

**Math 6320: Real Analysis 2**  
**Spring 2020**

**Class meetings:** MWF 1:00 p.m.-1:50 p.m. in KCEN N252.

**Instructor:**

Dr. Judith Packer  
MATH 227  
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<http://math.colorado.edu/~packer/206320.html>

**Office hours:** MWF 11 a.m.-12 noon, or by appointment

**Prerequisites:** Math 6310 (Introduction to Real Analysis 1), or instructor consent.

**Text:** “*Real Analysis*”, 4<sup>th</sup> edition, by H.L. Royden and Patrick Fitzpatrick, Pearson, 2010. We will cover much of Chapters 10, 12, 16, 17, 18, 19, and 20 of the textbook. Another useful reference is the text “*Real Analysis, an Introduction*”, by G. Folland, 2<sup>nd</sup> edition, John Wiley and Sons, 1999.

**Course outline:** The material to be covered includes: a brief review of locally compact Hausdorff topological spaces, the Stone–Weierstrass Theorem, the Arzela–Ascoli Theorem; Elements of functional analysis, including normed vector spaces, linear functionals, the Baire Category Theorem; Measure and integration: general theory, signed measures - the Hahn and Jordan decomposition theorem, outer measures and Caratheodory’s extension theorem, the Radon-Nikodym Theorem; General  $L^p$  spaces and duality; Product measures, the Fubini and Tonelli Theorems, cumulative distribution theorems and Borel measures on  $\mathbb{R}$ ; Radon measures: positive linear functionals on  $C_0(X)$  and the Riesz representation theorems, regularity of measures, the dual of  $C_0(X)$ ; Elements of Fourier analysis: convolutions, the Fourier transform, summation of Fourier integrals and series and applications of Hilbert space theory, pointwise convergence of Fourier series, Fourier analysis of measures.

**Assessment and Grading:** Grades will be based on one in-class midterm (20 %), one take-home midterm (20 %), five or six homework assignments assigned during the course of the semester consisting mostly of problems from the text (30%), and a comprehensive final exam (30%). 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: Friday, February 21, 2020, in class.
- Midterm 2: Monday, March 30, 2020 – Monday, April 6, 2020, takehome.
- Final Exam: Monday May 4, 2020, 4:30 p.m. - 7 p.m., in class.

### **Important Dates:**

- **January 29, 2020 (Wed.):** Last day to drop a course without Tuition/Fee charges and without a “W” appearing on your transcript.
- **March 20, 2020 (Fri.):** Last day to drop a course via MyCUInfo; Last day for students to make arrangements with their instructor if they have three or more final exams on the same day or two final exams scheduled to meet at the same time.
- **April 30, 2020 (Thurs.), 11:59 p.m.:** Last day for students to withdraw from the university for Spring semester. All withdrawals are assessed 100% of tuition and fees (\$0 refund) and “W” grades are posted to transcripts.

**Accommodations for disabilities:** If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the Disability Services website, <http://disabilityservices.colorado.edu/>. Contact Disability Services at 303-492-8671 or [dsinfo@colorado.edu](mailto:dsinfo@colorado.edu) for further assistance.

If you have a temporary medical condition or injury, see Temporary Medical Conditions under the Students tab on the Disability Services website (<http://disabilityservices.colorado.edu/>).

**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 <https://www.colorado.edu/policies/observance-religious-holidays-absences-classes-or-exams>.

### **Miscellaneous University Rules & Regulations:**

- **Honor Code:** All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code ([honor@colorado.edu](mailto:honor@colorado.edu)); 303-492-5550). Students found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the Honor Code Office website at <https://www.colorado.edu/sccr/honor-code>.

- **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 race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. For more information, see the policies on classroom behavior and the Student Code of Conduct (check website <https://www.colorado.edu/sccr/>). CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is 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. For more information, see the policies on classroom behavior and the Student Code of Conduct. See policies at <http://www.colorado.edu/policies/classbehavior.html> .
- **Statement on Discrimination and Harrassment:** The University of Colorado Boulder (CU Boulder) is committed to fostering a positive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct, intimate partner abuse (including dating or domestic violence), stalking, or protected-class discrimination or harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or [cureport@colorado.edu](mailto:cureport@colorado.edu). Information about the OIEC, university policies, anonymous reporting, and the campus resources can be found on the OIEC website, <http://www.colorado.edu/odece/>.

Please know that faculty and instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.