Bronx Community College of the City University of New York
Department of Mathematics and Computer Science

SYLLABUS: MTH 33 – Calculus and Analytic Geometry III (4 Credits – 6 Hours per week)
PREREQUISITE: MTH 32 – Calculus and Analytic Geometry II or equivalent; and CUNY English Proficiency, or ENG 100 or 110, if required

TEXT: Calculus: Early Transcendentals (Ninth Edition) by Stewart et al., Cengage Learning. ISBN 978-1337613927

Learning Objectives. On successful completion of this course, students will be able to

- Work with curves in two- and three-dimensional Euclidean space
- Work with vectors in Euclidean n-space.
- Compute partial derivatives, use them to determine tangent plane and gradient, state, and apply the Chain rule when needed.
- State and apply the Implicit and Inverse Function theorems to determine if equations can be solved locally; find a derivative by implicit methods.
- Find maxima and minima of functions; use the Lagrange multipliers method when subject to constraints.
- Compute double and triple integrals over general elementary regions in the plane and space, respectively.
- Compute the Jacobian of a transformation and use it to change variables in double and triple integrals; choose the appropriate coordinate system (rectangular, polar, cylindrical, spherical) to compute double and triple integrals.
- Apply double and triple integrals to compute areas of surfaces, volumes of solids, averages, and solve geometrical and physical problems.
- Compute line and surface integrals of functions and vector fields; use these integrals to solve geometrical and physical problems.
- State and use the vector forms of the Fundamental Theorem of Calculus in the multivariable setting.
- Apply Vector Analysis to study physical and geometrical problems.

SECTION	TOPIC	SUGGESTED EXERCISES
Week 1		
	CH 10: Parametric Equations and Polar Coordinates	
10.1	Curves Defined by Parametric Equations	669: 1-29 odd, 30-34
10.2	Calculus with Parametric Curves	680: 1-23 odd, 47, 49
10.3	Polar Coordinates	692: 1–11 odd, 15–25 odd, 33–49 odd
10.4	Calculus in Polar Coordinates	700: 1–31 odd, 49-53 odd

SECTION	TOPIC	SUGGESTED EXERCISES
Week 2		
10.5	Conic Sections	709: 1–47 odd
10.6	Conic Sections in Polar Coordinates	718: 1–21 odd
	CH 12: Vectors and the Geometry of Space	
12.1	Three-Dimensional Coordinate Systems	835/ 1-41 odd
12.2	Vectors	844/ 1-25 odd
Week 3		
12.3	The Dot Product	853/ 1-53 odd
12.4	The Cross Product	862/ 1-37 odd, 45, 46
12.5	Equations of Lines and Planes	873/ 1-39 odd, 45-59 odd
	Review	
Week 4		
	Exam	
	CH 13: Vector Functions	
13.1	Vector Functions and Space Curves	896/ 1-19 odd
13.2	Derivatives and Integrals of Vector Functions	903/ 1-27 odd
13.3	Arc Length and Curvature	914/ 1-33 odd
Week 5		
	CH 14: Partial Derivatives	
14.1	Functions of Several Variables	947/ 1-15 odd
14.2	Limits and Continuity	960/ 1-33 odd
14.3	Partial Derivatives	970/ 9-35 odd, 41-63 odd
14.4	Tangent Planes and Linear Approximations	982/ 1-9 odd, 15-25 odd
Week 6		
14.5	The Chain Rule	992/ 1-37 odd
14.6	Directional Derivatives and the Gradient Vector	1006/ 9-35 odd
14.7	Maximum and Minimum Values	1017/ 1-21 odd, 29-39 odd
Week 7		
14.8	Lagrange Multipliers	1027/1-33 odd
Review		
Exam		
Week 8		
	CH 15: Multiple Integrals	
15.1	Double Integrals over Rectangles	1049/ 1-33 odd
15.2	Double Integrals over General Regions	1060/ 1-39 odd
15.3	Double Integrals in Polar Coordinates	1068/ 1-27 odd
15.4	Applications of double integrals	1079/ 1-13 odd

SECTION	TOPIC	SUGGESTED EXERCISES
Week 9		
15.5	Surface Area	1082/ 1-13 odd
15.6	Triple Integrals	1093/ 1-23 odd
15.7	Triple Integrals in Cylindrical Coordinates	1101/ 1-29 odd
15.8	Triple Integrals in Spherical Coordinates	1107/ 1-35 odd
Week 10		
15.9	Change of variables in multiple integrals	1117/ 1-23 odd
Review		
Exam		
Week 11		
	CH 16: Vector Calculus	
16.1	Vector Fields	1130/ 1-21 odd, 25-33 odd
16.2	Line Integrals	1142/ 1-23 odd
16.3	The Fundamental Theorem for Line Integrals	1152/ 1-31 odd
Week 12		
16.4	Green's Theorem	1160/ 1-17 odd
16.5	Curl and Divergence	1169/ 1-33 odd, 14
Week 13		
16.6	Parametric Surfaces and Their Areas	1181/ 1, 3, 5, 13-25 odd, 33, 35, 39-49 odd
16.7	Surface Integrals	1193/ 5-31 odd
16.8	Stokes' Theorem	1200/ 1-23 odd
Week 14		
16.9	The Divergence Theorem	1207/ 1-21 odd, 27-31 odd
Review for the final exam		

Academic Integrity

Academic dishonesty (such as plagiarism and cheating) is prohibited at Bronx Community College and is punishable by penalties, including failing grades, dismissal and expulsion. For additional information and the full policy on Academic Integrity, please consult the BCC College Catalog.

Accommodations/Disabilities

Bronx Community College respects and welcomes students of all backgrounds and abilities. In the event you encounter any barrier(s) to full participation in this course due to the impact of a disability, please contact the disAbility Services Office as soon as possible this semester. The disAbility Services specialists will meet with you to discuss the barriers you are experiencing and explain the eligibility process for establishing academic accommodations for this course. You can reach the disAbility Services Office at: disability.services@bcc.cuny.edu, Loew Hall, Room 211, (718) 289-5874.

08/ 08/ 16 (JP) - 08/18/22 (RG), 3/11/23 (IP)