Cerro Coso College

Course Outline of Record Report

10/01/2019

MATHC251 : Analytic Geometry and Calculus III

General Information

Author (s)::	• Vivian Baker
Course Code (CB01):	MATHC251
Course Title (CB02):	Analytic Geometry and Calculus III
Department:	Mathematics
Proposal Start:	Fall 2018
TOP Code (CB03):	(1701.00) Mathematics, General
SAM Code (CB09):	Non-occupational
Distance Education Approved:	Yes
Course Control Number (CB00):	CCC000231937
Curriculum Committee Approval Date:	10/20/2017
Board of Trustees Approval Date:	12/14/2017
External Review Approval Date:	Pending
Course Description:	This course is a continuation of Analytic Geometry and Calculus II, extending the skills of differentiation and integration by learning new techniques and working with partial derivatives and double and triple integrals. Other major topics include cylindrical and spherical coordinates, quadric surfaces, vector functions, vector analysis, Green''s theorem and Stoke''s theorem.
Submission Type:	Change to Content Course is being updated to align program applicability with current programs, move current C-ID-defined SLO's to "Objectives," add locally-determined SLO's, and reduce the unit value from 5 to 4.

Faculty Minimum Qualifications

Master Discipline Preferred:	• Mathematics
Alternate Master Discipline Preferred:	• Engineering • Physics/Astronomy
Bachelors or Associates Discipline Preferred:	No value
Additional Bachelors or Associates Discipline:	No value

Course Development Options

Basic Skills Status (CB08)

Course is not a basic skills course.

Course Special Class Status (CB13)

Course is not a special class.

Grade Options

- Pass/No Pass
- Letter Grade methods

☐ Allow Students to Gain Credit by Exam/Challenge

Allowed Number of Retakes

0

Course Prior To College Level (CB21)

Not applicable.

Rationale For Credit By Exam/Challenge

No value

Retake Policy Description

Type:|Non-Repeatable Credit

☑ Allow Students To Audit Course

Associated Programs

Course is part of a program

Associated Program	Award Type
CC Liberal Arts: Mathematics & Science	A.A. Degree Major
Associate in Science Degree In Mathematics for Transfer	A.A. Degree for Transfer
Economics Associate in Arts Degree for Transfer (AA-T)	A.A. Degree for Transfer
CSU General Education (CSU GE Breadth)	Certificate of Achievement
Intersegmental General Education Transfer Curriculum Certificate of Achievement	Certificate of Achievement

Units and Hours

Summary

Minimum Credit Units (CB07)	4	**Total Course In-Class (Contact) Hours**	72	**Total Student Learning Hours**	216
Maximum Credit Units (CB06)	4	**Total Course Out-of-Class Hours**	144	**Faculty Load**	-

Credit / Non-Credit Options

Course Credit Status (CB04)	**Course Non Credit Category (CB22)**	**Non-Credit Characteristics**
Credit - Degree Applicable	Credit Course.	No value

Course Classification Code (CB11)	**Funding Agency Category (CB23)**	
Credit Course.	Not Applicable.	Cooperative Work Experience Education Status (CB10)

Variable Credit Course

Weekly Student Hours

	In Class	Out of Class
Lecture Hours	4	8
Lab Hours	-	-
Activity Hours	-	-

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	54
Course In-Class (Contact) Hours	
Lecture	72
Lab	-
Activity	-
Total	72
Course Out-Of-Class Hours	
Lecture	144
Lab	-
Activity	-
Total	144

Time Commitment Notes for Students

No value

Faculty Load

Extra Duty: -

Faculty Load: -

Units and Hours - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No value	No value	No value	No value

Requisites

Prerequisite

MATHC152 - Analytic Geometry and Calculus II

In Math C251 students are expected to consistently write the derivative of expressions that contain the inverse trigonometric, logarithmic, exponential, hyperbolic, and inverse hyperbolic functions; evaluate integrals (definite and indefinite) by using fundamental integral formulas, partial fractions, integration by parts, and substitutions, trigonometric substitutions; expand skills with limits, including l'Hôpital's Rule and improper integrals; identify the conic section represented by a second degree equation and give the foci, vertices, and directricies; use polar coordinates to graph equations and to find area, arc length, and intersection of curves; use the tests for convergence and divergence of sequences and series; write infinite series representations of various functions; and use the fundamental concepts of vectors including sums, dot product, and projection. Students successfully demonstrating these Math C152 skills will be prepared for Math C251.

Entrance Skills

Skill	Content Review
No value	No value

Limitations on Enrollment

Limitation	Provide Rationale
No value	No value

Specifications

Methods of Instruction	Methods of Instruction Rationale
Other	Other Methods: A. lecture and discussion of all course concepts. B. demonstration of developing proofs and solving application problems. C. reading textbooks and journals to see presentations different than those of the instructor. D. assignments and quizzes E. the use of computational and other types of mathematical software
Discussion	No value
Lecture	No value

Assignments

A. Reading assignments. B. Bi-weekly homework assignments. Example: Students work mathematics problems assigned from the text and from hand-outs to reinforce concepts and skills discussed in lecture. Sample homework problem: Find the volume of the solid that is bounded above by the cylinder image and below by the region enclosed by the parabola image and the line image in the image -plane. B. Online Course Management System Example: Assignments on MyMathLab

Methods of Evaluation	Methods of Evaluation Rationale
Tests	A. tests on course content, to include solving equations as well as demonstration of specific skills B. quizzes (in-class and take-home) to include solving equations as well as demonstration of specific skills
Participation	C. group work to analyze and solve application problems

Equipment

No Value

Textbooks

Author	Title	Publisher	Date	ISBN
Hass, Heil, Weir	Thomas' Calculus 14th ed. with MyMathLab	Addison-Wesley	2017	

Other Instructional Materials

Description	Author	Citation
No Value	No Value	No Value

Materials Fee

No

Learning Outcomes and Objectives

Course Objectives

Perform vector operations.

Determine equations of lines and planes.

Find the limit of a function at a point.

Evaluate derivatives.

Write the equation of a tangent plane at a point.

Determine differentiability.

Find local extrema and test for saddle points.

Solve constraint problems using Lagrange multipliers.

Compute arc length.

Find the divergence and curl of a vector field.

Evaluate two and three dimensional integrals.

Apply Green's, Stokes', and divergence theorems.

CSLOs

Apply the basic fundamentals of one variable differential and integral calculus as they pertain to multivariable calculus, including derivation and integration. Expected SLO Performance: 70.0

Use vectors and vector functions to model and solve problems by applying vector addition, scalar multiplication, the dot product, the cross product and the calculus of vector functions. Expected SLO Performance: 70.0

Apply the basics of vector calculus including line integrals, Green's Theorem, curl and divergence, and surface integrals. Expected SLO Performance: 70.0

Model spatial problems with vectors, lines, planes, curves and surfaces in space. Expected SLO Performance: 70.0

Use differentiation for vector-valued functions to compute tangent lines. Expected SLO Performance: 70.0

Outline

Outline

The Mathematics Department has adopted the following best practices for teaching this course: offering or awarding extra-credit is forbidden, the allowance of multiple attempts at exams is forbidden, and an approved on-site proctor for online course exams is required.

A. Vectors and vector operations in two and three dimensions;

B. Vector and parametric equations of lines and planes; rectangular equation of a plane;

C. Dot, cross, and triple products and projections;

D. Differentiability and differentiation including partial derivatives, chain rule, higher-order derivatives, directional derivatives, and the gradient;
E. Compute arc length and surface areas; tangent, normal, binormal vectors;
F. Vector-valued functions and their derivatives and integrals; finding velocity and acceleration;

G. Real-valued functions of several variables, level curves and surfaces;
H. Limits, continuity, and properties of limits and continuity;
I. Local and global maxima and minima extrema, saddle points, and Lagrange multipliers;

J. Vector fields including the gradient vector field and conservative fields;
K. Double and triple integrals;
L. Applications of multiple integration such as area, volume, center of mass, or moments of inertia;

M. Change of variables theorem;

N. Integrals in polar, cylindrical, and spherical coordinates;

O. Line and surface integrals including parametrically defined surfaces;
P. Integrals of real-valued functions over surfaces;
Q. Divergence and curl; and

R. Green's, Stokes', and divergence theorems.

Delivery Methods and Distance Education

Delivery Method: Please list all that apply -Face to face -Online (purely online no face-to-face contact) -Online with some required face-to-face meetings ("Hybrid") -Online course with on ground testing -iTV – Interactive video = Face to face course with significant required activities in a distance modality -Other

Online with some required face-to-face meetings ("Hybrid")
iTV – Interactive video = Face to face course with significant required activities in a distance modality
Online course with on ground testing
Face to face

Rigor Statement: Assignments and evaluations should be of the same rigor as those used in the on-ground course. If they are not the same as those noted in the COR on the Methods of Evaluation and out-of-class assignments pages, indicate what the differences are and why they are being used. For instance, if labs, field trips, or site visits are required in the face to face section of this course, how will these requirements be met with the same rigor in the Distance Education section?

All assignments in distance education courses (online, hybrid and iTV) are the same as those in the on-ground course, except that students in purely online sections will submit all of their assignments virtually, and students in hybrid sections will submit some of their assignments virtually. Instructor evaluation of student work in distance education courses is the same as in the on-ground course, except that evaluation of student work in online and hybrid courses is presented virtually. Instead of onsite lectures, hybrid and online courses will use videos and written lecture notes.

As with any on-ground class, the instructor must provide substantive critiques of all submitted material and at least general responses to discussion posts. Instructor assigns the completion of math problems in a publisher site as an exercise including check figures and assistance when needed. The publisher's site will reinforce the course's SLO's.

Effective Student-Instructor Contact: Good practice requires both asynchronous and synchronous contact for effective contact. List the methods expected of all instructors teaching the course. -Learning Management System -Discussion Forums -Moodle Message -Other Contact -Chat/Instant Messaging -E-mail -Face-to-face meeting(s) -Newsgroup/Discussion Board -Proctored Exam -Telephone -iTV - Interactive Video -Other (specify)

forums
message
email
face2face
proctored

Software and Equipment: What additional software or hardware, if any, is required for this course purely because of its delivery mode? How is technical support to be provided?

No Value

Accessibility: Section 508 of the Rehabilitation Act requires access to the Federal government's electronic and information technology. The law covers all types of electronic and information technology in the Federal sector and is not limited to assistive technologies used by people with disabilities. It applies to all Federal agencies when they develop, procure, maintain, or use such technology. Federal agencies must ensure that this technology is accessible to employees and the public to the extent it does not pose an "undue burden". I am using -iTV—Interactive Video only -Learning management system -Publisher course with learning management system interface.

itv
LMS
publisher

Class Size: Good practice is that section size should be no greater in distance ed modes than in regular face-to-face versions of the course. Will the recommended section size be lower than in on-ground sections? If so, explain why.

class_size Hybrid 45