Multivariable Calculus

Readings

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

“Text” refers to the course textbook: Edwards, Henry C., and David E. Penney. *Multivariable Calculus*. 6th ed. Lebanon, IN: Prentice Hall, 2002. ISBN: 9780130339676.

“Notes” refers to the “18.02 Supplementary Notes and Problems” written by Prof. Arthur Mattuck.

I. Vectors and matrices		
0	Vectors	Text: Section 12.1
1	Dot product	Text: Section 12.2 Text: Section 12.3
2	Determinants; cross product	Notes: Section D
3	Matrices; inverse matrices	Notes: Sections M.1 and M.2 Text: Pages 798-800
4	Square systems; equations of planes	Notes: Section M.4
5	Parametric equations for lines and curves	Text: Sections 12.4 and 10.4
6	Velocity, acceleration Kepler’s second law	Text: Section 12.5, page 818 Notes: Section K
7	Review	
II. Partial derivatives		
8	Level curves; partial derivatives; tangent plane approximation	Text: Sections 13.2 and 13.4 Notes: Section TA
9	Max-min problems; least squares	Text: Pages 878-881, 884-885 Notes: Section LS
10	Second derivative test; boundaries and infinity	Text: Section 13.10, through page 930 Notes: Section SD
11	Differentials; chain rule	Text: Sections 13.6-13.7
12	Gradient; directional derivative; tangent plane	Text: Section 13.8
13	Lagrange multipliers	Text: Section 13.9, through page 922
14	Non-independent variables	Notes: Section N
15	Partial differential equations; review	Notes: Section P
III. Double integrals and line integrals in the plane		
16	Double integrals	Text: Section 14.1-14.3 Notes: Section I.1

17	Double integrals in polar coordinates; applications	Text: Sections 14.4-14.5 Notes: Section I.2
18	Change of variables	Text: Section 14.9 Notes: Section CV
19	Vector fields and line integrals in the plane	Text: Section 15.2 Notes: Section V1
20	Path independence and conservative fields	Text: Section 15.3
21	Gradient fields and potential functions	Notes: Section V2
22	Green’s theorem	Text: Section 15.4
23	Flux; normal form of Green’s theorem	Notes: Sections V3 and V4
24	Simply connected regions; review	Notes: Section V5
IV. Triple integrals and surface integrals in 3-space		
25	Triple integrals in rectangular and cylindrical coordinates	Text: Sections 12.8, 14.6, and 14.7 Notes: Section I.3
26	Spherical coordinates; surface area	Text: Section 14.7 Notes: Sections I.4, CV.4, and G
27	Vector fields in 3D; surface integrals and flux	Notes: Sections V8 and V9
28	Divergence theorem	Text: Section 15.6 Notes: Section V10
29	Divergence theorem (cont.): applications and proof	Text: Section 15.6, Pages 1054-1055 Notes: Section V10
30	Line integrals in space, curl, exactness and potentials	Text: Pages 1017-1018 Notes: Sections V11 and V12
31	Stokes’ theorem	Text: Section 15.7 Notes: Section V13
32	Stokes’ theorem (cont.); review Topological considerations	
33	Maxwell’s equations	Notes: Sections V14 and V15
34	Final review	
35	Final review (cont.)	

Proud member of: Open Education GLOBAL