Texas Tech University, Department of Mathematics and Statistics
MATH 4350, ADVANCED CALCULUS
COURSE SYLLABUS, Spring 2014
Section #001 (CRN: 44578)

Instructor

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Weekly meeting

TR 02:00pm-03:20pm, room Math 114

Textbook

Introduction to Real Analysis - 3rd edition, by R.G. Bartle and D.R. Sherbert, Wiley. Chapters 1 - 6, and Appendix B.

Expected Student Learning Outcomes

Students learn how to think and reason abstractly in the context of analysis of the real line, and learn how to write correct and clear mathematical arguments in this context. There will be a heavy emphasis on proofs, especially epsilon-delta proofs. Concepts and skills to be mastered by the students include but are not limited to: suprema, infima, limits of sequences, limits of functions, continuous functions, derivatives of functions on the line.

Course outline

Preliminaries (Chap. 1) [$\sim$3 days]
    (1.1) Sets and Functions (1.2) Mathematical Induction (1.3) Finite and Infinite Sets (Appendix B) Finite and Countable Sets
The Real Numbers (Chap. 2) [$\sim$7 days]
    (2.1) The Algebraic and Order Properties of $\mathbb{R}$ (2.2) Absolute Value and Real Line (2.3) The Completeness Property of $\mathbb{R}$ (2.4) Applications of the Supremum Property (2.5) Intervals
Sequences and Series (Chap. 3) [$\sim$10 days]
    (3.1) Sequences and Their Limits (3.2) Limit Theorems (3.3) Monotone Sequences (3.4) Subsequences and the Bolzano-Weierstrass Theorem (3.5) The Cauchy Criterion (3.6) Properly Divergent Sequences (3.7) Introduction to Infinite Series
Limits (Chap. 4) [$\sim$5 days]
    (4.1) Limits of Functions (4.2) Limit Theorems (4.3) Some Extensions of the Limit Concept
Continuous Functions (Chap. 5) [$\sim$8 days]
    (5.1) Continuous Functions (5.2) Combinations of Continuous Functions (5.3) Continuous Functions on Intervals (5.4) Uniform Continuity (5.6) Monotone and Inverse Functions
Differentiation (Chap. 6) [$\sim$4 days]
    (6.1) The Derivative (6.2) The Mean Value Theorem

Assessment of Learning Outcomes

Homework

It will be assigned on a regular basis. It must be completed before the given deadline. Many of the homework problems will be discussed in class at a later time. Homework is worth **25%** of the final grade.

Examinations

- Exam #1: **Tuesday, February 18**, worth **20%** of the final grade
- Exam #2: **Thursday, March 27**, worth **20%** of the final grade
- Exam #3: **Tuesday, April 29**, worth **20%** of the final grade
- Final Exam: **Friday, May 9, 4:30pm-7:00pm, room Math 114**, worth **20%** of the final grade

Use of calculators in all the exams is not permitted. Electronic devices which can store formulas, including cell phones, must be turned off and stored during the exams. The instructor will specify what sections must be studied for each exam.

Grading Policy

Let g be the grade in percent: $g < 55$ F, $55 \leq g < 66$ D, $66 \leq g < 76$ C, $76 \leq g < 88$ B, $88 \leq g < 100$ A, $g \geq 100$ A+

The grading policy may be subject to slight adjustments depending on the achievements of the students.

Make-ups

There are usually no make-ups for the examinations, except for reasons of illness, stated in writing by a medical doctor, or observance of a religious holiday, or other very reasonable motivations.

Attendance and Class Policies

Attendance is mandatory. Students with up to 4 missed classes for the entire semester will receive an additional bonus of **3%** on the final grade. If students miss a class, it is their responsibility to find out what they missed (announcements, assignments, notes ...). Also, it is their responsibility to frequently check their e-mail for announcements made by the instructor. Students are strongly encouraged to read each section of the textbook in advance of the lecture.

Classes start and end always on time. Students are not allowed to leave the class before the end of the hour without authorization. During class time it is not allowed to text, chat and sleep. All electronic devices must be put in silent mode.

TTU Operating Policies

Americans with Disabilities Act (TTU OP 34.22)

Any student who, because of a disability, may require some special arrangements in order to meet course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services, during the instructor's office hours. Please note instructors are not allowed to provide classroom accommodations to student until appropriate verification from Student Disability Services has been provided. For additional information, you may contact the Student Disability Services office at 335 West Hall or 806-742-2405.

Absence for observance of a religious holy day (TTU OP 34.19)

1. "Religious holy day" means a holy day observed by a religion whose places of worship are exempt from property taxation under Texas Tax Code 11.20. 2. A student who intends to observe a religious holy day should make that intention known to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence. 3. A student who is excused under Section 2 may not be penalized for the absence; however, the instructor may respond appropriately if the student fails to complete the assignment satisfactorily.

Academic Honesty (TTU OP 34.12)

It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension. "Scholastic dishonesty" includes, but it not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor) or the attempt to commit such an act.

The grade of "I" (TTU OP 34.12)

The grade of "I" is given only when a student's work is satisfactory but, due to reasons beyond his or her control, cannot not be completed. It is not given in lieu of an "F" or "W". The instructor assigning the grade will stipulate in writing at the time the grade is given the conditions under which the "I" may be removed. The assigned work and a change of grade must be recorded within one calendar year from the date of the "I". Failure to do so results in an "F" for that course.