BARUCH COLLEGE
DEPARTMENT OF MATHEMATICS

MTH 3050 SYLLABUS
Calculus III and Vector Calculus

Textbook or ebook: Calculus – 11th Edition by Larson and Edwards, Cengage Learning Publisher. The WebAssign homework correlates with the section number and topic in the textbook.

Lesson #	Topics	Reading	Homework Problems
1-4	Conics and calculus	10.1	P. 696: 5 – 10, 11, 15, 19, 20, 23, 27, 29, 31, 35, 45, 47, 49, 86
	Plane curves and parametric equations	10.2	P. 707: 5, 7, 11, 17, 19, 25, 31, 41, 42
	Parametric equations and calculus	10.3	P. 715: 5, 11, 13, 23, 27, 31, 35, 43, 51, 63
	Polar coordinates and polar graphs	10.4	P. 726: 5, 7, 13, 25, 29, 32, 35, 37, 64, 76, 79, 83, 85, 89
	Area and arc length	10.5	P. 735: 3, 4, 7, 9, 10, 23, 27, 31, 37, 39, 44, 57, 65
5-8	Vectors in the plane	11.1	P. 759: 3, 4, 5, 9, 11, 25, 27, 29, 33, 37, 39, 46, 51, 53, 61
	Space coordinates and vectors in space	11.2	P. 767: 5, 9, 21, 29, 36, 38, 39, 43, 55, 57, 59, 67, 68, 75, 77, 79, 83
	Dot product	11.3	P. 777: 3, 7, 9, 13, 15, 17, 19, 21, 31, 39, 41, 43, 51, 63, 64
	Cross product 37	11.4	P. 785: 3, 4, 5, 7, 9, 11, 12, 13, 19, 23, 33, 35,
	Lines and plane in space	11.5	P. 794: 5, 7, 9, 11, 15, 19, 21, 33, 40, 41, 47, 51, 53, 63, 65, 69, 71, 76, 79, 83, 85, 89, 91, 95
	Surfaces in space	11.6	P. 806: 5 – 10, 11, 17, 19, 23, 25, 31, 32,34, 38
	Cylindrical and spherical coordinates	11.7	P. 813: 3, 7, 9, 11, 23, 25, 31, 39, 51, 53, 55, 59, 61, 71-74 (all), 79, 81, 85, 87, 91
9	Vector-valued functions	12.1	P. 825: 11, 12, 15, 19, 21, 27, 31, 55, 61,67, 69
	Calculus and vector-valued Functions	12.2	P. 834: 3 – 15 (odd), 19, 23, 35, 41, 71
10-14	Functions of several variables	13.1	P. 880: 5, 11, 13, 17, 27, 36, 37, 39, 51, 54
	Limits and continuity	13.2	P. 891: 9, 17, 23, 25, 31, 42, 44, 51, 58
	Partial derivatives	13.3	P. 900: 7, 11, 13, 19, 23, 41, 51, 55, 71, 74, 81
	Differentials	13.4	P. 909: 3, 5, 7, 11, 18, 24, 39
	Chain rule	13.5	P. 917: 3, 5, 7, 15, 18, 19, 29, 33
	Directional derivative and gradients	13.6	P. 928: 5, 7, 15, 22, 28, 31, 35, 37 – 42, 47
	Tangent planes and normal lines	13.7	P. 937: 7, 12, 15, 18, 25, 27, 33, 37
	Extrema of functions of two variables	13.8	P. 946: 7, 11, 14, 21, 23, 33, 41, 43, 45

	Applications	13.9	P. 953: 3, 7, 8, 12, 16, 21
	Lagrange multipliers	13.10	P. 962: 8, 12, 13, 15, 36
15-18	Iterated integrals and Area	14.1	P. 976: 3, 7, 9, 11, 21, 27, 31, 33, 55, 59, 65
	Double integrals and volume	14.2	P. 987: 9, 12, 13, 19, 21, 24, 27, 29, 30, 45
	Change of variables and polar coordinates	14.3	P. 995: 11, 13, 17, 31, 33, 43, 45, 47
	Surface area	14.5	P. 1011: 7, 13, 17, 19, 23, 28
	Triple integrals	14.6	P. 1021: 3, 5, 7, 9, 19, 27, 29
	Change of variables	14.8	P. 1036: 3, 5, 9, 17, 21, 25, 33
19-25	Vector fields	15.1	P. 1053: 5 – 8, 10, 19, 23, 29, 31, 37, 38, 41, 45, 57, 58, 62
	Line integrals	15.2	P. 1065: 11, 15, 19, 29, 33, 47, 49, 53, 55
	Conservative vector fields	15.3	P. 1076: 3, 4, 7, 9, 11, 13, 23, 25, 27
	Green's theorem	15.4	P. 1085: 5, 7, 11, 15, 19, 29, 30, 31
	Parametric surfaces	15.5	P. 1095: 3 – 9, 11, 17, 19, 21, 33, 37, 38
	Surface integrals	15.6	P. 1108: 5, 7, 9, 15, 18, 25, 27
	Divergence theorem	15.7	P. 1116: 3 – 11, 27
	Stokes's theorem	15.8	P. 1123: 3,4, 5, 6, 7, 9, 20

LEARNING GOALS OF COURSE: Upon completion of this course, students will be able to:

- Perform vector operations with dot and cross products; analyze the motion of an object in the space.
- Use equations to describe curves and surfaces in the space; find arc length and curvature.
- Find domains, limits, and partial derivatives of multivariable functions, compute directional derivatives and gradients, apply derivative analysis to geometric problems, approximation problems, and optimization problems.
- Evaluate double and triple integrals and use them to find the volume, center of mass, moments of inertia and surface area.
- Evaluate line integrals and surface integrals, understand and use the major theorems in vector calculus (the Fundamental Theorem of Line Integral, Green’s theorem, Stokes’ theorem, and the Divergence theorem); apply vector analysis to potential and conservation of energy problems.