Course Subject, Number, and Title

MATH 704, Methods of Applied Math II

Credits

3

Course URL

http://www.math.wisc.edu/~jeanluc/704.php

Course Designations and Attributes

None

Meeting Time and Location

MWF 9:55–10:45am in Sterling 1333

Instructional Mode

Face-to-face

Credit Hours

This class meets for three 50-minute class periods each week over the Spring semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc) for about 2 hours out of classroom for every class period. The syllabus includes more information about meeting times and expectations for student work.

INSTRUCTORS AND TEACHING ASSISTANTS

Instructor Title and Name

Prof. Jean-Luc Thiffeault

Instructor Availability

M 11:00–11:45am, W 2:20–3:10pm, in Van Vleck 503

Instructor Email/Preferred Contact

thiffeault@wisc.edu

OFFICIAL COURSE DESCRIPTION

Official Course Description

Derivation, nature and solution of canonical partial differential equations of applied mathematics. Conservation laws, advection, diffusion. First order PDEs, characteristics, shocks. Traffic flow, eikonal and Hamilton-Jacobi equations. Higher order PDEs: classification, Fourier analysis, well-posedness. Series solutions and integral transforms. Green's functions and distributions. Similarity solutions. Asymptotics of Fourier integrals. Laplace's method, stationary phase. Ship waves. Perturbation methods. Enroll Info: Knowledge of undergraduate linear algebra, analysis and complex analysis is strongly recommended.

Requisites

Math 340, 521-22, and 623 (or 623 concur), or equiv.

LEARNING OUTCOMES

Course Learning Outcomes

Students will be able to

- Understand the derivation and nature of canonical partial differential equations of appliedmathematics.
- Recognize and distinguish the properties of different classes of partial differential equations, such as linear vs. nonlinear equations, parabolic vs. elliptic vs. hyperbolic equations, etc.
- Determine solutions to partial differential equations.
- Understand and apply asymptotic methods for finding approximate solutions to partial differential equations.

GRADING

Homework (50%), take-home final (50%)

There may be some curving, which may differ between graduate and undergraduates.

REQUIRED TEXTBOOK, SOFTWARE & OTHER COURSE MATERIALS

Introduction to Partial Differential Equations by Olver.

EXAMS, QUIZZES, PAPERS & OTHER MAJOR GRADED WORK

The final exam will be a take-home exam, due on May 8 at 11am in my office.

HOMEWORK & OTHER ASSIGNMENTS

There will be homework assignments every two weeks or so, posted at http://www.math.wisc.edu/~jeanluc/704.php. You are encouraged to discuss the problems with your classmates, however, the final write-up should be yours. A selection of problems will be graded, and the rest graded for completion. Homework is due at the beginning of the lecture on the due date.

RULES, RIGHTS & RESPONSIBILITIES

To see the Undergraduate Guide's Rules, Rights and Responsibilities information, refer to http://guide.wisc.edu/undergraduate/#rulesrightsandresponsibilitiestext.

ACADEMIC INTEGRITY

By enrolling in this course, each student assumes the responsibilities of an active participant in UW-Madisons community of scholars in which everyones academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. This includes but is not limited to failure on the assignment/course, disciplinary probation, or suspension. Substantial or repeated cases of misconduct will be forwarded to the Office of Student Conduct & Community Standards for additional review. For more information, refer to http://studentconduct.wiscweb.wisc.edu/academic-integrity/.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

McBurney Disability Resource Center syllabus statement: "The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA." http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php

DIVERSITY & INCLUSION

Institutional statement on diversity: "Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.
The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background people who as students, faculty, and staff serve Wisconsin and the world." https://diversity.wisc.edu/