



18.02 | Spring 2006 | Undergraduate

Multivariable Calculus

Menu

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Readings

Listed in the table below are reading assignments for each lecture session.

“Text” refers to the course textbook: Simmons, George F. *Calculus with Analytic Geometry*. 2nd ed. New York, NY: McGraw-Hill, 1995. ISBN: 0070576424.

“Notes” refers to the “[18.02 Supplementary Notes and Problems](#)” written by Prof. Mattuck.

LEC #	TOPICS	READINGS
I. Vectors and Matrices		
1	Vectors in 2- and 3-space Dot Product	Text: Sections 17.3, 18.1, 18.2
2	Determinants of Orders 2 and 3 Cross Product	Text: Section 18.3 Notes: Section D
3	Matrices; Inverse Matrices	
4	Solving Systems of Linear Equations; Lines, Planes	
5	Parametric Curves; Velocity, Acceleration	Text: Sections 18.4, 17.1, 17.4
6	Kepler’s Second Law	Text: 17.7 Notes: Section K
	Exam 1 (Covering Lectures 1-6)	
II. Partial Derivatives		
7	Level Curves, Partial Derivatives, Tangent Plane	Text: Sections 19.1-19.3 Notes: Section TA
8	Max-Min Problems Least Squares Approximation	Text: Section 19.7 Notes: Section LS
9	2nd Derivative Test; Boundaries and Infinity	
10	Differentials; Chain Rule	Text: Section 19.6
11	Gradient, Directional Derivative	Text: Section 19.5
12	Lagrange Multipliers	Text: Section 19.8
13	Non-independent Variables	
14	Partial Differential Equations Review	Text: Section 19.8
	Exam 2 (Covering Lectures 7-14)	
III. Double and Triple Integrals		
15	Double and Iterated Integrals	Text: Sections 20.1, 20.2 Notes: Section I.1
16	Double Integrals in Polar Coordinates Applications	Text: Sections 20.3, 20.4 Notes: Section I.2
17	Change of Variables	Text: Section 20.3
18	Triple Integrals in Rectangular and Cylindrical Coordinates	Text: Sections 20.5, 10.6

Feedback

LEC #	TOPICS	READINGS
19	Spherical Coordinates Gravitational Attraction	Text: Section 20.7
IV. Vector Calculus in 2 and 3-space		
20	Line Integrals in the Plane	Text: Section 21.1 Notes: Section V1
21	Gradient Fields and Path Independence	Text: Section 21.2 Notes: Section V2.1
22	Conservative Fields and Potential Functions	
23	Green's Theorem 2-dimensional Curl (Vorticity)	Text: Section 21.3 Notes: Section V4.3
24	Simply-connected Regions Review	
	Exam 3 (Covering Lectures 15-24, Except 18-19)	
25	Flux Form of Green's Theorem	
26	Vector Fields in 3-space; Surface Integrals and Flux	
27	Divergence (= Gauss's) Theorem	Text: Section 21.4 Notes: Section V10
28	Divergence Theorem (cont.)	
29	Line Integrals in Space, Exactness, and Potentials	
30	Stokes' Theorem	Text: Section 21.5 Notes: Section V4.3, V13
31	Understanding Curl Review	
	Exam 4 (Covering Lectures 18-19, 25-31)	
32	Topological Issues	
33	Conservation Laws; Heat/Diffusion Equation	
34	Course Review	
35	Course Evaluation Maxwell's Equations	Text: Section 21.6 Notes: Section V15



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