

## 20E Syllabus - Vector Calculus

Lecture Schedule based on Marsden and Tromba, *Vector Calculus*, Freeman 2004

Section	Lectures	Topic
1.1-1.2	1	Vectors, scalar product
1.3	0.5	Cross product, determinants
1.5	0.5	Matrix multiplication, linear maps
1.4, 2.1	1	Cylindrical, spherical coordinates, surfaces
2.2-2.3	1	Derivatives
2.4-2.5	1.5	Curves, the chain rule
2.6	0.5	Gradient
3.1-3.2	1	Taylor's Theorem (3.5 – Implicit Function Theorem)
4.1-4.2	1	Parametrized curves and arclength
4.3	1.5	Vector fields and flow lines
4.4	0.5	Divergence and curl
5.1-5.4	1	Areas and double and iterated integrals
5.5	1	Triple integrals
6.1-6.2	2	Change of Variables
7.1-7.2	1.5	Path, line integrals
7.3	0.5	Parametrized surface
7.4	1	Area of surface
7.5-7.6	4	Integrals over surfaces
8.1	1	Green's Theorem
8.2	1	Stokes Theorem
8.3	1	Conservation Fields
8.4	1	Gauss's Theorem (8.5 – Maxwell's equations, Fluid mechanics and 8.6 – Differential forms