

**Math 6310: Introduction to Real Analysis I**  
**Fall 2013**

**Class meetings:** MWF 10:00-10:50 p.m. in ECCR 131

**Instructor:**

Dr. Judith Packer  
MATH 227  
492-6979  
packer@colorado.edu  
<http://spot.colorado.edu/~packer/6310.html>

**Office hours:** MWF, 3:00 p.m. - 4:00 p.m., or by appointment

**Prerequisites:** Math 3001 and 4001 (Analysis I and Analysis II), or the equivalent

**Text:** *Real Analysis*, H.L. Royden, P.M. Fitzpatrick, Prentice Hall, 2010, 4th edition. We will cover most of Chapters 2–7, and more if time permits.

**Course outline:** This course is meant to familiarize the student with the analysis of functions of a single real variable, with an emphasis on Lebesgue measure and Lebesgue integration on the real line, together with their relationship to differentiation. Topics to be covered include: the historical development of the Lebesgue integral, a review of set theory, the structure of open sets and Borel sets on the real line, Lebesgue outer measure on  $\mathbb{R}$ , Lebesgue measurable subsets of  $\mathbb{R}$ , Lebesgue measurable extended real-valued functions, definition of the Lebesgue integral, convergence theorems in Lebesgue integration, functions defined by integrals and convolution, differentiation of monotone functions, functions of bounded variation, absolute continuity, review of metric space theory,  $L^p$  spaces, the Arzela-Ascoli Theorem, and if time permits, the Stone-Weierstrass Theorem.

**Grading:** Grades will be based on two in-class midterms (20% each), six homework assignments assigned during the course of the semester consisting mostly of problems from the text (25%), and a comprehensive final exam (35%). The last homework assignment will be a group project. You are encouraged to work together on homework, although each student must submit an individual write-up. Late homework will not be accepted.

**Test and exam dates:**

Midterm 1: Wednesday, October 2, in class

Midterm 2: Wednesday, November 6, in class

FINAL EXAM: Monday, December 16, 4:30 p.m. – 7:00 p.m. in class.

THERE WILL BE NO MAKE-UP EXAMS, so make sure now that you have no conflicts!

### Friendly advice:

- **Come to class.** Things will often be said in class that are not covered in the text, and participating in classroom discussions is an important part of the learning process.
- **Read the book.** The text is intended to be read *in addition to* classroom lectures, and it contains many more details and examples than are possible to cover in lectures.
- **Do the homework.** Not only does it count for a significant portion of your grade, but this is one of the best ways to study and learn.
- **Come to office hours.** I am happy to help you with the homework, or discuss anything we've done in class.

### Other important Dates:

- **September 11 (Wed.):** Last day to drop a course without the instructor's signature, and without being assessed tuition and fees for that course and having a W appear on the transcript for that course.
- **November 1 (Wed.):** Last day to drop a course without approval signatures via MyCUInfo.

**Accommodations for disabilities:** If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services in a timely manner so that your needs be addressed. Disability Services determines accommodations based on documented disabilities. Contact: 303-492-8671, Center for Community N200; their web page address is

<http://www.Colorado.EDU/disabilityservices>

If you have a temporary medical condition or injury, see guidelines at

<http://www.colorado.edu/disabilityservices/go.cgi?select=temporary.html>

**Religious observances:** Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, assignments will either be rescheduled or dropped from grading calculations depending on the nature of the conflict. If you have a conflict, please advise me as soon as possible so that arrangements can be made. See full details at [http://www.colorado.edu/policies/fac\\_relig.html](http://www.colorado.edu/policies/fac_relig.html)

### Miscellaneous University Rules & Regulations:

- **Honor Code:** All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council ([honor@colorado.edu](mailto:honor@colorado.edu); 303-725-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Additional information on the Honor Code can be found at <http://www.colorado.edu/policies/honor.html>  
<http://www.colorado.edu/academics/honorcode/>
- **Classroom behavior policy:** Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards

may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See policies at

<http://www.colorado.edu/policies/classbehavior.html>

[http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student\\_code](http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code)

- **Sexual harassment policy:** The University of Colorado at Boulder policy on Discrimination and Harassment, the University of Colorado policy on Sexual Harassment and the University of Colorado policy on Amorous Relationships apply to all students, staff and faculty. Any student, staff or faculty member who believes s/he has been the subject of discrimination or harassment based upon race, color, national origin, sex, age, disability, religion, sexual orientation, or veteran status should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Judicial Affairs at 303-492-5550. Information about the ODH, the above referenced policies and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at <http://www.colorado.edu/odh>