

Math 8370: Harmonic Analysis 1
Spring 2018

Class meetings: MWF 10:00-10:50 a.m. in ECCR 118

Instructor:

Dr. Judith Packer
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Office hours: MWF, 2:00 p.m. - 3:00 p.m., or by appointment

Prerequisites: Math 6320 (Introduction to Real Analysis 2), or instructor consent.

Text: *A First Course in Harmonic Analysis*, Anton Deitmar, Springer Verlag, 2005, second edition. This book is available in electronic form from the CU library.

Course outline: The material to be covered includes all of Chapters 1, 2 and 3 of the Deitmar book and much of Chapters 6, 7, 10 or 11, depending on student interest. Topics to be covered include: A review of periodic functions on \mathbb{R} relating them to functions on the unit circle \mathbb{T} , trigonometric polynomials and Fourier series on the circle, including convergence problems for Fourier series on \mathbb{T} , including convergence in L^1 and L^2 ; mean, pointwise and absolute convergence. Convolution in $L^1(\mathbb{T})$. The Fourier Transform in $L^1(\mathbb{R})$: convolution in $L^1(\mathbb{R})$, approximate identities and the Poisson summation formula. The Fourier transform in $L^2(\mathbb{R})$, inversion and the Plancherel Theorem; the Poisson Summation formula. Depending on student interest we might cover one or more of the following topics: Fourier analysis on locally compact abelian groups and Pontryagin duality; representation theory for the matrix group $SU(2)$, and/or representation theory for the Heisenberg group.

Assessment and Grading: Grades will be based on homework, assigned every two to three weeks or so (65 %), and on a final project on some topic related to harmonic analysis, due in early May (35%). Each student will write a short paper and give an oral presentation based on their project, so please reserve the exam period for our course, Sunday, May 6, 1:30 p.m.-4 p.m. for presentations (both giving them and listening to them). You are encouraged to work together on homework, although each student must submit an individual write-up. Late homework will not be accepted.

Important Dates:

- **January 31 (Wed.):** Last day to drop a course without Tuition/Fee charges and without a “W” appearing on your transcript.
- **March 23 (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.
- **May 3 (Fri.), 5 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 to me a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail at dsinfo@colorado.edu.

If you have a temporary medical condition or injury, see Temporary Injuries under Quick Links at Disability Services website (<http://disabilityservices.colorado.edu/>) and discuss your needs with your professor.

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

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; 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, color, culture, religion, creed, politics, veterans status, sexual orientation, gender, gender identity and gender expression, age, disability, 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. For more information, see the policies on classroom behavior and the student code.
- **Statement on Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation:** The University of Colorado Boulder (CU Boulder) is committed to maintaining a positive learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct, discrimination, harassment or related retaliation against or by any employee or student. CU's Sexual Misconduct Policy prohibits sexual assault, sexual exploitation, sexual harassment, intimate partner abuse (dating or domestic violence), stalking or related retaliation. CU Boulder's Discrimination and Harassment Policy prohibits discrimination, harassment or related retaliation based on race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Individuals who believe they have been subject to misconduct under either policy should contact the Office of Institutional Equity

and Compliance (OIEC) at 303-492-2127. Information about the OIEC, the above referenced policies, and the campus resources available to assist individuals regarding sexual misconduct, discrimination, harassment or related retaliation can be found at the OIEC website (<http://www.colorado.edu/institutionalequity/>).