DELAWARE TECHNICAL & COMMUNITY COLLEGE
COLLEGEWIDE COURSE SYLLABUS

Campus:	Terry
Department:	Mathematics
Course Number and Title:	MAT 283 -- Calculus III
Instructor Name:	**Telephone:** **E-mail:**
Prerequisites:	MAT 282
Corequisites:	None
Course Hours and Credits:	4:1:4
Course Description:	A study of partial derivatives, multiple integrals, line integrals, and vectors.
Required Text:	Stewart, James (2003). Calculus, (5^{th} ed.), Belmont, CA: Brooks/Cole, Thomson Learning, Inc.
Materials:	A graphing calculator is required
Method of Instruction:	Lecture
Manuals:	None
Disclaimer:	None

CORE COURSE PERFORMANCE OBJECTIVES

The student will be able to:

1. Perform operations on vectors, vector-valued functions, and use them to solve problems. (CCC 2,6,7)
2. Demonstrate understanding of limits and continuity of functions of several variables. (CCC 1,2,6,7)
3. Use partial derivatives, the gradient, and directional derivatives to solve application problems. (CCC 2,6,7)
4. Evaluate multiple integrals, and apply them to solve problems involving areas and volumes over two and three-dimensional regions. (CCC 2,6,7)
5. Demonstrate understanding of vector fields, vector operators, and line integrals, and use them in physical applications. (CCC 1,2,6,7)

MEASURABLE PERFORMANCE OBJECTIVES

1. Perform operations on vectors, vector-valued functions, and use them to solve problems. (CCC 2,6,7)

1.1 Define and demonstrate the understanding of fundamental concepts:
   a. scalars
   b. unit vectors
   c. vector components
   d. dot product
   e. cross product
   f. orthogonal vectors

1.2 Perform the following actions on vector-valued functions:
   a. evaluate limits of vector-vector valued functions
   b. calculate the derivatives of vector-valued functions
   c. evaluate integrals involving vector-valued functions

1.3 Explore several applications of vector-valued functions:
   a. work
   b. surface area
   c. velocity/acceleration
   d. finding curvatures
   e. finding tangential and normal components of acceleration

2. Demonstrate understanding of limits and continuity of functions of several variables. (CCC 1,2,6,7)

2.1 Find limits of functions in two or more variables.

2.2 Investigate the concept of continuity of multivariate functions.

2.2 Investigate the concepts of domain and range of multivariate functions.

2.3 Sketch level curves.

3. Use partial derivatives, the gradient, and directional derivatives to solve application problems. (CCC 2,6,7)

2.1 Find first, second, and mixed partial derivatives of a given function.

2.2 Find directional derivatives.

2.3 Compute the gradient of functions of several variables.

2.4 Find the equation of the tangent plane and normal line of surfaces.

2.5 Find extrema of multivariate functions and investigate:
a. saddle points
b. Lagrange multipliers

4. Evaluate multiple integrals, and apply them to solve problems involving areas and volumes over two and three-dimensional regions. (CCC 2,6,7)

4.1 Evaluate multiple integrals.

4.2 Express the area of a region in terms of one or more iterated integrals in:
a. Rectangular coordinates
b. Polar coordinates

4.3 Express the volume of a region in terms one of one or more iterated triple integrals.

5. Demonstrate understanding of vector fields, vector operators, and line integrals, and use them in physical applications. (CCC 1,2,6,7)

5.1 Sketch vectors and vector fields.

5.2 Compute the curl of a vector function.

5.3 Compute the gradient of a scalar function of several variables.

5.4 Find the divergence of a vector-valued function.

5.5 Evaluate line integrals.

5.6 Investigate conservative fields and path independence.

5.7 Investigate Green's Theorem.

5.8 Investigate Stoke's Theorem.

5.9 Investigate the Divergence Theorem.

EVALUATION CRITERIA

Students will demonstrate proficiency on all Measurable Performance Objectives at least to the 75% level. The final grade will be determined using the College Grading System:

92 - 100	A
83 - 91	B
75 - 82	C
0 - 74	R

Students should refer to the Student Handbook for information on Academic Standing Policy, Academic Honesty Policy, Students Rights and Responsibilities and other policies relevant to their academic progress.

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