

18.02 MULTIVARIABLE CALCULUS, SPRING 2005 @ ESG: SYLLABUS

DAVID ROE

1. COURSE INFORMATION

Teacher: David Roe, roed@mit.edu, “office” hours upon arrangement.

Text: Edwards and Penny, *Multivariable Calculus with Analytic Geometry*, 6th edition. Also *18.02 Supplementary Notes and Problems*, available from CopyTech in Bldg. 11.

Course Web Page: <http://web.mit.edu/roed/www/18.02/>

Class Times: MWF12

Problem Sets: Weekly, due Tuesdays at 11:59:59 pm.

Homework Rules: I think you will learn the material better if you work on problem sets with others. However,

- (1) Attempt each part of each problem yourself. Read each part of each problem before asking for help. If you don’t understand what is being asked, ask for help interpreting the problem and then make an honest attempt to solve it.
- (2) You may use any sources and get help from anyone. However, write up each problem independently. A classmate may explain their method for solving a problem once you’ve worked on it and gotten stuck, but you should not be looking at their solution as you write up your own.

Tutoring: If you are struggling in this class, please PLEASE talk to me about help that is available for you before you get too behind. You can also talk to Holly or any of the other ESG staff. It is possible to get tutoring through ESG or the math department.

Grading: The four in class exams are worth a total of 400 points, the problem sets together are worth 250 and the final is worth 250. A 90% will guarantee you an A, an 80% a B, etc., though the final cutoffs may be slightly lower.

Questions: Come talk to me.

2. SCHEDULE

.			Vectors and Matrices
0.	W	Feb 2	Vectors, coordinate systems, maps.
1.	F	Feb 4	Linear maps, matrices, inverse matrices.
2.	M	Feb 7	Determinants, dot product, cross product. PS1 due Tues, Feb 8
3.	W	Feb 9	Solving linear systems, equations of planes.
4.	F	Feb 11	Parametric equations for lines, curves and surfaces.
5.	M	Feb 14	More parametric eq, derivatives of vector functions. PS2 due Tues, Feb 15
6.	W	Feb 16	Overflow space, review.
7.	F	Feb 18	EXAM 1 covering classes 0-5.
.	M	Feb 21	No class: Presidents Day.
.			Multivariable Differentiation
8.	T	Feb 22	(Monday schedule) Partial derivatives, differentiability, total derivative.
9.	W	Feb 23	More differentiation, tangent planes and linear approximation.
10.	F	Feb 25	Min-max problems, compact sets, least squares.
11.	M	Feb 28	Second derivative test, boundaries, infinity. PS3 due Tues, Mar 1
12.	W	Mar 2	Differentials, chain rule.
13.	F	Mar 4	Gradient, directional derivatives.
14.	M	Mar 7	Lagrange multipliers. PS4 due Tues, Mar 8
15.	W	Mar 9	Overflow and Review
16.	F	Mar 11	EXAM 2 covering classes 8-14.
.			Double and Triple Integrals
17.	M	Mar 14	Double and triple integrals in rectangular coordinates.
18.	W	Mar 16	Change of variables, double integrals in polar coordinates.
19.	F	Mar 18	Triple integrals in cylindrical and spherical coordinates.
.			SPRING BREAK!
.			Line and Surface Integrals
20.	M	Mar 28	Vector fields, curl, divergence. PS5 due Tues, Mar 29
21.	W	Mar 30	Line integrals in the plane and in space.
22.	F	Apr 1	Path independence and conservative fields.
23.	M	Apr 4	Gradient fields and potential functions. PS6 due Tues, Apr 5
24.	W	Apr 6	Overflow and Review.
25.	F	Apr 8	EXAM 3 covering classes 17-23.
26.	M	Apr 11	Surface integrals and flux.
27.	W	Apr 13	More surface integrals.
28.	F	Apr 15	Green's theorem.
.	M	Apr 18	No class: Patriots Day. PS7 due Tues, Apr 19
.			Variations on Stokes' Theorem
29.	W	Apr 20	Normal form of Green's theorem, simply connected regions.
30.	F	Apr 22	Question day.
31.	M	Apr 25	Stokes' theorem. PS8 due Tues, Apr 26
32.	W	Apr 27	Divergence theorem.
33.	F	Apr 29	Divergence theorem continued: applications and proof.
34.	M	May 2	(Hopefully) Interesting topics and applications. PS9 due Tues, May 3
35.	W	May 4	Overflow and Review.
36.	F	May 6	EXAM 4 covering classes 26-33.
37.	M	May 9	Review for final.
38.	W	May 11	Review for final.