INSTRUCTOR: Marian Bocea
OFFICE: Loyola Hall, Room 207; Phone (773) 508-3590
E-MAIL: mbocea@luc.edu
WEB PAGE: http://www.math.luc.edu/~mbocea
OFFICE HOURS: Monday, Wednesday, Friday, from 10:00AM to 11:00AM & by appointment

CLASS MEETS: Monday, Wednesday, Friday, 11:30AM - 12:20PM in Cuneo Hall - Room 103
WEB PAGE: http://www.math.luc.edu/~mbocea/Fall2012MATH388-488.html

COURSE OBJECTIVE: The main goal of the course is to provide a solid conceptual understanding of some basic topics in Partial Differential Equations.

COURSE DESCRIPTION & TENTATIVE SCHEDULE: This is an introductory course on linear partial differential equations (PDE). A PDE is a differential equation involving derivatives of the unknown function with respect to more than one variable. Such equations model many real-world phenomena and, as such, arise in various disciplines. Typical examples are the heat equation, \( u_t - \Delta u = 0 \), which governs the evolution of temperature in a conductive material, the wave equation, \( u_{tt} - \Delta u = 0 \), which governs propagation of waves, or Laplace’s equation, \( \Delta u = 0 \), satisfied by the stream function of an incompressible fluid.

The course will serve as an introduction to the theory of PDE; although we will learn how to find explicit solutions for certain PDE (this is a problem that very often doesn’t have a tractable solution, even for the simplest linear equations), the focus will be on studying qualitative properties of solutions which will help us understand phenomena encountered in applications. The course is primarily aimed at undergraduate Mathematics majors and MS students, but it is suitable for students majoring in Physics, Chemistry, or other disciplines who would like to develop a more conceptual understanding of the subject.

In addition to first order PDE (such as the transport equation) we will study in detail the main types of second order PDE (as illustrated by the Laplace equation, the heat equation, and the wave equation), with an emphasis on understanding the different qualitative behavior of the solutions. This will include the treatment of both homogeneous and nonhomogeneous equations and boundary conditions. We will cover selected topics from Chapters 1-7 of the textbook, according to the following (tentative) schedule:

1. Chapter 1: Where Do PDE Come From (2-3 weeks);
2. Chapter 2: Waves and Diffusions (2-3 weeks);
3. Chapter 3: Reflections and Sources (2 weeks);
4. Chapter 4: Boundary Value Problems (2 weeks);
5. Chapter 5: Fourier Series (2-3 weeks);
6. Chapter 6: Harmonic Functions (2 weeks);
7. Chapter 7: Green’s Identities and Green’s Functions (1-2 weeks).

PREREQUISITES:
MATH 263 Multivariable Calculus & MATH 264 Ordinary Differential Equations
HOMEWORK: Homework problems and their due dates will be posted on the course web page as we proceed. Your solutions to the homework problems will be collected and graded regularly throughout the semester. The homework scores will be averaged and their average will count toward your final grade as described below. If you have difficulties with any of the assigned problems or any other problems in your textbook please see me as soon as possible.

EXAMS: There will be two in-class exams (closed books and notes, no calculators) and a comprehensive final exam (closed books and notes, no calculators) which will be given according to the following schedule:

- EXAM # 1 - FRIDAY, SEPTEMBER 28, 2012
- EXAM # 2 - MONDAY, OCTOBER 29, 2012
- FINAL EXAM - MONDAY, DECEMBER 10, 2012, 1:00PM-3:00PM

GRADES: Your final letter grades for the course will be based on your overall Score for the course. This will be computed using the following formula:

\[ \text{Score} = \frac{30 \cdot \max(E_1, E_2) + 15 \cdot \min(E_1, E_2) + 20 \cdot H + 35 \cdot F}{100} \]

where
- \(E_1, E_2\) = Midterm Exam scores (min = 0, max = 100 each)
- \(H\) = Homework average (min = 0, max = 100)
- \(F\) = Final Exam score (min = 0, max = 100)

The following scale will be used to determine your letter grade for the course:

- 95-100 \(\to\) A; 90-94 \(\to\) A-; 85-90 \(\to\) B+; 80-84 \(\to\) B; 75-79 \(\to\) B-; 70-74 \(\to\) C+; 65-69 \(\to\) C;
- 60-64 \(\to\) C-; 55-59 \(\to\) D+; 50-54 \(\to\) D; 0-49 \(\to\) F

COURSE POLICIES

ACADEMIC INTEGRITY: All work in this course must be completed in a manner consistent with the accepted standards of academic integrity. In particular, cheating during exams may result in the instructor assigning the grade of “F” and notification of the appropriate dean. Cheating includes copying another student’s work, allowing another student to copy your work, using unauthorized references, collaborating with another student, etc. The Code of Academic Integrity will be enforced in all areas of the course. More information regarding the relevant policies and procedures, including information about your rights and responsibilities as a student, is available at http://www.luc.edu/academics/catalog/undergrad/regacademicintegrity.shtml

SPECIAL ACCOMMODATIONS: The Americans with Disabilities Act requires that reasonable accommodations be provided for students with disabilities or other special needs. Students who would like accommodations at the University need to contact the Coordinator of Services for Students with Disabilities. For more information, please visit www.luc.edu/sswd/.

Students eligible for special accommodations are strongly encouraged to share their concerns or requests with me at the beginning of the semester, or as soon as possible thereafter. I will be happy to make appropriate arrangements.

CLASS ATTENDANCE: Class attendance is expected. You are solely responsible for missed handouts or announcements made during lecture. If you cannot attend a particular lecture, make sure that you stay informed regarding the information provided during that lecture.

HOMEWORK: You are allowed discuss the homework problems with your classmates. You may form study groups to work on the homework problems or similar ones together. However, it is important that you first attempt to solve the homework problems on your own, and that you only hand in your own work.

EXAMS: The two midterms and the final exam are to be written individually, any collaboration is prohibited. Make-ups will be given only in case of a legitimate, documented excuse. If for some reason you are not able to take a particular exam at the scheduled time, you are required to inform me in advance.

FEEDBACK AND GRADING ACCURACY: I strongly encourage you to carefully review every single graded homework and exam to check for feedback and grading accuracy. I will be happy to answer any questions that you might have regarding your graded work.

You are welcome to discuss with me any questions or concerns about the course during my office hours or by appointment.