, partial derivatives, multiple integrals, calculus of vector fields, Green's Theorem, Stokes's Theorem and the Divergence Theorem. Selected introductory topics in differential geometry will be discussed in the honors-specific portion of this course. May be taken for grades or on a pass-no pass basis. Transfer Credit: CSU; UC.

JUSTIFICATION FOR COURSE:

Comparable to UC course.

PREREQUISITES:

- MATH A182H: Calculus 1 and 2 Honors with a minimum grade of C or better
or
- MATH A185: Calculus 2 with a minimum grade of C or better
or
- MATH A185H: Calculus 2 Honors with a minimum grade of C or better
or
- Appropriate OCC Math Placement Score, see Testing Center.

COREQUISITES:

ADVISORIES:

ASSIGNED DISCIPLINES:

Mathematics

MATERIAL FEE: Yes [] No [X] Amount: \$0.00

CREDIT STATUS: Noncredit [] Credit - Degree Applicable [X] Credit - Not Degree Applicable []

GRADING POLICY: Pass/No Pass [X] Standard Letter [X] Not Graded []

OPEN ENTRY/OPEN EXIT: Yes [] No [X]

TRANSFER STATUS: CSU Transferable[] UC/CSU Transferable[X] Not Transferable[]

BASIC SKILLS STATUS: Yes [] No [X] **LEVELS BELOW TRANSFER:** Not Applicable

CALIFORNIA CLASSIFICATION CODES: Y - Not Applicable

NON CREDIT COURSE CATEGORY: Y - Not applicable, Credit Course

OCCUPATIONAL (SAM) CODE: E

REPEATABLE ACCORDING TO STATE GUIDELINES: No [X] Yes [] **NUMBER REPEATS:**

REQUIRED FOR DEGREE OR CERTIFICATE: No [] Yes [X]

Associate in Science in Physics for Transfer(Associate in Science for Transfer)

GE AND TRANSFER REQUIREMENTS MET:

IGETC Area 2: Mathematical Concepts and Quantitative Reasoning

2A: Mathematic

CSU GE Area B: Scientific Inquiry and Quantitative Reasoning

B4 - Mathematics/Quantitative Thinking

OCC AA Gen Ed

AREA A2: LANGUAGE AND RATIONALITY - Communication and Analytical Thinking

OCC AS Gen Ed

AREA A2 – ENGLISH COMMUNICATION - Communication and Analytical Thinking

COURSE LEVEL STUDENT LEARNING OUTCOME(S) Supported by this course:

1. Apply vector algebra to describe lines and planes.
2. Graph and analyze space curves and common surfaces.
3. Setup and solve multiple integrals, line integrals and surface integrals over various domains.
4. Find partial derivatives and gradients and use them in applications.
5. State and apply Green's Theorem, Stokes's Theorem and the Divergence Theorem.

COURSE OBJECTIVES:

1. Apply vectors and vector algebra.
2. Determine equations of lines and planes, including tangent planes.
3. Determine vector derivatives.
4. Find the limit of a function at a point.
5. Determine partial derivatives.
6. Determine differentiability.
7. Find local extrema and saddlepoints.
8. Solve constraint problems using Lagrange multipliers.
9. Compute arc length.
10. Determine and use multiple integrals.
11. Determine and use line integrals.
12. Determine and use surface integrals.
13. Use Green's Theorem.
14. Use the Divergence Theorem.
15. Use Stokes's Theorem.
16. Calculate gradient, divergence and curl.

COURSE CONTENT:

LECTURE CONTENT:

It is imperative that instructors cover all topics in the outline. The instructor may determine the order of topics. The department encourages the instructor to incorporate the graphing calculator wherever it is appropriate.

A. Vector and Vector Algebra

1. Define basic concepts including different coordinate systems for three dimensions
2. Discuss vector operations and their properties in two and three dimensions
3. Compute and apply dot and cross products, triple products and projections of vectors
4. Find equations of lines and planes

B. Vector Functions

1. Apply vector functions and space curves, their derivatives and integrals
 2. Determine limits and continuity for vector valued functions
 3. Solve applications of velocity and acceleration
 4. Determine arc length and curvature, tangent, normal and binomial vectors
- C. Partial Derivatives
1. Define real valued functions of several variables, level curves and surfaces
 2. Define limits and continuity and their properties for spacial domains
 3. Find partial derivatives, differentiability and higher-order derivatives
 4. Apply the chain rule
 5. Find tangent planes
 6. Find and apply gradients and directional derivatives
 7. Determine local and global extrema and saddlepoints
 8. Use Lagrange multipliers to find extrema
- D. Multiple Integrals
1. Define and apply double and triple integrals
 2. Apply multiple integrals to polar, cylindrical and spherical coordinates
 3. Apply multiple integration to calculate quantities such as area, volume, center of mass or moments of inertia
 4. Apply change of variables
- E. Vector Calculus
1. Evaluate line integrals and apply the Fundamental Theorem
 2. Prove and apply Green's Theorem
 3. Find divergence and curl of vector fields
 4. Calculate surface area
 5. Integrate real-valued functions and vector fields over surfaces (including parametrically defined surfaces) and apply to flux and circulation
 6. Prove and apply the Divergence Theorem and solve applications
 7. Prove and apply Stokes's Theorem and solve applications
- F. Additional Topics
1. Frenet equations
 2. Jacobian matrices
 3. First and second fundamental forms

LABORATORY CONTENT:

METHODS OF INSTRUCTION:

- A. Lecture:
- B. Independent Study:

INSTRUCTIONAL TECHNIQUES:

Lecture, discussion, written homework.

COURSE ASSIGNMENTS:

Out-of-class Assignments

As assigned by instructor. 8 hour.

Reading Assignments

As assigned from text. 1 hour.

Writing Assignments

Tests include writing definitions and comparisons. 1 hour

METHODS OF STUDENT EVALUATION:

Midterm Exam

Final Exam

Written Assignments

Demonstration of Critical Thinking:

Tests include writing definitions and comparisons, comprehensive final.

Required Writing, Problem Solving, Skills Demonstration:

Tests include writing definitions and comparisons. Written assignments and exams, comprehensive final lecture, discussion, written homework.

TEXTS, READINGS, AND RESOURCES:

TextBooks:

1. Stewart, James. *Calculus, Early Transcendentals*, 7TH ed. New York: Stewart, Brooks/Cole Publishing, 2012

Other:

1. Other appropriate textbook as chosen by faculty.

LIBRARY:

Adequate library resources include: Print Materials

Non-Print Materials

Online Materials

Services

Comments:

Attachments:

[Attached Files](#)