SUNY OLD WESTBURY

Department of Mathematics, Computer & Information Science

CALCULUS & ANALYTIC GEOMETRY III
MA 3330 • SYLLABUS FALL 2023

Professor: **Frank Sanacory**
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Course Web Site: ***sanacory.net*** *Office Hours:* **MW 11:10PM – 12:10AM, T 1:00-200**

TEXTBOOK: Calculus Volume 3 by Gilbert Strang, Edwin Herman, Openstax.
PRINT BOOK ISBN -13: 978-1- 938168-07-9 PDF VERSION ISBN-13: 978-1- 947172-16-6
https://openstax.org/details/books/calculus-volume-3

PREREQUISITES: A grade of C or better in Calculus II, MA 2320.

COURSE DESCRIPTION: We will continue with the Calculus from MA2320. We will study three main areas. The first is vector algebra and geometry of three-dimensional space including: lines, planes, and curves in space; polar, cylindrical, and spherical coordinate systems. Then using this geometry we learn limits, partial differentiation, directional derivatives, max-min theory and Lagrange Multipliers. The final area of study is integration, including double, triple integrals, line integrals, and the divergence, Green's and Stokes Theorems.

COURSE OBJECTIVES: After successful completion of this course students should understand the algebra of vectors, meaning of limits, continuity, and derivatives of functions of two or three variables and double and triple integrals and green's Theorem. Also be able to use these skills to solve a variety of problems.

COURSE EVALUATION & GRADING: Your grade for the course will be based on your homework/quiz performance (15%), two tests (50%) and a comprehensive final exam (35%).

A = [94, 100] A- = [90, 93]	B+ = [87, 89] B = [84, 86] B- = [80, 83]	C+ = [77, 79] C = [74, 76] C- = [70, 73]	D+ = [67, 69] D = [64, 66] D- = [60, 63]	F = [0, 59]

CALCULATOR: No calculator is allowed.

TUTORIAL: Drop-in tutorial is available in the Mathematics Learning Center in **the Library**.

ACCOMMODATIONS FOR STUDENTS WITH SPECIAL NEEDS:

If you have or suspect you may have a physical, psychological, medical or learning disability that may impact your course work, please contact Stacey DeFelice, Director, The Office of Services for Students with Disabilities (OSSD), NAB, 2065, Phone: 516-628-5666, Fax (516) 876-3005, TTD: (516) 876-3083. E-mail: defelices@oldwestbury.edu.
The office will help you determine if you qualify for accommodations and assist you with the process of accessing them. All support services are free and all contacts with the OSSD are

strictly confidential. SUNY/Old Westbury is committed to assuring that all students have equal access to all learning activities and to social activities on campus.

RESPECT: No cell phones in class and no texting.

FINAL EXAM: Will be held Wednesday December 13, 2023 in our regular classroom at the regular class time.

TOPICS COVERED

1. Parametric Equations and Polar Coordinates

1.1. Parametric Equations
1.2. Calculus of Parametric Curves
1.3. Polar Coordinates
1.4. Area and Arc Length in Polar Coordinates
1.5. Conic Sections

2. Vectors in Space

2.1. Vectors in the Plane
2.2. Vectors in Three Dimensions
2.3. The Dot Product
2.4. The Cross Product
2.5. Equations of Lines and Planes in Space
2.6. Quadric Surfaces
2.7. Cylindrical and Spherical Coordinates

3. Vector-Valued Functions

3.1. Vector-Valued Functions and Space Curves
3.2. Calculus of Vector-Valued Functions
3.3. Arc Length and Curvature
3.4. Motion in Space*

4. Differentiation of Functions of Several Variables

4.1. Functions of Several Variables
4.2. Limits and Continuity
4.3. Partial Derivatives
4.4. Tangent Planes and Linear Approximations
4.5. The Chain Rule
4.6. Directional Derivatives and the Gradient
4.7. Maxima/Minima Problems
4.8. Lagrange Multipliers

5. Multiple Integration

5.1. Double Integrals over Rectangular Regions
5.2. Double Integrals over General Regions
5.3. Double Integrals in Polar Coordinates
5.4. Triple Integrals
5.5. Triple Integrals in Cylindrical and Spherical Coordinates
5.6. Calculating Centers of Mass and Moments of Inertia*
5.7. Change of Variables in Multiple Integrals

6. Vector Calculus

6.1. Vector Fields
6.2. Line Integrals
6.3. Conservative Vector Fields
6.4. Green's Theorem
6.5. Divergence and Curl
6.6. Surface Integrals
6.7. Stokes' Theorem
6.8. The Divergence Theorem