Partial Differential Equations II (Math 222) - Spring 2017

Lecture: TR 9:00 - 10:15 AM, COB 262
Discussion Section: F 10:30 - 11:20 AM, COB 274

Professor: Shilpa Khatri
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Office: COB 347

Course Description: Math 222 is a course in graduate partial differential equations (PDEs). We will discuss several topics in the theory of PDEs.

Course Topics:

1. Modeling of physical phenomena using partial differential equations.
2. Solving first order linear and nonlinear partial differential equations.
3. The well-posedness of initial value problems and boundary value problems.
4. Solutions of second order linear partial differential equations.

Learning Outcomes: The goals of this course include understanding how partial differential equation arise in applications, knowing some of the canonical partial differential equations, and understanding some of the fundamental theory of partial differential equations. By the end of this course you should be able to:

1. Describe real-world phenomena using partial differential equations.
2. Solve first order partial differential equations using the method of characteristics.
3. Determine the well-posedness of solution of partial differential equations.
4. Solve second order linear partial differential equations.

Prerequisites: Math 221 or an equivalent course.

Texts: We will be using several sources throughout the semester:

1. *An Introduction to Partial Differential Equations*, Y. Pinchover and J. Rubinstein
2. *Partial Differential Equations: An Introduction to Theory and Applications*, M. Shearer and R. Levy
3. *Partial Differential Equations, An Introduction*, W. A. Strauss
4. *Complex Variables*, M. J. Ablowitz and A. S. Fokas
5. *Partial Differential Equations of Mathematical Physics and Integral Equations*, R. B. Guenther and J. W. Lee
6. *Partial Differential Equations of Applied Mathematics*, E. Zauderer

Texts: These texts may help with prerequisite material:

1. *Advanced Engineering Mathematics*, M. D. Greenburg
2. *Elementary Differential Equations and Boundary Value Problems*, W. E. Boyce and R. C. DiPrima
3. *Advanced Calculus*, R. C. Buck
4. *Basic Complex Analysis*, J. E. Marsden and M. J. Hoffman
5. *Complex Variables and Applications*, J. W. Brown and R. V. Churchill
6. *Complex Variables*, Ahlfors

Course Website: http://faculty.ucmerced.edu/skhatri3/math222_spring2017/math222
(There will always be a link from http://faculty.ucmerced.edu/skhatri3)

Office Hours: Wednesdays 3:30-5:00 PM
*If these times do not work for you, do not hesitate to email me and make appointments.

Grading:
Homework Assignments and Participation: 15%
Each Exam: 20%
Final Project : 25%

Homework Assignments and Discussion Section: Homework will be assigned every two weeks and written solutions will be due at the beginning of class on Thursday. Discussion section will be used every other week to present solutions starting January 27th. Every other week Friday's discussion will be an extra office hour. Your homework and participation grade will be based on your written solutions, interactions at discussion section, and your presentations of problems. There will be approximately 7 homework assignments throughout the semester.

Exams: There will be three exams during the semester.

Exam 1: February 16
Exam 2: March 21
Exam 3: April 27

*Note that this is just a plan and the dates may change as the course evolves. I will attempt to notify you of any changes as early as possible.

Final Project: During the course of this class, you will be expected to design, execute, and present a research project. These projects should be done in pairs. The research conducted should be based on the topics presented in class. I encourage working in advance and using myself as a resource for each step of the project.
Step 1: Partners must be chosen by March 9
Step 2: Project plan is due on April 6
Step 3: Project research should be completed by April 20
Step 4: Written reports are due by May 4 in class
Step 5: Presentations will be given at the final exam time on May 9 at 3:00 pm in COB 262
Note that this is just a plan and the dates may change as the course evolves. I will attempt to notify you of any changes as early as possible.

Special Accomodations: If you qualify for accommodations because of a disability, please submit a letter from Disability Services to the instructor in a timely manner so that your needs may be addressed. Student Affairs determines accommodations based on documented disabilities.

We will make every effort to accommodate all students who, because of religious obligations, have conflicts with scheduled exams, assignments, or required attendance. Please speak with me during the first week of classes regarding any potential academic adjustments or accommodations that may arise due to religious beliefs during this term.

Academic Integrity Academic integrity is the foundation of an academic community and without it none of the educational research goals of the university can be achieved. All members of the university community are responsible for its academic integrity. Existing policies forbid cheating on examinations plagiarism and other forms of academic dishonesty. The UC Merced Academic Honesty Policy and Adjudication Procedures are available on the website http://studentlife.ucmerced.edu by following the link to Student Judicial Affairs.