

COCONINO COMMUNITY COLLEGE  
COURSE OUTLINE

Reviewed by: Philip Martinez  
Status: Permanent

Spring 2017

A. Identification

1. Subject Area: Math (MAT)
2. Course Number: MAT 241 SUN # MAT 2241
3. Course Title: Calculus and Analytic Geometry III
4. Credit hours: 4
5. Catalog Description: Multidimensional calculus. Includes conic sections, polar coordinates, partial derivatives, gradients, directional derivatives, extrema, multiple and iterated integrals, vector calculus, line integrals, and Green's Theorem. General Education: Mathematics. Prerequisite: \*MAT 230. Four lecture.

B. Course Goals: To build student confidence in the use of the fundamental principles of calculus and analytic geometry in relation to engineering and the physical sciences, and to develop problem solving skills.

C. Course Outcomes

Upon successful completion of this course, students will:

1. graph and find the extrema of conics;
2. determine the equation of conics and classify the various types of conics;
3. parametrize equations and graph them;
4. integrate and differentiate parametric equations;
5. find the polar form of an equation and convert back to rectangular form;
6. graph polar equations;
7. calculate arc lengths;
8. graph and perform basic operations with vectors;
9. graph planes and surfaces and determine their equations;
10. solve problems related to the properties of planes and surfaces;
11. convert equations to spherical and cylindrical form and back to rectangular form;
12. graph, integrate, and differentiate vector valued functions;
13. work application problems related to vector valued functions;
14. demonstrate an understanding of functions of several variables including their graphs, continuity, partial derivatives, directional derivatives, gradients, tangent planes, normal lines and extrema;
15. evaluate multiple integrals;
16. calculate areas and volumes;
17. demonstrate an understanding of vector fields and some of their properties including conservativity, potential functions, and line integrals;
18. define and apply Green's Theorem.

D. Course Assessment will include a comprehensive final exam.

E. Course Content will include:

1. Conics
2. Parametric equations and polar coordinates

3. Vectors, Planar and Solid Geometry
4. Vector valued functions
5. Multivariate functions
6. Multiple Integrals
7. Vector Analysis: Vector fields, line integrals, and Green's Theorem

\*Course has additional pre or co-requisite(s)