

Course Title: Harmonic Analysis

Course and Section Number, Semester: MATH 634, 0101, Fall 2023

Instructor: Radu Balan

Lectures: Tuesday, Thursday, 11:00am-12:15pm, in EGR 1102

Office Hours: Thursdays 1:00pm-2:00pm, in MATH 2308.

Contact Information: Email rvbalan@umd.edu

MATH 634 Harmonic Analysis is the graduate level course in mathematics that continuous MATH 630 Real Analysis I, MATH 631 Real Analysis II and MATH 632 Functional Analysis. Topics include some of the following: Fourier series and Fourier transform: L^1 theory: Dirichlet and Fejer theorems, inversion theorem L^2 theory: Plancherel-Parseval theorems, Paley-Wiener theorem. L^p theory: Hausdorff-Young theorem. Distribution theory - Schwartz theory, almost periodic functions. Square integrable group representations: Windowed Fourier transforms and Wavelets; Gabor frames; Wavelet frames/ONB.

Prerequisite: MATH 630

Recommended Textbooks:

1. Harmonic Analysis, B. Simon (vol. 3 of the 5-volume set)
2. Harmonic Analysis and Applications, J. Benedetto
3. Fourier Analysis, Stein and Shakarchi (one volume from the set of 4 books).
4. A First Course in Fourier Analysis, Kammler

Grading. There will be one mid-term exam (100 points), homework assignments (for a total of 100 points), and a final exam (200 points - cumulative).

The point cutoffs for final grades will be no higher than: 90% for a grade of A- , 80% for a grade of B- ; 70% for a grade of C- ; 60% for a grade of D- .

Homeworks. Homework must be submitted on the date assigned as due date. Homework must be prepared without consulting any other person. You may however consult any written reference. In this case you should cite the reference. Results taken from the reference should be (re)stated to the notation used in the course. Explanations should be given in complete English sentences. Written work must be legible and clear.

Expectations for Students. Course Schedule. Homework due dates, exam dates, and a list of lectures are maintained on ELMS and/or

<https://www.math.umd.edu/~rvbalan/TEACHING/MATH634Fall2023/index.html>

Students are expected to submit homeworks on time and take exams as scheduled.

Academic Integrity. You are expected to adhere to the University's Code of Academic Integrity, available online at: <https://faculty.umd.edu/main/activity/teaching-policies-guidelines#integrity>

Students with Disabilities: If you have a documented disability and wish to discuss academic accommodation with me, please contact me as soon as possible.

08/29/2023

Religious Observances. If you will be absent from class because of religious observances, please submit a list of the dates of your absences within a couple of days.