MATH 2220 SYLLABUS AND COURSE INFORMATION 2008

Note: some of the information in this document has not yet been finalized.

General information

Instructor: Dr. Richard Vale, Malott Hall 583.

`rvale@math.cornell.edu`

Lecture 1: MWF 0905-0955 in BKL (Baker Laboratory) G08.

Lecture 2: MWF 1115-1205 in WRN (Warren Hall) 260.

The content of the two lectures is exactly the same.

TA: Nikolai Dimitrov.

`dimitrov@math.cornell.edu`

Section 1: Monday 1325-1415 in Rockefeller 112.

Section 2: Monday 1430-1520 in Rockefeller 110.

Note: there will be no Sections on Monday September 1.

The course webpage is accessible from the Cornell Mathematics Department website and is located at:

http://www.math.cornell.edu/˜rvale/math2220.html

Scope We intend to cover the textbook

Marsden & Tromba, *Vector Calculus* (5th ed.), W. H. Freeman, 2003 (ISBN: 0-7167-4992-0)

Homework will be taken from the textbook, so you need to have access to a copy. Optionally, there is also a study guide by Pao and Soon, ISBN 0-7167-0528-1.

Office hours

- Vale: Tuesday 1400-1600.
- Dimitrov: TBA.

If you are unable to attend office hours, please make an appointment by email.

Lecture plan This course is the fourth semester of a four-semester calculus sequence. The course covers calculus of functions of several variables, making use of linear algebra. The proofs in this subject tend to more difficult than in linear algebra, so we will often give explanations without complete proofs.

We may not follow this plan exactly but it gives a rough idea of what will be taught when.

- Week -1: You should already have taken a course in linear algebra. In particular, you should know how to multiply matrices and how to compute 2×2 and 3×3 determinants.
- Week 0: (29 August) Course introduction, vectors, inner product. Sections 1.1, 1.2.
- Week 1: (1 Sept) Cross products, planes and lines. Level sets. Sketching surfaces. Sections 1.3, 2.1.
- Week 2: (8 Sept) Limits and continuity, the derivative. Tangent planes. Sections 2.2, 2.3, 2.5.
- Week 3: (15 Sept) Chain rule, directional derivatives, gradient. Sections 2.5, 2.6.
- Week 4: (22 Sept) Taylor series. Extrema. Lagrange multipliers. 3.1, 3.2, 3.3, 3.4.
- Week 5: (29 Sept) Review for prelim. **Prelim 1 30 Sept.** Inverse and implicit function theorems. 3.5.
- Week 6: (6 Oct) Double integrals. 5.1, 5.2, 5.3, 5.4.
- Week 7: (13 Oct) Fall Break, 13 and 14 Oct (a whole *two days!* How generous.) Triple integrals. 5.4, 5.5.
- Week 8: (20 Oct) More triple integrals. Change of variable. 1.4, 6.1, 6.2, 6.3.
- Week 9: (27 Oct) Review for prelim. **Prelim 2 30 Oct.** Vector fields. Line and path integrals. Arc length. 4.3, 7.1, 7.2, 4.2.
- Week 10: (3 Nov) Area and surface integrals. 7.3, 7.4, 7.5, 7.6.
- Week 11: (10 Nov) Area and surface integrals continued. Grad, div and curl. 7.5, 7.6, 4.4.
- Week 12: (17 Nov) Green's and Stokes' Theorem. 8.1, 8.2.
- Week 13: (24 Nov) Conservative fields. Gausses Theorem. 8.3, 8.4. No Friday lecture.
- Week 14: (1 Dec) Gausses Theorem. Review. 8.4.

Coursework There will be a weekly homework assignment due on Wednesday in class. To earn full credit, your reasoning must be correct and your proofs presented in a clear and rigorous manner. *Homework which is late for any reason will not be accepted.*

Exams and grading

There are two **evening** prelims and a final.

Prelim 1: 30 September 1930-2100.

Prelim 2: 30 October 1930-2100.

Final exam: 15 December 1900-2130 (room to be assigned in early November).

The course grade will be made up of the grades for the prelims, final exam and homework roughly as follows:

- Homework 20 %
- Prelim 1 20 %
- Prelim 2 20 %
- Final 40 %

There may also be occasional quizzes during class. Active participation in class may be taken into account when determining your final grade.

Academic integrity You are encouraged to discuss the theory and problems from the course with your classmates. However, directly copying from other students is not allowed. You are obliged to abide by the Code of Academic Integrity.

Help and feedback I encourage you to approach me or the TA if anything is unclear. Questions affecting a sizeable part of the class will be discussed in the lectures. I will welcome any feedback you have about our teaching or any concerns about the course. If there is anything that you feel can be improved (eg. the lecturer is standing in front of the blackboard and it is hard to take notes) it is much better to discuss it during the course than to wait until the end!