STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK

MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
MATH263 – Calculus III

Created by: Math Department

Updated by: Daniel Gagliardi

Canino School of Engineering Technology

Department: Mathematics

Semester/Year: Fall 2018

A. **TITLE**: Calculus III

B. **COURSE NUMBER:** MATH263

C. **CREDIT HOURS: (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)**

 # Credit Hours: 4
 # Lecture Hours: 4 **per week**
 # Lab Hours: **per week**
Other: **per week**

Course Length: 15 **Weeks**

D. **WRITING INTENSIVE COURSE**: Yes ☐ No ☒

E. **GER CATEGORY: None:** ☐ **Yes:** GER 1 Mathematics
***If course satisfies more than one*:** GER

F. **SEMESTER(S) OFFERED: Fall** ☐ **Spring** ☐ **Fall & Spring** ☒

G. **COURSE DESCRIPTION:**

This course is the third of a three-semester sequence of calculus courses. Included are topics from analytic geometry, plane curves and polar coordinates, vectors, vector valued functions and topics from differential geometry, partial differentiation, multiple integrals, along with selected topics from vector calculus.

H. **PRE-REQUISITES: None** ☐ **Yes** ☒ **If yes, list below:**

Calculus II (MATH 162) with a grade of C or better or permission of instructor.

CO-REQUISITES: None ☒ **Yes** ☐ **If yes, list below:**

I. STUDENT LEARNING OUTCOMES: (*see key below*)

By the end of this course, the student will be able to:

Course Student Learning Outcome [SLO]	***Program Student Learning Outcome [PSLO]***	***GER*** *[If Applicable]*	***ISLO & SUBSETS***	
Use vector operations to solve problems involving areas, volumes and distance in two and three Euclidean space.		GER 1	3-Found Skills	QTR
Use vector operations to develop equations of lines and planes in three space.		GER 1	3-Found Skills	QTR
c. Use derivatives and integrals of vector valued functions to compute the length, velocity, acceleration, and curvature of vector valued functions		GER 1	3-Found Skills	QTR
d. Use partial and directional derivatives to analyze critical points and find absolute maximums and minimums of multivariable functions over compact sets		GER 1	3-Found Skills	QTR
. Compute multiple integrals by changing the order of integration and by transforming from rectangular coordinates to polar, cylindrical and spherical coordinates		GER 1	3-Found Skills	QTR

KEY	**Institutional Student Learning Outcomes [ISLO 1 – 5]**
ISLO #	**ISLO & Subsets**
1	**Communication Skills** Oral [O], Written [W]
2	**Critical Thinking** *Critical Analysis [CA] , Inquiry & Analysis [IA] , Problem Solving [PS]*
3	**Foundational Skills** *Information Management [IM], Quantitative Lit,/Reasoning [QTR]*
4	**Social Responsibility** *Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]*
5	**Industry, Professional, Discipline Specific Knowledge and Skills**

*Include program objectives if applicable. Please consult with Program Coordinator

J. APPLIED LEARNING COMPONENT: Yes ☐ No ☐

If YES, select one or more of the following categories:

- ☒ Classroom/Lab
- ☐ Internship
- ☐ Clinical Placement
- ☐ Practicum
- ☐ Service Learning
- ☐ Community Service
- ☐ Civic Engagement
- ☐ Creative Works/Senior Project
- ☐ Research
- ☐ Entrepreneurship (program, class, project)

K. TEXTS:

Calculus, the Classic Edition, Earl Swokowski, Brooks/Cole Cengage Learning (1991). ISBN-13: 978-0-534-43538-7

L. REFERENCES:

None

M. EQUIPMENT: None ☒ Needed:

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

- **Quizzes**
- **Exams**
- **Projects**
- **Homework**
- **Participation**

P. DETAILED COURSE OUTLINE:

I. Conics, Parametric Equations, and Polar Coordinates
A. Parabolas
B. Ellipses
C. Hyperbolas
D. Graphs of parametric equations
E. Parametric equations and calculus
F. Polar graphs and polar-rectangular conversions
G. Calculus with Polar Coordinates
H. Area of Polar Regions

II. Vectors
A. Vectors in the plane
B. Vectors in space
C. Dot product

D. Cross product
E. Lines and Planes in three dimensional Euclidean Space
F. Quadric Surfaces

III. Vector-Valued Functions and Elementary Differential Geometry
A. Vector-valued functions
B. Differentiation and integration of vector-valued functions
C. Velocity and Acceleration
D. Tangent vectors and normal vectors
E. Arc length, curvature and torsion

IV. Functions of Several Variables
A. Limits and continuity
B. Partial derivatives
C. Differentials
D. Chain rules for functions of several variables
E. Directional derivatives and gradients
F. Tangent planes and normal lines
G. Extrema of functions of two variables with applications
H. Lagrange Multipliers (Optional)

V. Multiple Integration
A. Iterated integrals
B. Double integrals and volume
C. Double integrals in polar coordinates
D. Center of mass and moments of inertia
E. Surface area
F. Triple integrals and applications
G. Triple integrals in cylindrical and spherical coordinates
H. The Jacobian and change of variables for double integrals (optional)

VI. Vector Analysis (OPTIONAL)
A. Vector fields
B. Divergence and curl
C. Line integrals
D. Green's theorem

Q. LABORATORY OUTLINE: None ☒ Yes ☐