

**QUEENSBOROUGH COMMUNITY COLLEGE
DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE**

COURSE OUTLINE

MA-443 **ANALYTIC GEOMETRY & CALCULUS III**

Pre-requisite: MA-442 (with a grade of C or better)

Hours: 4 Class Hours 1 Recitation/Laboratory Hour 4 Credits

Course Description: In this third course of a three-semester sequence, students encounter the mathematics of polar coordinates, conic sections, solid analytic geometry and vectors, partial derivatives and multiple integrals. Students use these concepts to solve problems, using computers and calculators as aids.

Curricula for which the course is required/recommended:
A.S. Degree Programs in Liberal Arts and Sciences (Science and Mathematics), Engineering Science

General Education Objectives: Use analytical reasoning skills; reason quantitatively and mathematically; integrate knowledge and skills in students' programs of study; use information technology skills effectively; communicate quantitative information effectively.

Course Objectives/ Expected Student Learning Outcomes: Understand and become proficient with important mathematical tools and techniques in analytic geometry and multi-variable calculus, including polar coordinates, descriptions of conic sections, three-dimensional analytic geometry, vectors, partial derivatives, the gradient, and multiple integrals; apply these tools to solve problems in mathematics and related fields, understand and appreciate the application of mathematics in physics and engineering; construct models, analyze data, observe patterns, and draw conclusions by using computer software such as MAPLE, DERIVE, CONVERGE, or MATHCAD.

Text: CALCULUS, Sixth Edition
 By: James Stewart
 Brooks/Cole Cengage Learning Publishing Co.

Calculator: A graphing calculator is required.

Methods by which student learning will be evaluated:

- The general guidelines for assessing grades are as follows:
- Examinations, Assignments and Classroom Performance 60%
 - Computer Laboratory Work 15%
 - Final Examination 25%

The distribution may be changed at the discretion of the individual instructor.

Academic Integrity: Academic honesty is taken extremely seriously and is expected of all students. All assignments must be the original work of the student (and partners or group, if applicable). All questions or concerns regarding ethical conduct should be brought to the course instructor. "It is the official policy of the College that all acts or attempted acts that are violations of academic integrity be reported to the Office of Student Affairs (OSA). At the faculty member's discretion and with the concurrence of the student or students involved, some cases, though reported to the OSA, may be resolved within the confines of the course and department. The instructor has the authority to adjust the offender's grades as deemed appropriate, including assigning an F to the assignment or exercise or, in more serious cases, an F to the student for the entire course." (Taken from the QCC Academic Integrity Policy, 2/14/2005.)

NOTE: Any student who feels that he/she may need an accommodation based upon the impact of a disability should contact the instructor privately to discuss his/her specific needs. Please contact the office of Services for Students with Disabilities in Science Building, room 132 (718 631 6257) to coordinate reasonable accommodations for students with documented disabilities.

<u>TOPIC</u>	<u>CHAPTER AND SECTION</u>	<u>HOURS</u>
<u>Polar Coordinates</u>		
Polar Coordinates	11.3	1
Areas and Lengths in Polar Coordinates	11.4	2
Conic Sections	11.5	3
Polar Equations of Conics	11.6	3
<i>Chapter Recap and Synthesis</i>		1
<u>Vectors and the Geometry of Space</u>		
Three-Dimensional Coordinate Systems	13.1	2
Vectors	13.2	2
Dot Product	13.3	2
Cross Product	13.4	2
Lines and Planes in Space	13.5	2
Cylinders and Quadric Surfaces	13.6	3
<i>Chapter Recap and Synthesis</i>		1
<u>Vector-Valued Functions</u>		
Vector Functions and Space Curves	14.1	2
Derivative and Integrals of Vector Functions	14.2	1
Arc Length and Curvature	14.3	2
Velocity and Acceleration	14.4	1
<i>Chapter Recap and Synthesis</i>		1
<u>Partial Derivatives</u>		
Functions of Several Variables	15.1	1
Limits and Continuity in Higher Dimensions	15.2	1
Partial Derivatives	15.3	1
Tangent Planes and Linear Approximations	15.4	1
Chain Rule	15.5	2
Directional Derivative and Gradient Vectors	15.6	1
Maximum and Minimum Values	15.7	1
Lagrange Multipliers	15.8	1
<i>Chapter Recap and Synthesis</i>		1
<u>Multiple Integrals</u>		
Double Integrals over Rectangles	16.1	1
Iterated Integrals	16.2	1
Double Integrals over General Regions	16.3	1
Double Integrals in Polar Coordinates	16.4	1
Applications of Double Integrals	16.5	1
Triple Integrals	16.6	1
Triple Integrals in Cylindrical and Spherical Coordinates	16.7, 16.8	2
Substitutions in Multiple Integrals	16.9	2
<i>Chapter Recap and Synthesis</i>		1
<u>Exams</u>		4
	TOTAL	56

The approximate hours per chapter are guidelines and are at the discretion of the instructor. The instructor is responsible for making assignments and scheduling examinations. The Final Exam date is scheduled by the Registrar.