

18.02 MULTIVARIABLE CALCULUS, FALL 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. You will also need *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: Monday 1-2, Wednesday 1-2, Friday 2-3.

Problem Sets: Due at 11:59:59 pm either in my box at ESG or my room.

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	Sep	7	Vectors, coordinate systems, maps.
1.	F	Sep	9	Linear maps, matrices, inverse matrices.
2.	M	Sep	12	Determinants, dot product, cross product. PS1 due Tues, Sep 13
3.	W	Sep	14	Solving linear systems, equations of planes.
4.	F	Sep	16	Parametric equations for lines, curves and surfaces.
.	M	Sep	19	No class: Student Holiday.
5.	W	Sep	21	More parametric eq, derivatives of vector functions. PS2 due Thur, Sep 22
6.	F	Sep	23	Overflow space, review.
7.	M	Sep	26	EXAM 1 covering classes 0-5.
.				Multivariable Differentiation
8.	W	Sep	28	Partial derivatives, differentiability, total derivative.
9.	F	Sep	30	More differentiation, tangent planes and linear approximation.
10.	M	Oct	3	Min-max problems, compact sets, least squares. PS3 due Tues, Oct 4
11.	W	Oct	5	Second derivative test, boundaries, infinity.
12.	F	Oct	7	Differentials, chain rule.
.	M	Oct	10	No class: Columbus Day. PS4 due Tues, Oct 11
13.	W	Oct	12	Gradient, directional derivatives.
14.	F	Oct	14	Interesting topics: invite your parents!
15.	M	Oct	17	Lagrange multipliers. PS5 due Tues, Oct 18
16.	W	Oct	19	Overflow and review.
17.	F	Oct	21	EXAM 2 covering classes 8-13,15.
.				Double and Triple Integrals
18.	M	Oct	24	Double and triple integrals in rectangular coordinates.
19.	W	Oct	26	Change of variables, double integrals in polar coordinates.
20.	F	Oct	28	Triple integrals in cylindrical and spherical coordinates.
.				Line and Surface Integrals
21.	M	Oct	31	Vector fields, curl, divergence. PS6 due Tues, Nov 1
22.	W	Nov	2	Line integrals in the plane and in space.
23.	F	Nov	4	Path independence and conservative fields.
24.	M	Nov	7	Gradient fields and potential functions. PS7 due Tues, Nov 8
25.	W	Nov	9	Overflow and Review.
.	F	Nov	11	No class: Veteran's Day.
26.	M	Nov	14	EXAM 3 covering classes 18-24.
27.	W	Nov	16	Surface integrals and flux.
28.	F	Nov	18	More surface integrals.
.				Variations on Stokes' Theorem
29.	M	Nov	21	Green's theorem. PS8 due Tues, Nov 22
30.	W	Nov	23	Question day.
.	F	Nov	25	No class: Thanksgiving.
31.	M	Nov	28	Normal form of Green's theorem, simply connected regions.
32.	W	Nov	30	Stokes' theorem. PS9 due Thur, Dec 1
33.	F	Dec	2	Divergence theorem.
34.	M	Dec	5	Divergence theorem continued: applications and proof. PS10 due Tues, Dec 6
35.	W	Dec	7	Overflow and Review.
36.	F	Dec	9	EXAM 4 covering classes 27-34.
37.	M	Dec	12	Review for final.
38.	W	Dec	14	Review for final.