MASTER COURSE OUTLINE
Prepared By: Date: September 2017

COURSE TITLE
Calculus IV

GENERAL COURSE INFORMATION

Dept.: MATH&	Course Num: 254	(Formerly: MATH 271)
CIP Code: 27.0103	Intent Code: 11	Program Code:
Credits: 5		
Total Contact Hrs Per Qtr.: 55		
Lecture Hrs: 55	Lab Hrs: 0	Other Hrs: 0

Distribution Designation: Math Science MS, Symbolic or Quantitative Reasoning SQR

COURSE DESCRIPTION (as it will appear in the catalog)
This course is an introduction to multivariable calculus. It includes the study of three dimensional space curves, vector-valued functions, partial derivatives, differentials, directional derivatives, multiple integration, vector fields, line integrals, Green's and Stoke's theorems, surface integrals, and the divergence theorem.

PREREQUISITES
MATH&163 or permission of instructor

TEXTBOOK GUIDELINES
Appropriate college level text as chosen by the instructor

COURSE LEARNING OUTCOMES
Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills:
1. Visualize three dimensional mathematical objects.
2. Find the limits of multidimensional functions.
3. Differentiate and integrate multidimensional functions.
4. Find extreme of multidimensional functions.
5. Find the surface area and volume of multidimensional objects.
6. Solve applied problems in physics and engineering using the calculus of several dimensions.

INSTITUTIONAL OUTCOMES
IO2 Quantitative Reasoning: Students will be able to reason mathematically.

COURSE CONTENT OUTLINE
Introduction to functions of several variables
Limits and continuity
Partial derivatives
Differentials
Chain rule for functions of several variables

Directions derivatives and gradients
Tangent planes and normal lines
Extrema of functions of two variables
Multiple Integration
Terated integrals and area in the deplane
Double integrals and volume
Change of variables: Polar Coordinates
Center of mass and moments of inertia
Surface area
Triple integrals and applications
Triple integrals in cylindrical and spherical coordinates
Change of variables: Jacobians
Vector Analysis
Vector Fields
Line integrals
Conservative vector fields and independence of path
Green's theorem
Surface integrals
Divergence theorem
Stoke's theorem

DEPARTMENTAL GUIDELINES *(optional)*
In order to give the instructor the greatest flexibility in assigning a grade for the course, grades will be based on various instruments at the instructor's discretion. However, to maintain instructional integrity there must be four class exams or three class exams and a project. A final exam will be given if there are less than four exams or a project may be substituted for the final exam if there are four in-class exams. At least 60% of the grade will be based on quantifiable work (exams, homework, quizzes, etc.). The remaining portion of the grade may be based on quantifiable work, attendance, projects, journal work, etc., at the instructor's discretion.

The following is a compilation of acceptable grading instruments: in class exams and a final, attendance, homework or quizzes, research paper, modeling projects on the calculator or computer. Other projects or assignments may be assigned as deemed appropriate at the instructor's discretion.

PO5 should be assessed: Students will be able to solve problems by gathering, interpreting, combining and/or applying information from multiple sources.

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DIVISION CHAIR APPROVAL **DATE**