

## 18.02 Multivariable Calculus — Fall 2008

### COURSE INFORMATION

**Lecturer:**

Denis Auroux, 2-248, ext. 3-4993, [auroux@math.mit.edu](mailto:auroux@math.mit.edu).

Office hours: Tuesdays 2–3, Wednesdays 4–5:30 (to be confirmed).

**Required text:** Edwards and Penney, *Multivariable Calculus*, 6th edition.

Also: *18.02 Supplementary Notes and Problems*, available from the copy center in Bldg. 11.

**Course web page:** <http://math.mit.edu/18.02/>

**Lectures:** 10–250, Tuesday and Thursday 1:00–2:00, Friday 2:00–3:00.

**Recitations:** Monday and Wednesday, times posted on door of 2-108.

Section changes online (course web page). *Recitations start Wednesday September 3.*

**Problem Sets:** Weekly, due on Thursdays at 12:45 in 2-106; returned in recitation. *First unexcused late homework score will be multiplied by 3/4. No subsequent unexcused late homework is accepted. All late homework (excused or not) must include a signed statement certifying that you have not looked at solutions or discussed them with anyone.*

**Homework Rules:** Collaboration on problem sets is encouraged, **but**

a) **Attempt each part of each problem yourself.** Read each portion of the 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.

b) **Write up each problem independently.** On both Part A and B exercises you are expected to write the answer in your own words.

c) **Write on your problem set whom you consulted and the sources you used.** If you fail to do so, you may be charged with plagiarism and subject to serious penalties.

d) **It is illegal to consult materials from previous semesters.**

**Tutoring:** in 2-102, Mon-Tues-Wed-Thurs, 3-5 and 7:30-9:30 pm.

**Exams:** Four in-class 50-minute exams, and one final exam. See Syllabus for dates.

**Make-up Exams:** If you miss or fail an exam, you may take a make-up exam in 2-102 at certain arranged times. You will be notified by e-mail soon after taking an exam if you have failed it, so that you can plan for the make-up. Make-ups for failed exams can boost your grade only up to the lowest passing score (C-), which will be announced. Make-ups for full credit are permitted with a medical excuse. If you must be absent for other reasons, such as team sports, you must arrange to be excused **in advance** in 2-108.

**Grading:** Approximate weighting: problem sets 250, exams 400, final 250.

**Questions:** Concerns about homework, grading, exams: see your recitation instructor. Checking grade records, changing recitations, other: online (course web page), or see 2-108.

## 18.02 Syllabus and Schedule — Fall 2008

### Vectors and Matrices

0.	W	Sept	3	Recitation: Vectors.	
1.	R	Sept	4	Dot product.	
2.	F	Sept	5	Determinants. Cross product.	
3.	T	Sept	9	Matrices, inverse matrices.	
4.	R	Sept	11	Square systems. Equations of planes.	<b>PS 1 due</b>
5.	F	Sept	12	Parametric equations for lines and curves.	
6.	T	Sept	16	Velocity, acceleration. Kepler's Second Law.	
7.	R	Sept	18	Review.	<b>PS 2 due</b>
8.	F	Sept	19	<b>EXAM 1</b> covering lectures 1–7.	

### Partial Derivatives

9.	T	Sept	23	Level curves. Partial derivatives. Tangent plane approximation.	
10.	R	Sept	25	Max-min problems. Least-squares.	<b>PS 3 due</b>
11.	F	Sept	26	Second derivative test; boundaries, infinity.	
12.	T	Sept	30	Differentials. Chain rule.	
13.	R	Oct	2	Gradient, directional derivative, tangent plane.	<b>PS 4 due</b>
14.	F	Oct	3	Lagrange multipliers.	
15.	T	Oct	7	Non-independent variables.	
16.	R	Oct	9	Partial differential equations. Review.	<b>PS 5 due</b>
17.	F	Oct	10	<b>EXAM 2</b> covering lectures 9–16.	

### Double Integrals and Line Integrals in the Plane

18.	T	Oct	14	Double integrals.	
19.	R	Oct	16	Double integrals in polar coordinates. Applications.	<b>PS 6 due</b>
20.	F	Oct	17	Change of variables.	
21.	T	Oct	21	Vector fields and line integrals in the plane.	
22.	R	Oct	23	Path independence and conservative fields.	<b>PS 7 due</b>
23.	F	Oct	24	Gradient fields and potential functions.	
24.	T	Oct	28	Green's theorem.	
25.	R	Oct	30	Flux. Normal form of Green's theorem.	<b>PS 8 due</b>
26.	F	Oct	31	Simply connected regions. Review.	
27.	T	Nov	4	<b>EXAM 3</b> covering lectures 18–26.	

### Triple Integrals and Surface Integrals in 3-space

28.	R	Nov	6	Triple integrals.	<b>PS 9 due</b>
29.	F	Nov	7	Spherical coordinates. Surface area.	
	T	Nov	11	<b>Veterans' Day – no classes</b>	
30.	R	Nov	13	Vector fields in 3D; surface integrals and flux.	<b>PS 10 due</b>
31.	F	Nov	14	Divergence theorem.	
32.	T	Nov	18	Divergence theorem continued: applications and proof.	
33.	R	Nov	20	Line integrals in space, curl, exactness, potentials.	<b>PS 11 due</b>
34.	F	Nov	21	Stokes' theorem.	
35.	T	Nov	25	Stokes' theorem continued. Topological considerations.	
	R,F	Nov	27,28	<b>Thanksgiving holiday – no classes</b>	
36.	T	Dec	2	Maxwell's equations. Review.	
37.	R	Dec	4	<b>EXAM 4</b> covering lectures 28–36.	<b>PS 12 due</b>
38.	F	Dec	5	Final review.	
39.	T	Dec	9	Final review continued. (FINAL EXAM date to be announced)	