HOSTOS COMMUNITY COLLEGE
DEPARTMENT OF MATHEMATICS

MAT 310	**CALCULUS III**
CREDIT HOURS:	**4.0**
EQUATED HOURS:	**4.5**
CLASS HOURS:	**4.5**
PREREQUISITE:	**MAT 220 (Calculus II) with a grade of C or higher**
REQUIRED TEXTS:	**Thomas, Weir & Hass: Calculus, Multivariable, 13th Edition, Pearson**
DESCRIPTION:	**This course provides skills in geometry in the plane and space, and integral calculus in several variables. Topics: vectors, solid analytic geometry, polar coordinates, partial derivatives, multiple integral with applications, Green's theorem, Stokes' theorem and the Divergence theorem.**
EXAMINATIONS:	**A minimum of four partial tests (suggested: 60%) and a comprehensive final examination (40%).**
GRADES:	**A, A$^-$, B$^+$, B, B$^-$, C$^+$, C, D, I, F.**

Math 310 (Calculus III) Student Learning Outcomes

1. Interpret and draw appropriate inferences of derivatives and integrals of functions and their properties from quantitative representations such as graphs of polynomial, rational and trigonometric functions of several variables including vector valued functions. Geometric description and analytic representation of lines and planes.
2. Use algebraic, numerical and graphical methods to solve mathematical problems including finding the limit of a function of several variables, determining partial derivatives, continuity and differentiability of a function of several variables.
3. Represent quantitative problems expressed in natural language in suitable algebraic, functional and graphical form.
4. Effectively communicate solutions to mathematical problems in written, graphical or analytic form.
5. Evaluate solutions to problems and graphs of functions for reasonableness by inspection.
6. Apply calculus based methods to problems in other fields of study such as Physics, Economics, Geometry, Chemistry or Biology.

SUGGESTED COURSE OUTLINE

WEEK	CLASS	TOPICS
1	**1**	Parametrization of Plane Curves, Calculus with Parametric Curves
	2	Polar Coordinates and Graphing in Polar Coordinates
	3	Areas and Lengths in Polar Coordinates
2	**4**	Conic Sections and Conic Sections in Polar Coordinates
	5	Three-Dimensional Coordinate Systems
	6	Vectors
3	**7**	The Dot Product
	8	The Cross Product
	9	Lines and Planes in Space
4	**10**	Cylinders and Quadric Surfaces
	11	Curves in Space and Their Tangents, Integrals of Vector Functions; Projectile Motion
	12	Arc Length in Space
5	**13**	Curvature*. Normal Vectors of a Curve
	14	Normal Components of Acceleration.
	15	**Review for Exam 1**
6	**16**	**EXAM 1 (Suggested 15%)**
	17	Functions of Several Variables, Limits and Continuity in Higher Dimensions
	18	Partial Derivatives
7	**19**	The Chain Rule
	20	Directional Derivatives and Gradient Vectors. Tangent Planes. Differentials.*
	21	Extreme Values and Saddle Points
8	**22**	Lagrange Multipliers
	23	**Review for Exam 2**
	24	**EXAM 2 (Suggested 15%)**
9	**25**	Double and Iterated Integrals over Rectangles and General Regions
	26	Area by Double Integration
	27	Double Integrals in Polar Form
10	**28**	Triple Integrals in Rectangular Coordinates
	29	Triple Integrals in Cylindrical and Spherical Coordinates
	30	Substitutions in Multiple Integrals. Moments*. Centers of Mass.*
11	**31**	**Review for Exam 3**
	32	**EXAM 3 (Suggested 15%)**
	33	Line Integrals, Vector Fields and Line Integrals; Work*, Circulation* and Flux*
12	**34**	Path Independence, Conservative Fields and Potential Functions
	35	Green's Theorem in the Plane
	36	Surfaces and Area
13	**37**	Surface Integrals
	38	Stokes Theorem
	39	The Divergence Theorem and a Unified Theory
14	**40**	**Review For Exam 4**
	41	**EXAM 4 (Suggested 15%)**
	42	**Review for Final**
15		**Final Exam (Suggested 40%)**

* Denotes optional material.