PMATH 450/650 Lebesgue Integration and Fourier Analysis, Fall 2023

Lectures: time and place TBA.

Instructor: Stephen New, office MC 5419, extension 35554, office hours TBA.

Website: Course materials can be found at https://www.math.uwaterloo.ca/∼snew.

Text: Real Analysis, by A.Bruckner, J.Bruckner and B.Thomson, can be purchased in paperback form, or downloaded free in pdf form, at http://ClassicalRealAnalysis.info

Course Outline: We will cover the following material from the textbook

Sections 1.1–1.4. 1.6–1.12, 1.15–1.20: Preview of Integration
Sections 2.1, 2.8, 2.10: Lebesgue Measure
Sections 4.1, 4.2, 5.1–5.4: Lebesgue Measurable Functions and Lebesgue Integration
Sections 13.1–13.4, 13.8: The L_p Spaces
Sections 12.1, 12.3, 12.11, 14.1–14.4: Banach and Hilbert Spaces
Sections 15.1–15.5, 15.9, 15.11: Fourier Series

Assignments: There will be about 5 assignments, to be submitted using Crowdmark. Each student's lowest assignment mark will be dropped. Students may receive help from any source as long as the help is acknowledged. Your solutions must be written in your own words (not copied) and they must reflect your own understanding. Any assignments which remain uncollected by the end of January, 2024 will be shredded.

Tests: There will be a 2-hour midterm test and a 2.5-hour final exam (which will cover all of the course material). Calculators will not be allowed on tests.

Course Mark: The final course grade G will be given by the maximum of the two marking schemes

$$G = 30\%A + 30\%T + 40\%E \qquad\qquad G = 15\%A + 15\%T + 70\%E$$

where A is at the average of the assignment marks (with the lowest mark excluded), T is the mark on the midterm test, and E is the mark on the exam. Graduate students will be expected to do an additional project which will also contribute to the grade.

Persons with Disabilities: Access Ability Services located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the Access Ability Services at the beginning of each academic term.

Academic Integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. (Check www.uwaterloo.ca/academicintegrity/ for more information.)

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4,
http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm.
When in doubt please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity to avoid committing academic offenses and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the undergraduate associate dean. For information on categories of offenses and types of penalties, students should refer to Policy 71, Student Discipline,
http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm.
For typical penalties check Guidelines for the Assessment of Penalties,
http://www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm.

Appeals: A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (other than a petition) or Policy 71, Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72, Student Appeals, http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm.