

MATH 723

Differential Equations I

Fall 2012

Meeting times: MWF 1:25 - 2:15 PM at LeConte ([LC](#)) 405.

Instructor: Dr. Peter G. Binev

<http://www.math.sc.edu/~binev/>

e-mail: binev@math.sc.edu

phones: 576-6269 (at [LC](#) 425) or 576-6304 (at [SUM](#) 206H)

Office hours: MWF 11:00 - 12:00 AM at [LeConte](#) 425 or by appointment.

Text: Partial Differential Equations by Lawrence C. Evans, *Second Edition*, American Mathematical Society 2010. The course will cover the material considered in chapters 2-5.

Description: Basic theory for partial differential equations including representations of solution for transport, Laplace's, heat, wave, and nonlinear first-order equations; fundamental solutions, maximum principles, Green's function, energy method and Dirichlet principle; Sobolev spaces: weak derivatives, extension and trace theorems.

Credits: 3

Prerequisites: MATH 703/704 or permission of instructor

Learning Outcomes: Upon the successful completion of this course students will be able to:

- recall methods for finding representation formulas for solutions of basic linear and nonlinear PDEs;
- apply the basic properties of transport, Laplace's, heat, wave, and nonlinear first-order equations to analyze their solution;
- utilize the theory of Sobolev spaces to derive facts about solutions of elliptic equation.

Cell Phones and Calculators: All electronic devices, especially cell phones, *must be disabled* during the class. No calculators are allowed.

Homework and Presentations: A few homework problems will be assigned each class. The homework will not be collected or graded. The problems will be discussed in class and some of them presented by a student. The students will have to present a proof will be several five-minute quizzes at the end of some classes on problems similar to ones from the homework. Each quiz will be graded 0 or 1 (no partial scores). The quiz grade will be the number of successfully solved quizzes but will not exceed 10. It will account for 10% of the final grade.

Project / Final Exam: In place of the final exam each student has to prepare a project considering a theoretical subject from the textbook which was not discussed in class. A 25-minute talk should be prepared and presented at the end of the semester or during the time slot for the final exam on Wednesday, December 12 at 12:30 PM.

Grading: The final grade will be determined from the homework presentations and participation in the discussions (50%) and the project talk (50%). The letter grades will be assigned as follows: **A** for at least 90%; **B+** for at least 86%; **B** for at least 80%; **C+** for at least 76%; **C** for at least 70%; **D+** for at least 66%; **D** for at least 60%; **F** for less than 60%.

Academic Dishonesty: Cheating and plagiarism will not be allowed. The University of South Carolina has clearly articulated its policy governing academic integrity and students are encouraged to carefully review it: <http://www.housing.sc.edu/academicintegrity/policy.html>.

ADA: If you have special needs as addressed by the Americans with Disabilities Act and need any assistance, please notify the instructor immediately.