

Unified Calculus III: 50:640:221

Prepared by Siqi Fu

Note: *This sample syllabus is provided as an indication of what is typically taught in this course. It is the instructor's responsibility to make up his/her own syllabus and decide the emphasis, ordering, pacing, homework assignments, exams, and grading policy for his/her class.*

Textbook: Calculus (8th-edition) by James Stewart. Publisher: Cengage Learning, 2016.

Description: This 4-credit course introduces the students to multi-variable calculus. Topics include: Vectors and analytic geometry of three dimensional space; partial derivatives; multiple integrals; line integrals; integral formulas (Green's, Stokes', and divergence theorems). This corresponds to the material in Chapter 12-16 of the textbook.

Schedule: This tentative schedule is based on a two lectures per week scheduling.

Lecture	Sections	Topics	Homework Problems
1	12.1	Three dimensional coordinate systems	2, 5, 7, 13, 18, 21, 42
	12.2	Vectors	1, 4, 13, 18, 31, 34
2	12.3	The dot product	5, 7, 9, 12, 14, 23, 51
	12.4	The cross product	1, 5, 11, 16, 19, 25, 33, 39
3	12.5	Equations of Lines and planes	4, 10, 13, 20, 28, 51, 56, 59
	12.6	Cylinders and quadric surfaces	4, 9, 13, 21, 26, 29
4	13.1	Vector functions	5, 12, 17, 23, 26, 28, 53
	13.2	Derivatives and integrals of vector functions	3, 8, 12, 20, 25, 36, 40
5	13.3	Arc length and curvature	2, 6, 7, 11, 14, 18, 25
	13.4	Motion in space	1, 4, 11, 19, 23
6	14.1	Functions of several variables	2, 8, 10, 22, 28, 32, 33, 44, 46
	14.2	Limits and continuity	2, 6, 16, 25, 34, 37
7	14.3	Partial derivatives	3, 10, 14, 14, 23, 32, 60
7	14.4	Linear approximations	2, 6, 15, 20, 22, 25, 40
8	14.5	The chain rule	1, 6, 9, 14, 15, 27, 31
9	14.6	Directional derivatives and gradient vector	1, 4, 8, 13, 18, 23, 32
10	14.7	Maximum and minimum values	1, 4, 6, 12, 18
11	14.8	Lagrange multipliers	3, 10, 16, 19, 29
		Review for Midterm Exam 1	
12		Midterm Exam 1	
13	15.1	Double integrals over rectangles	1, 3, 6, 7, 13, 24, 29, 34, 37, 47
14	15.2	Double integrals over general regions	2, 5, 8, 11, 15, 19, 25
15	15.3	Double integrals in polar coordinates	2, 4, 5, 7, 15, 22, 33
	15.4	Applications of double integrals	1, 3, 9, 15, 17, 22
16	15.5	Surface area	1, 2, 9, 12
17	15.6	Triple integrals	2, 4, 8, 9, 13, 20, 27, 37
18	15.7	Triple integrals in cylindrical coordinates	2, 3, 6, 9, 15, 27
	15.8	Triple integrals in spherical coordinates	1, 3, 8, 13, 15, 17, 20, 21, 41
19	15.9	Change of variables in multiple integrals	2, 5, 8, 12, 17
20	16.1	Vector fields	3, 9, 12, 14, 18, 22, 25, 33
21	16.2	Line integrals. Review for Midterm Exam 2	2, 7, 12, 17, 20, 33
22		Midterm Exam 2	
23	16.3	Fundamental theorem for line integrals	2, 6, 7, 11, 12, 19, 22, 23, 25, 33
	16.4	Green's theorem	2, 6, 9, 12, 17, 26
24	16.5	Curl and divergence	1, 7, 10, 14, 21, 33, 37
	16.6	Parametric surfaces and their areas	1, 3, 6, 13, 18, 46
25	16.7	Surface integrals	5, 9, 16, 23, 30
26	16.8	Stokes' theorem	1, 4, 7, 13, 17, 19, 21
27	16.9	The divergence theorem	5, 9, 16, 23, 30
28		Catchup and reviews	