

Mathematics 430 – Advanced Calculus I – SPRING 2007

HERE IS [TEST 1](#). You have an opportunity to raise your grade by submitting a complete solution by **Wednesday, Feb 28**.

Prerequisites: Math 232 and Math 240, or Math 334

Textbook: Introduction to Analysis, 5th edition, by Edward D. Gaughan, Brooks/Cole Publishing Company (1998)

Syllabus: The course content is contained in Chapters 0 through 5. Detailed projected syllabus is below.

Instructor information: Dr. ILYA KRISHTAL; office is Watson 371;
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office hours are: M 2:30 – 4:00, R 12:00 – 1:00.

Grading System: Grades will be based on the accumulation of points out of 700 possible, of which 200 points are for homework, 300 points are for the three one-hour examinations, and 200 points are for the final examination. As a guideline, students should expect to attain 85% of the points for an A; 75% for a B; 60% for a C; and 50% for a D.

Projected dates for exams are Feb. 16, Mar. 9, and Apr. 20. These are most likely to be adjusted depending on the pace of the class.

The information of the final examination will be posted as soon as it is available. I will maintain the webpage for the course.

Homework due dates will vary from week to week. Often I will try to correct all of the assignments but give out grades only based on certain parts of it.

Course objectives:

1. To enable the student to develop a basic understanding of certain new (to the student) mathematical concepts and to enhance the understanding of concepts previously encountered.
2. To develop further the student's idea of what constitutes proof, and to enhance the understanding of the need for precise language.
3. To enable the student to develop further the ability to read mathematics individually.
4. To enable the student to understand better how mathematicians think and develop their ideas.

Advice: DO NOT LAG BEHIND. The course is very intense and you may find it impossible to catch up.

Homework: Follow the [link](#) for up-to-date assignments.

PROJECTED SYLLABUS

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| Week 1 | Chapter 0 | Sets, set theoretic operations, functions, induction |
| Week 2 | Chapter 0 | The field of real numbers: axioms and properties |
| Week 3 | Chapter 1 | Sequences, limits of sequences, algebra of limits |
| Week 4 | Chapter 1 | Convergence of Cauchy sequences, monotone sequences |
| Week 5 | Chapter 1 Chapter 2 | Examples, Review, Test 1 Functions, limits of functions |
| Week 6 | Chapter 2 | Limits of functions vs. limits of sequences, algebra of limits |
| Week 7 | Chapter 2 | Limits of monotone functions, examples |
| Week 8 | Chapter 3 | Continuity at a point, algebra of continuous functions |
| Week 9 | Chapter 3 | Uniform continuity, topology, Test 2 |
| Week 10 | Chapter 3 | Bolzano, Heine-Borel, Intermediate Value theorems |
| Week 11 | Chapter 4 | Differentiation, algebra of derivatives |
| Week 12 | Chapter 4 | Mean value theorem, L'Hospital rule |
| Week 13 | Chapter 4 | Inverse Function theorem, Review, Test 3 |
| Week 14 | Chapter 5 | Riemann sums, integral, integrable functions |
| Week 15 | Chapter 5 | FTC, Final review. |