

PALOMAR COLLEGE
COURSE OUTLINE OF RECORD FOR
DEGREE CREDIT COURSE

 x Transfer Course x A.A. Degree applicable course
(check all that apply)

COURSE NUMBER AND TITLE: MATH 205 Calculus with Analytic Geometry, Third Course

UNIT VALUE: 4

MINIMUM NUMBER OF SEMESTER HOURS: 64

BASIC SKILLS REQUIREMENTS: Appropriate language and computational skills.

ENTRANCE REQUIREMENTS

PREREQUISITE: A minimum grade of "C" in MATH 141.

COREQUISITE: None

RECOMMENDED PREPARATION: None

SCOPE OF COURSE: Vectors in the plane and space, 3-dimensional coordinate system and graphing, vector-valued functions and differential geometry, partial differentiation, multiple integration, and vector calculus.

SPECIFIC COURSE OBJECTIVES:

Successful students will be able to:

1. Do computations with vectors in the plane and space, and solve applied problems with vectors.
2. Solve problems and graph in rectangular coordinates, cylindrical coordinates, and spherical coordinates.
3. Calculate limits, derivatives, and integrals of vector-valued functions, and solve applied problems with vector-valued functions.
4. Calculate arc length, curvature, tangential and normal components of acceleration, and velocity of vector-valued functions.
5. Calculate partial derivatives.

6. Calculate differentials, directional derivatives, equations of tangent planes.
7. Solve applied problems using the 2nd-partials test and Lagrange Multipliers.
8. Set up and calculate double and triple integrals using rectangular, cylindrical, spherical, and polar coordinates.
9. Change variables in multiple integration using Jacobians.
10. Use multiple integration to solve applied problems.
11. Set up and calculate line integrals and surface integrals.
12. Understand and apply Green's Theorem, the Divergence Theorem, Stokes Theorem, and the Fundamental Theorem of Line Integrals.

CONTENT IN TERMS OF SPECIFIC BODY OF KNOWLEDGE: At least the following topics will be covered:

1. Vectors
 - Dot product
 - Cross product
 - Vector projections
 - Unit vectors
 - Lines in space
 - Planes
 - Applications
2. 3-Dimensional Coordinate Systems
 - Graphing
 - Change of coordinate systems
 - Midpoint and distance formulas
3. Vector-Valued Functions
 - Definition of limits, derivatives, and integrals
 - Evaluation of limits, derivatives, and integrals
 - Applications
4. Differential Geometry
 - Velocity
 - Acceleration
 - Arc length
 - Curvature
5. Partial Differentiation
 - Definition of partial derivatives
 - Computation of partial derivatives
 - Chain Rule
 - Differentials
 - Directional derivatives
 - Tangent planes
 - 2nd-partials test
 - Lagrange Multipliers
 - Functions of several variables

- Level curves and level surfaces
- Applications
- 6. Multiple Integration
 - Iterated integrals
 - Definition of double and triple integrals
 - Double and triple integrals using rectangular coordinates, polar coordinates, cylindrical coordinates, and spherical coordinates.
 - Area and volume
 - Applications
- 7. Vector Calculus
 - Vector fields
 - Divergence
 - Curl
 - Line integrals
 - Green's Theorem
 - Stoke's Theorem
 - Divergence Theorem
 - Fundamental Theorem of Line Integrals
 - Applications
- 8. Additional topics may be included at instructor's discretion.

REQUIRED READING:

Stewart, James. Multivariable Calculus: Early Transcendentals, 5th Edition, pp 792-1139. Belmont: Brooks/Cole-Thomson Learning, Inc. 2003.

OR

Equivalent pages from other multivariable texts.

SUGGESTED READING: Additional reading may be included at instructor's discretion.

REQUIRED WRITING: Problem-solving exercises on homework assignments and written tests are more appropriate. Homework assignments may require the students to write out detailed solutions at least one paragraph in length. Some essay questions may be assigned when appropriate. These essays will be of 1 to 3 pages in length. Examinations may also require the students to write solutions to problems. These will be 1 to 10 pages in length. All writing assignments will require the use of correct grammar and punctuation. In addition, students may be required to write reports from one paragraph to several pages explaining concepts or explaining and interpreting solutions to non-routine or applied problems.

OUTSIDE ASSIGNMENTS:

Students are expected to spend a minimum of three hours per unit per week in class and on outside assignments, prorated for short-term classes.

INSTRUCTIONAL METHODOLOGY:

Check all that apply:

- lecture
- laboratory

lecture-laboratory combination
 directed study

DISTANCE LEARNING:

This course may be offered as a distance learning course and meets Title 5 regulations 55370, 55372, 55374, 55376, 55378, and 55380.

Yes No

If yes, check all that apply:

- Television Course (Video one-way, e.g. ITV, video cassette, etc.)
- Online Course (Text one-way, e.g. newspaper, correspondence, electronic file, etc.)
- Two-Way Video Conferencing (Two-way interactive video and audio)
- One-Way Video Conferencing (One-way interactive video and two-way interactive audio)
- Computer Assisted Instruction (A specialized form of mediated instruction relying primarily on student access to information and prepared lessons or teaching materials through a computer terminal, but not under immediate supervision of a qualified instructor.)

GRADING POLICY AND STANDARDS (include methods of determining whether the stated objectives have been met by students):

Homework assignments	0% - 20%
Computer assignments	0% - 20%
Written exams	60% - 80%
Final	20% - 40%

IS COURSE REPEATABLE FOR REASON(S) OTHER THAN DEFICIENT GRADE?

Yes No Number of times course may be taken for credit: 1

If yes, identify specific provision of Title 5 Division 2 section(s), 55761-55763 and 58161 which qualifies course as repeatable:

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SIGNATURES ON FILE