

**Topic Outline and Schedule:**

Week	Lecture	Topic
1	1.1	12.1 Three-dimensional coordinate systems
	1.2	12.1 Three-dimensional coordinate systems
	1.3	Exercises: 3, 5, 8, 9, 10, 11, 12, 16, 17, 19, 20, 21, 22, 27, 28, 31, 34, 40, 41
1	1.3, 1.4	12.2 Vectors
	1.4	Exercises: 4, 6, 15, 18, 21, 25, 26, 29,41
	1.5	12.3 The dot product
2	2.1	Exercises:1,2,5,8,10,15,19, 22,24,25, 26,27,28,32,34, 36, 37, 38,40,43,46, 53,55,56
	2.1 , 2.2	12.4 The cross product
	2.3	Exercises: 1,4,13,14,19,20,27,29,34,35,37,38,45
2	2.3	12.5 Equations of lines and planes
	2.3 , 2.4	12.5 Equations of lines and planes
	2.5	Exercises: 1,2,3,4,5,7,10, 11,12,14,16,17,19,20,21,22, 24,26,27,30,31, 34,37, 38,44,46,48,49,52, 56,59,61,62,63,64,68,70,72,73,75,76,78,79
3	3.1	12.6 Cylinders and quadric surfaces
	3.2	Exercises: 3,5, 11– 36, 41, 42,43,44
	3.2, 3.3	13.1 Vector functions and space curves
3	3.3	Exercises: 1,2,4,7,11,14,16,17,26,27
	3.4	13.2 Derivatives and integrals of vector functions Exercises: 3,6,9,12,17,19, 24,25,27,33,36,41
	3.5	13.3 Arc length and curvature
4	4.1	Exercises: 1,3,4,13,14,17, 19,22,25,28,31,44,48,49
	4.1 , 4.2	14.1 Functions of several variables
	4.3	Exercises: 9,10,12,14,15, 17,19,20,21,22,29,31,44,48,49
4	4.2, 4.3	14.2 Limits and continuity
	4.4	Exercises: 5,7, 8, 9, 10, 12, 13, 14, 16, 17, 18, 21, 29, 33, 37, 38,40,41
	4.5	14.3 Partial derivatives Exercises: 15,21,26,28,29,31,36,39,41,43,46,51,57,63,72,76
5	5.1	14.4 Tangent planes and linear approximation
	5.2	Exercises: 1,4,6,11,12,14, 17,19,31, 46
	5.2, 5.3	14.5 The chain rule
5	5.4	Exercises: 2,4,8,11,13,15,21,24,29,32,45,48,54
	5.5	14.6 Directional derivatives and the gradient vector

6	6.1	Exercises: 4, 8, 10, 11, 15, 20, 21, 24, 28, 39, 43, 54, 55
	6.1 , 6.2	14.7 Maximum and minimum values
	6.2	Exercises: 1,5,8,12,13,16,29,33,35,39,40,43,46
6	6.2 , 6.3	14.8 Lagrange multipliers Exercises: 3,6,8,11,19,27,28,31,34,40
	6.4	15.2 Iterated integrals Exercises: 4,7,9,12,16,19,23,26,27,28,31
	6.4, 6.5	15.3 Double integrals over general regions Exercises: 5,6,11,12, 19,21,24,26,28, 31, 34,41, 43, 44,45, 46, 49,51
6	6.5	15.4 Double integrals in polar coordinates Exercises: 5,7,8,10,11, 15, 17,19,21,25,26, 29,31, 32
7	7.1	15.7 Triple integrals Exercises: 4,9,11,12,16, 17,19,20,22,30
	7.2	15.8 Triple integrals in cylindrical coordinates Exercises: 3,8,9,17,18,21, 22,23,29,30
	7.3	15.9 Triple integrals in spherical coordinates Exercises: 4,7,8,10,21,22, 24,26,30,39,40,41