Math 53 - Section 2 - Multivariable Calculus - Spring 2016

Denis Auroux - MWF 3-4pm, Room 155 Dwinelle

[Announcements] [Textbook] [Grading policy] [Homework] [Exams] [Syllabus] [Resources] [Sections]

Instructor: Denis Auroux (auroux@math.berkeley.edu)

Office: 817 Evans.
Office hours: Mondays and Tuesdays 10:30-12.

Lectures: Mondays, Wednesdays and Fridays, 3-4pm, 155 Dwinelle
Discussion sections: Mondays, Wednesday and Fridays, at various times. See list.

Section enrollment/changes are performed through TeleBears. Note: Keep in mind that you will get placed on the waitlist if you try to enroll in a discussion section that is full, and won't get off the waitlist until space opens up in that section. Your position on the discussion waitlist is what will determine your ability to get into the class.

Announcements

- (3/6) To make up for my being unable to hold office hours on Tuesday 3/8 and on Monday 3/14, I will exceptionally have office hours this coming Friday 3/11, from 12:30 to 2:30.
- (3/4) (a) No quiz on Monday 3/7. (b) My office hours are cancelled on Tuesday 3/8.
- (3/4) **Midterm 1** has been graded; you can access your graded paper by logging in to Gradescope (you should have received an e-mail from Gradescope this morning). Regrade requests: first check carefully against the solutions and, if needed, talk to your GSI on Monday to figure out why your answer didn't get full credit. If there are still unresolved issues, regrade requests will be accepted via Gradescope from Monday night until Wednesday night.
- (3/2) Midterm solutions are posted here. Grading is under way; when done, your paper will be visible in Gradescope.
- (2/16) (a) My office hours on Tuesday 2/23 will be cancelled -- sorry! (b) Two practice midterms for midterm 1 are available below. I suggest you first review the material, and only attempt the practice midterms, with the indicated time limits, once you feel ready.
- (2/5) The slides shown in today's lecture are here.
- (2/5) My office hours on Monday 2/8 will exceptionally be: 11:30-12:30.
- (2/4) Section 215 has moved from 122 Latimer to 81 Evans Hall, effective 2/5.
- (12/1) Make sure to read the course policy and the detailed syllabus.

Textbook

The textbook for this course is: **Stewart, *Multivariable Calculus: Early Transcendentals for UC Berkeley***, 8th edition (ISBN: 978-1-305-75645-8, Cengage).

This is a custom edition containing chapters 10 and 12-16 of Stewart's "Calculus: Early Transcendentals", 8th edition; the regular edition is also fine. The 6th or 7th editions are also acceptable, but you will need to watch for differences in the numbering of assigned homework problems.

Grading and course policy

Weekly homework and quizzes 25%; two midterms 25% each; final exam 25%; the lowest midterm can be dropped and replaced by the final exam grade. There will be **no make-up exams**. This grading policy allows you to miss one midterm, but check your schedule to make sure you have no conflict for the final exam.

Make sure to read the detailed **course policy** for important information.

Homework

Homework assignments are due each Wednesday in section; they will be posted here.

- Homework 1 (due Wednesday 1/27) and solutions
- Homework 2 (due Wednesday 2/3) and solutions
- Homework 3 (due Wednesday 2/10) and solutions
- Homework 4 (due Wednesday 2/17) and solutions
- Homework 5 (due Wednesday 2/24) and solutions
- Homework 6 (due Wednesday 3/2) and solutions
- Homework 7 (due Wednesday 3/9) and solutions
- Homework 8 (due Wednesday 3/16)
- Homework 9 (due Wednesday 3/30)
- Homework 10 (due Wednesday 4/6)
- Homework 11 (due Wednesday 4/13)
- Homework 12 (due Wednesday 4/20)
- Homework 13 (due Friday 4/29)

Exams

There will be two midterms, on **Wednesday March 2 and Monday April 25 (3-4pm)** in the usual lecture room. The final exam will be on **Wednesday May 11, 7-10pm.**

Practice exams and solutions to midterms will be posted here. Please note: the practice midterms are longer (70-80 minutes) than the actual midterms (50 minutes, during regular class time). I recommend that you first review the material carefully, and only attempt the practice midterms, with the indicated time limits, once you feel ready. Attempting a practice midterm under conditions that closely replicate an actual exam (closed book, no documents, with time limit) is a good way to prepare, but only works if you already know the material.

- Practice midterm 1A and solutions
- Practice midterm 1B and solutions
- Midterm 1 solutions

Midterm 1 score distribution: the quartiles are $48, 61, 76$. (i.e.: 25% of the class got above 76, 25% got between 61 and 76, 25% got between 48 and 61, 25% got below 48). Individual scores and graded papers can be found in Gradescope. A very rough estimate of what this might mean in terms of letter grades: cut-off between A- and B+ = somewhere around 78-80; cut-off between B- and C+ somewhere around 58-60; cut-off between C- and D somewhere around 45.

Remember your lowest midterm score will be dropped and replaced by your final exam score if that one

is better; so, if you are unhappy with how you did, don't despair, but make sure to go over the things you missed, review any concepts that may be giving you trouble, and come regularly to section and to office hours.

Syllabus

Date	Topics	Book
Wed 1/20	Parametric equations	§ 10.1, 10.2
Fri 1/22	Polar coordinates	§ 10.3
Mon 1/25	Polar coordinates continued	§ 10.4
Wed 1/27	Vectors, dot product	§ 12.1, 12.2, 12.3
Fri 1/29	Dot product continued; determinant	§ 12.3
Mon 2/1	Cross product	§ 12.4
Wed 2/3	Equations of lines and planes	§ 12.5
Fri 2/5	Parametric equations and vector functions	§ 13.1
Mon 2/8	Velocity, acceleration	§ 13.2, 13.4
Wed 2/10	Functions of several variables	§ 14.1
Fri 2/12	Partial derivatives	§ 14.2, 14.3
Mon 2/15	NO CLASS (Presidents' Day)	
Wed 2/17	Tangent plane, linear approximation	§ 14.4
Fri 2/19	Chain rule	§ 14.5
Mon 2/22	Gradient, directional derivatives	§ 14.6
Wed 2/24	Max-min problems	§ 14.7
Fri 2/26	Max-min problems continued	§ 14.7
Mon 2/29	Review	
Wed 3/2	*MIDTERM 1*	
Fri 3/4	Lagrange multipliers	§ 14.8
Mon 3/7	Double integrals	§ 15.1, 15.2
Wed 3/9	Double integrals in polar coordinates	§ 15.3
Fri 3/11	Applications of double integrals	§ 15.4
Mon 3/14	Change of variables in double integrals	§ 15.9
Wed 3/16	Triple integrals	§ 15.6
Fri 3/18	Triple integrals in cylindrical coordinates; applications	§ 15.7
3/21-3/25	NO CLASS (Spring Break)	
Mon 3/28	Triple integrals in spherical coordinates	§ 15.8
Wed 3/30	Vector fields	§ 16.1
Fri 4/1	Line integrals	§ 16.2
Mon 4/4	Gradient fields, fundamental theorem for line integrals	§ 16.3

Wed 4/6	Green's theorem	§ 16.4
Fri 4/8	Curl and divergence, Green's theorem revisited	§ 16.5
Mon 4/11	Surface area	§ 16.6
Wed 4/13	Surface integrals and flux	§ 16.7
Fri 4/15	The divergence theorem	§ 16.9
Mon 4/18	More about the divergence theorem	§ 16.9
Wed 4/20	Stokes' theorem	§ 16.8
Fri 4/22	Review	
Mon 4/25	*MIDTERM 2*	
Wed 4/27	Stokes' theorem continued; applications to physics	§ 16.8
Fri 4/29	Review	
Mon 5/2	Optional review (RRR week)	
Wed 5/11	*FINAL EXAM (7-10pm)*	

Additional resources

MIT's OpenCourseWare project has a nice set of video lectures for MIT's multivariable calculus class, taught by a familiar instructor. The overall course topics are roughly the same, but they are covered in a different order and not quite in the same manner, so don't use this as a replacement for attending lectures!

Discussion sections

Section	Time	Room	Instructor	e-mail	Office hours
201	MWF 8-9am	4 Evans	Steven Karp	skarp@berkeley.edu	Tu 1-3 / 775 Evans
202	MWF 8-9am	122 Latimer	Simon Segert	ssegert@berkeley.edu	M & Tu 2-3 / 1058 Evans
203	MWF 9-10am	242 Hearst Gym	Steven Karp	skarp@berkeley.edu	Tu 1-3 / 775 Evans
204	MWF 11-12pm	254 Sutardja Dai	Andrew Hanlon	a.hanlon@berkeley.edu	Tu 12:30-2:30 / 741 Evans, website
205	MWF 10-11am	87 Evans	Andrew Hanlon	a.hanlon@berkeley.edu	Tu 12:30-2:30 / 741 Evans, website
206	MWF 10-11am	85 Evans	Brandon Williams	btwilliams47@berkeley.edu	
207	MWF 11-12pm	247 Cory	Catherine Cannizzo	ckacannizzo@berkeley.edu	Tu 1-3 & F 5-6 / 1056 Evans,

					website
208	MWF 11-12pm	75 Evans	Brandon Williams	btwilliams47@berkeley.edu	
209	MWF 1-2pm	81 Evans	Catherine Cannizzo	ckacannizzo@berkeley.edu	Tu 1-3 & F 5-6 / 1056 Evans, website
210	MWF 1-2pm	71 Evans	Simon Segert	ssegert@berkeley.edu	M & Tu 2-3 / 1058 Evans
211	MWF 2-3pm	210 Wheeler	Michael Lindsey	lindsey@berkeley.edu	
212	MWF 2-3pm	109 Wheeler	Jeffrey Hicks	jeff.hicks@math.berkeley.edu	
213	MWF 1-2pm	200 Wheeler	Jeffrey Hicks	jeff.hicks@math.berkeley.edu	
214	MWF 1-2pm	20 Wheeler	Calvin McPhail-Snyder	cmcphailsnyder@berkeley.edu	Tu 3:30-5 & Wed 2-3 / 826 Evans, website
215	MWF 4-5pm	81 Evans	Calvin McPhail-Snyder	cmcphailsnyder@berkeley.edu	Tu 3:30-5 & Wed 2-3 / 826 Evans, website
216	MWF 4-5pm	106 Wheeler	Michael Lindsey	lindsey@berkeley.edu	