Course Outline for MAT 273
CALCULUS III

I. CATALOG DESCRIPTION:

MAT 273 – Calculus III – 4 credits (5 contact hours per week)

This course covers the calculus of several variables and is the third calculus course in a three-course sequence. Topics include functions of several variables, partial derivatives, multiple integrals, solid analytical geometry, vectored-valued functions, and line and surface integrals. Upon completion, students should be able to solve problems involving vectors and the functions of several variables.

II. PREREQUISITE: MAT 272

III. COREQUISITE: None

IV. EXPECTED STUDENT LEARNING OUTCOMES:

Upon completion of the course, students should be able to:

A. Perform operations with vectors in two and three dimensional space and apply to analytic geometry.
B. Differentiate and integrate vector-valued functions and apply calculus to motion problems in two and three dimensional space.
C. Determine the limits, derivatives, gradients, and integrals of multivariate functions.
D. Solve problems in multiple integration using rectangular, cylindrical, and spherical coordinate systems.
E. Select and apply appropriate models and techniques to define and evaluate line and surface integrals; these techniques will include but are not limited to Green's, Divergence, and Stoke's theorems.
F. Demonstrate proficiency in using CAS technology to analyze, solve and interpret the various applications.

V. METHODS OF INSTRUCTION:

A. Lectures in basic concepts and skills
B. Read text
C. Class and group discussion of topics
D. Skill building lab exercises using Maple

VI. CONTENT:

A. Vectors: Dot and cross products, equations of lines and planes, and quadric surfaces.
B. Vector Valued Functions: Curves, derivatives and integrals, arc length, and motion.
C. Functions of Several Variables: Limits and continuity, gradient, extrema.
D. Multiple Integration: Double and triple integrals, area and volume, center of mass, cylindrical and spherical coordinates.
E. Vector Fields: Line integrals, Green's Theorem, Stokes' Theorem, and Divergence Theorem
VII. **TYPICAL ASSIGNMENTS:**
A. In class participation during lecture  
B. Online and/or textbook homework  
C. Chapter exams  
D. Topic labs including analysis and evaluation of course concepts  
E. Comprehensive final exam

VIII. **EVALUATION:**
A. Methods of Evaluation  
   1. Objective examinations (for lecture and text reading assignments)  
   2. Evaluation of online skill building assignments  
   3. Approximately 10 Maple labs will be used for evaluation  
   4. A comprehensive final exam will be evaluated based on process and accuracy of solutions  
B. Frequency of Evaluation  
   1. Periodic tests (about 5)  
   2. Online assignments for each chapter  
   3. Approximately one Maple lab per week  
   4. End-of-semester comprehensive exam


X. **OTHER SUPPLIES REQUIRED OF STUDENTS:**
1. A TI 83 or TI 84 graphing calculator is required.  
2. A MyLabsPlus student access code is required.

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