

## Math 20E Syllabus - Vector Calculus (revised September 2016)

Lecture schedule based on *Vector Calculus, sixth edition* by Jerrold E. Marsden and Anthony Tromba

Section	Lectures	Topic
Review Assignment (no lecture): Sections 1.1 - 1.4, 2.1 - 2.6, 3.1, 3.3 - 3.4 and 4.1 - 4.2		
5.1, 5.2	1	The Double Integral
5.3	1	The Double Integral Over More General Regions
5.4	1	Changing the Order of Integration
5.5	1	The Triple Integral
6.1	1	The Geometry of Maps from $\mathbb{R}^2$ to $\mathbb{R}^2$
1.4	1	Cylindrical and Spherical Coordinates
6.2	2	The Change of Variables Theorem
4.3	1	Vector Fields
7.1	1	The Path Integral
7.2	1	Line Integrals
7.3	1.5	Parametrized Surfaces
7.4	1.5	Area of a Surface
7.5	1.5	Integrals of Scalar Functions Over Surfaces
7.6	1.5	Surface Integrals of Vector Fields
8.1	2	Green's Theorem
4.4; 8.2	2	Curl; Stokes' Theorem
4.4; 8.4	2	Divergence; Gauss's Theorem
8.3	1	Conservative Vector Fields

### Notes:

1. The prerequisite for this course is Math 18 (or Math 20F) and Math 20C. Thus, the students are expected to have a working knowledge of linear algebra and multivariable calculus. No lecture time should be allotted to the Review Assignment (except perhaps to address questions).
2. Double and triple integration (Sections 5.1 - 5.5) are also covered in Math 20C. Reviewing those topics here is helpful since integration is the central theme of this course.
3. Section 1.4 (Cylindrical and Spherical Coordinates) may be treated as a subtopic Section 6.2 (The Change of Variables Theorem). Since polar, cylindrical, and spherical coordinates are important coordinate systems that are frequently used in other disciplines, they should be treated explicitly as part of the discussion on change of variables.
4. The lecture schedule is, at best, approximate. However, it allots 24 lectures for the course, so there should be plenty of flexibility to complete it in a standard quarter with 25 - 26 lecture days available.