COURSE OUTLINE OF RECORD

Palo Verde College

One College Drive, Blythe, CA 92225
(760) 921-5500

Course Control Number: CCC000449236

Course Outline Approval Dates		
	Curriculum Committee	Board of Trustees
Face-to-Face	9/12/13	10/8/13
Correspondence Ed.	9/12/13	10/8/13
Distance Ed.	9/12/13	10/8/13

Course Information. Course Initiator: Sandra Sher

Subject Area and Course Number: **MAT 226**	Course Title: **Calculus III**		
New Course ☐ Revised ☐ Updated ☒	Static ID	TOP Code **1701.00**	Credit Status Request **D=Credit-Degree Applicable**
Classification Code **Y=Credit Course**	SAM Code **E=Non-occupational**		Course prior to college level **Y=Not applicable**
Noncredit category **Y=Not Applicable; Credit Course**	Meets a unique need: Yes ☒ No ☐	Course duplicated: Yes ☐ No ☒	Demand/Enrollment Potential: Yes ☒ No ☐
Transfer request **A=UC and CSU**	Articulation request: UC ☒ CSU ☒ CSU-GE ☒ IGETC ☒		
Basic Skills **N=Not a Basic Skills Course**	Funding Agency **Y=Not Applicable**		Course Program Status **1=Program Applicable**
Co-Op Status **N=Not Part of a Co-Op Program**	Special Class Status **N=Course is Not a Special Class**		

JUSTIFICATION FOR NEED:

(Briefly describe the primary method used to determine the need for this course. For example, Labor Market Projections from Employment Development Department, employer survey, community or student interest survey, state licensing requirements or mandated certification. A maximum of 4000 characters is allowed.)

Mat 226 is a transferable course that also applies to the AA degree as an elective. It is commonly used for students going into science, medicine, mathematics, computer technology, and engineering.

CATALOG DESCRIPTION:

This course is a continuation of MAT 224. Topics include vectors, multivariable functions and 3-dimensional graphs, partial differentiation, multiple integration, line integrals and surface integrals.

SEMESTER UNITS: 4.0

Course Length: Lecture: 72 **Laboratory:** **Clinic/Field:**

PRE-REQUISITES, CO-REQUISITES AND ADVISORIES:

If the course has pre-requisites, co-requisites or advisories, list them here and attach a completed Pre-requisite Justification form.

Pre-requisite is Mat 224 (Calculus II).

COURSE OBJECTIVES:

Upon successful completion of the course the student will be able to:

1. Calculate dot products, cross products, vector projections and the triple scalar product
2. Differentiate and integrate vector-valued functions
3. Find tangential and normal components of acceleration
4. Calculate arc length and curvature
5. Determine continuity and find limits of multivariable functions
6. Calculate partial derivatives, differentials, directional derivatives and gradients
7. Find equations of tangent planes
8. Solve problems using the 2nd-partials test and Lagrange multipliers
9. Set up and evaluate multiple integrals in rectangular, cylindrical, spherical and polar coordinates
10. Evaluate double integrals using Jacobians
11. Calculate line and surface integrals
12. Apply Green's Theorem, Stokes' Theorem, the Divergence Theorem, and the Fundamental Theorem of Line Integrals

STUDENT LEARNING OUTCOMES:

1. Students should be able to evaluate triple integrals and their applications.
2. Students should be able to evaluate partial derivatives, directional derivatives, volumes, and work with vectors.

COURSE OUTLINE AND SCOPE:

1. Outline of topics or content:

1. Vectors, including dot products, cross products, unit vectors, and vector projections
2. Differentiation and integration of vector-valued functions
3. Limits and continuity of multivariable functions
4. Partial differentiation and directional derivatives
5. Multiple integration and its applications
7. Vector analysis
8. Applications of all of the above

2. If a course contains laboratory or clinic/field hours, list examples of activities or topics:

N/A

3. Examples of reading assignments:

Textbook and other readings: Read all sections containing the topics of Calculus III. The topics are: parametric equations, polar coordinates, vectors, spherical coordinates, triple integrals, arc length, curvature, partial derivatives, line integrals, and 2nd order differential equations.

4. Examples of writing assignments:

Homework from the text and other supplemental readings. Calculations (homework) from the reading assignments. Written quizzes and exams will be conducted. This is done in an effort to reinforce the skills from the reading assignments.

5. Appropriate assignments to be completed outside of class:

Homework from the text or other appropriate sources.

6. Appropriate assignments that demonstrate critical thinking:

The entire course is critical thinking, especially application problems.

7. Other assignments (if applicable):

8. Face-to-Face Course Sections:

Face-to-face education is a mode of delivery in which instruction is delivered in a traditional classroom setting, with instructor and students located simultaneously in the same classroom facility.

a. Describe the methods of instruction.

Lecture, computer software, office hours.

Note: Students will be encouraged by instructors of this course to direct themselves to the College's Disabled Students' Programs and Services (DSP&S) department if they believe they have a learning disability.

b. Describe the methods of evaluating of student performance.
Tests, quizzes, homework, final exam.

c. Describe how the confidentiality of the student's work and grades will be maintained.
Instructors shall make reasonable efforts to protect the confidentiality of students' grades and graded work consistent with practices described in the Family Education Rights and Privacy Act (FERPA).

d. If the course has a lab component, describe how lab work is to be conducted and how student work is to be evaluated.
N/A

9. Correspondence Education Course Sections (correspondence, hybrid correspondence)
Correspondence education is a mode of delivery in which instructional materials are delivered by mail, courier or electronic transmission to students who are separated from the instructor by distance. Contact between instructor and student is asynchronous. **Hybrid correspondence education** is the combination of correspondence and face-to-face interaction between instructor and student.

a. Describe the methods of instruction.
Textbook, handouts, mail correspondence, email correspondence, office hour consultation, video instruction (if available), and computer software.

b. Describe the methods of evaluating student performance.
Tests, quizzes, homework, final exam.

c. Describe how regular, effective contact between the instructor and a student is maintained.
Regular, effective contact includes, but is not limited to, exams; quizzes; graded homework assignments; syllabus receipt; office hours; instant messaging; and synchronous online discussions, e-mails, letters, notes, phone calls, or postings on the Bridge between instructor and student.

d. Describe procedures that help verify the individual submitting class work is the same individual enrolled in the course section.

e. Describe procedures that evaluate the readiness of a student to succeed in a correspondence or hybrid correspondence course section.

f. Describe how the confidentiality of the student's work and grades will be maintained.
Instructors shall make reasonable efforts to protect the confidentiality of students' grades and graded work consistent with practices described in the Family Education Rights and Privacy Act (FERPA).

g. If the course has a lab component, describe how lab work is to be conducted and how student work is to be evaluated.
N/A

h. If the course requires specialized equipment, including computer and computer software or other equipment, identify the equipment, and describe how it is to be accessed by students.

Scientific or graphing calculator.

10. Distance Education Course Sections (online, ITV, hybrid)
Online education is a mode of delivery in which all instruction occurs online via the Internet. Student and instructor access to email and the Internet is required. Students are required to complete class work using email, chat rooms, discussion boards and other instructional online venues. **Interactive television (ITV)** is a mode of synchronous delivery in which instruction occurs via interactive television (closed circuit). **Hybrid** instruction is a combination of face-to-face instruction and online instruction.

a. Describe the methods of instruction.
Via online, ITV, or hybrid instruction. May include but are not limited to: instructional materials delivered by the Bridge platform, Hawkes Learning System website provided by the publisher, email correspondence, supplemental worksheets, voicemail, and video presentations.

b. Describe the methods of evaluating student performance.
Homework, quizzes, tests, final exam.

c. Describe how regular, effective contact between the instructor and a student is maintained.
Regular, effective contact includes, but is not limited to, exams; quizzes; graded homework assignments; syllabus receipt; office hours; instant messaging; and synchronous online discussions, e-mails, letters, notes, phone calls, or postings on the Bridge between instructor and student.

d. Describe procedures that help verify the individual submitting class work is the same individual enrolled in the course section.

e. Describe procedures that evaluate the readiness of a student to succeed in an online, ITV or hybrid course section.

f. Describe how the confidentiality of the student's work and grades will be maintained.
Instructors shall make reasonable efforts to protect the confidentiality of students' grades and graded work consistent with practices described in the Family Education Rights and Privacy Act (FERPA).

g. If the course has a lab component, describe how lab work is to be conducted and how student work is to be evaluated
As a part of this course, students will be required to complete practice exercises online and/or from the text. Quizzes may be online or from the text. Technically, there is no lab component for this course.

h. If the course requires specialized equipment, including computer and computer software or other equipment, identify the equipment, and describe how it is to be accessed by students.
The students will be required to use a computer if this course is online. Computer software and the internet are required. For lecture, ITV will be required and will be supplied through Palo Verde College.

REPRESENTATIVE TEXTBOOKS AND OTHER READING AND STUDY MATERIALS:

List author, title, and current publication date of all representative materials.

Calculus 10th Edition by Howard Anton, Irl C. Bivens, Stephen Davis. Published January 2012.

SIGNATURES:

COURSE INITIATOR: _____ **DATE:** _____

LIBRARY: _____ **DATE:** _____

CHAIR OF CURRICULUM COMMITTEE: _____ **DATE:** _____

SUPERINTENDENT/PRESIDENT: _____ **DATE:** _____