

Math 4023, Introduction to Modern Analysis
Course Information

Dr. L. Mantini
Summer 2010

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Course Times: MTWR 10:30–11:45 AM in MSCS 422.

Problem Sessions: An optional homework discussion session will be held Mondays and Wednesdays, MW 12:00–12:30 pm (or later) in MS 422.

Office Hours: MTW 1:30 – 2:30 PM in MS 410; other times are available by appointment.

Course Objectives: The aim of this course is to revisit our study of calculus from a theoretical viewpoint. Many of the definitions and proofs we will study became necessary because mathematicians discovered that, without rigorous definitions and careful proofs, numerous paradoxes and contradictions arose! Our goals are to

- develop a rigorous understanding of convergence, continuity, derivatives, and integrals, to complement the intuition that you gained in your prior courses;
- refine and improve your ability to read and write mathematical proofs and to develop a feeling for why they are so essential in mathematics.

Prerequisites: The prerequisites for this course are Calculus I, II, and III (OSU's MATH 2144, 2153, and 2163) and Introduction to Modern Algebra (MATH 3613) or another course in which you have learned to read and write proofs. Anyone without prior experience in the reading and writing of proofs should speak to me after class.

Text: The text is *Analysis: With an Introduction to Proof*, fourth edition, by Steven R. Lay. For those with little experience in techniques of proof, I recommend the text *How to Prove It: A Structured Approach* by Daniel Velleman as a supplement.

Course Requirements: The requirements for this course are as follows:

- Three exams worth 150 points each, scheduled for 10:30 – 11:45 PM on
 - Monday, June 28;
 - Wednesday, July 14;
 - Thursday, July 29.
- Homework totalling 150 points, collected mostly on Tuesdays and Thursdays. Each assignment is worth 15 points, and your best 10 scores will determine your homework grade.
- Occasional bonus points may be available from attendance or pop quizzes or other assignments. Bonus points cannot be made up.

Grading: The maximum total points for the course are 600. Preliminary cutoffs for the final course grade are listed below.

- 540 points (90%) guarantees an A in the course
- 480 points (80%) guarantees a B
- 420 points (70%) guarantees a C
- 360 points (60%) guarantees a D

Homework: Homework is assigned from every text section we cover. It is collected on Tuesdays and Thursdays, selected problems will be graded, and the assignment returned as soon as possible. Solutions to all problems on the assignment will be posted on our course's D2L page. Of the 12 assignments, your top 10 scores will determine your homework grade. No late homework will be accepted. Homework rules:

- Leave homework on a pile on the table as you enter class on the day it is due;
- Prepare your homework on 8.5" by 11" sheets which are **stapled** and with **no ragged edges**.
- Label each problem with the *complete* problem number, written as 11.5 for problem 5 from section 11, in the **left margin**.
- Write clearly in full, grammatically correct English sentences. Partial credit is not guaranteed.

Makeup exams: Makeup exams will be given only for very serious and unavoidable extenuating circumstances and **only** if you notify me before or as soon as possible after the missed exam.

Drop Policy: The last day to drop the course with a partial fee refund is Friday, June 11. The last day to drop the course with an automatic grade of W is Friday, July 16. Your first two exams will be returned before this date. The last day to withdraw from all classes with an assigned grade of W or F is Friday, July 23.

Attendance Policy: Bonus points may occasionally be awarded for attending class. Attendance is not otherwise a part of your course grade, but it is **very highly recommended**. You are responsible for all material covered in class and all assignments. There is a strong correlation between poor class attendance and low grades.

Academic Integrity: Oklahoma State University is committed to the maintenance of the highest standards of integrity and ethical conduct of its members. This level of ethical behavior and integrity will be maintained in this course. Participating in a behavior that violates academic integrity will result in your being sanctioned. These behaviors include, but are not limited to unauthorized collaboration or plagiarism; unauthorized advance access to examinations, cheating on examinations, or helping another person cheat; altering or destroying the work of others or fraudulently altering academic records. Violations may subject you to disciplinary action including the following: receiving a failing grade on an assignment, examination or course, receiving a notation of a violation of academic integrity on your transcript (F!), and being suspended from the University. Carefully read the OSU policy at academicintegrity.okstate.edu.

With regard to the homework in this course, you should note that I encourage the formation of study groups and the discussion of homework solutions. However, you must write up your homework solutions *yourself*. The following are not permitted:

- Showing your written homework solutions to another student;
- Reading another student's written homework solutions;
- Writing a solution to a homework problem jointly with another student and then both students copying that solution onto their own papers;
- Reading homework solutions written by faculty or students in other semesters and/or at other universities, including such solutions posted on the internet or in the instructor's manual.

Study Hints: This course is difficult but students all over the country succeed in this course every semester, and you can too. Here are some helpful resources:

- The textbook: *read it!*, before class if necessary. The examples, practice problems, and hints for the homework might be particularly useful.
- My posted homework solutions on our D2L page: I may not grade all problems on every assignment, so you should read my solutions to check your work and to learn what I had in mind for each solution.
- Other students in the class: consider forming or joining a study group. The sense of support is very helpful, but it can also be very instructive to hear ideas on the subject from several different points of view.
- Your time management skills: Keep up with the class and do not fall behind, especially during the summer. Give your brain a chance to have those *aha!* moments by working on the course frequently, keeping the ideas fresh in your mind.
- Your instructor: you'd be surprised how few students attend office hours.
- The MLRC: one of our tutors will help with this course. We will announce his hours during the first week of class.

Calendar: The following is a tentative calendar for our course.

Week of	Monday	Tuesday	Wednesday	Thursday
June 7	Sec. 1–2	Sec. 2–3	Sec. 3–4	Sec. 4–5 [PS1]
June 14	Sec. 6	Sec. 7 [PS2]	Sec. 7	Sec. 10 [PS3]
June 21	Sec. 8	Sec. 8 [PS4]	Sec. 11	Sec. 12/Review
June 28	EXAM 1	Sec. 12–13 [PS5]	Sec. 13–14	Sec. 14–16 [PS6]
July 5	HOLIDAY	Sec. 16 [PS7]	Sec. 17	Sec. 18 [PS8]
July 12	Sec. 20	Review	EXAM 2	Sec. 21 [PS9]
July 19	Sec. 22	Sec. 25 [PS10]	Sec. 26	Sec. 29 [PS11]
July 26	Sec. 29	Review [PS12]	Review	FINAL EXAM

Math 4023 Homework List, Summer 2010: Remember to read the examples in the text, do the practice problems in the text, and answer the true-false questions at the beginning of each section. Problems marked with an asterisk are important enough that they are used later in the text; problems marked with a star have hints or answers in the back of the text.

Prob. Set	Due Date	Sections	Problems assigned
1	6/10	1 2 3	4 c–e, 6, 8, 10 d–h, 12 4, 6 a–c, 8, 10 a–d, 14, 15, 16 3, 4, 6 b, d, g, i, k; 10
2	6/15	3 4 5	7 c–f, 8 4, 10, 11, 16, 18, 19, 22 4, 5, 6, 10, 15, 23, 25
3	6/17	6 7	8, 10, 11, 14, 18, 19 3, 5, 6, 7 (give proof for (b)), 9, 10
4	6/22	7 10	11, 13, 14, 15 a–b, 16 a–b, 19, 22, 26, 30 4, 6, 15, 17, 21
Exam 1	6/28	covers problem sets 1–4	
5	6/29	8	3, 4, 5, 6, 9, 10, 11, 16, 17, 22
6	7/1	11 12	3 b–d, 4, 6, 7, 11 3 (2nd col), 4 (2nd col), 5, 8, 9, 10, 12
7	7/6	13 14	3, 4, 5, 6, 11, 14, 20 a–b, 21 c–e 3, 4, 5, 8, 9
8	7/8	16	3, 6, 7 c–e, 8 a–b, 9, 10, 12, 15
Exam 2	7/14	covers problem sets 5–8	
9	7/15	17 18	3, 4; 5b, d, f; 6, 7, 15, 18 3 b–d, 4, 10
10	7/20	20 21	3 d–h, 6, 7, 9, 16 3, 4, 8, 9
11	7/22	22 25	3 a–b, e–g; 5, 9, 14a 4, 6, 7a, b, d; 9
12	7/27	26 29	4, 5a, c, f; 6, 8b, 9, 17 4, 6, 7, 10, 12
Final Exam	7/29	comprehensive, emphasizes problem sets 9–12	