College of Engineering, Forestry, and Natural Sciences
Department of Mathematics and Statistics

MAT 461 (Partial Differential Equations) Syllabus
Fall 2013, Section 1 (Class Number 6308)
3 Credit Hours, MWF 11:30-12:20 in Adel Math Building 164

Instructor Information

Instructor: Dr. Jim Swift   Adel Math Bldg. 110   523-6878   `Jim.Swift@NAU.edu`

Office Hours: WF 10-11, MWTh 3-4. If these times are inconvenient, you can make an appointment, or drop by my office any time.

Websites: `www.nau.edu/Jim.Swift` is my web site. Follow the "Instructor Information" link. On that page, there is a link to the web site for this class, as well as a link to official U.S. time, `http://www.time.gov`, that our class will observe.

Course Description

Text: *Elementary Applied Partial Differential Equations*, by Richard Haberman (Fifth Edition). You can get by with the fourth edition.

Prerequisite: A grade of C or better in MAT 239 (Ordinary Differential Equations) and MAT 316 (Linear Algebra).

Content/Outline: I would like to cover chapters 1 through 7 of the text. Realistically, we will not be able to do this, so I will skip many of the sections. My goal is that you understand how Partial Differential Equations (PDEs) represent real world problems, and know how to use some of the basic techniques available to solve them. The main techniques are separation of variables and Fourier series. You should get an acquaintance with some of the special functions that are useful in various geometries. I will teach you the basics of numerical techniques.

Student Learning Outcomes: Students will learn how to solve certain PDEs using separation of variables and Fourier Series. The student will become familiar with the heat equation, Laplace's equation, and the wave equation. The student will learn about Sturm-Liouville eigenvalue problems, and get a gentle introduction to solving PDEs numerically. The student will work on an individual project and give a short presentation to the class.

Course Structure The class will use lecture-discussion format.

Assessment of Student Learning Outcomes

Class Points: There are approximately 750 class points (plus extra credit). Letter grades are assigned with the scale 90% = A , 80% = B, 70% = C, and 60% = D.

Midterms: (2 or $3 \times 100 = 200$ or 300 points). Note that the math/stat department has permission to give an exam during End of Semester Week (formerly known a Reading Week). I might give an exam on Friday, Dec. 6, but not later.

Homework: (approximately 100 class points.) It is necessary to practice math to learn it. I will assign homework regularly and collect it. A few problems will be graded and you will get a score for each assignment. You are *allowed* and *encouraged* to work together on homework.

Project: (100 class points.) A typical project would be a paper describing a problem, a PDE model for the problem, a strategy for solving the PDE numerically, and a summary of your results. You will give a 15 minute presentation to the class.

Final Exam: (250 class points) The Final Exam will be comprehensive. It is scheduled for Tuesday, December 17, from 10:00 to 12:00 in our usual classroom.

Extra Credit: At each midterm exam I will give you 3 points if you had no unexcused absences since the previous exam, and I will give you 2 points if you turned in all the homework in that period. Any points that you get for the Problem of the Week will be credited to this class.

Course Policies

Calculators: A graphing calculator will be allowed at the exams. Please bring your calculator to class. (You don't need to bring your textbook to class.)

Late Homework: I will handle requests on a case-by-case basis, but please contact me before the due date.

Missed Class Days: It is important and required that you come to class every day. I will give excused absences for institutional excuses, illness, or other reasons that I approve. If you are experiencing flu-like symptoms, you should not attend class. Please notify me of an absence by e-mail or voice mail *before* class if possible. Furthermore, if you are late and I take roll before you arrive, then you will be counted absent.

Makeup Exams: A similar policy to "Missed Class Days" holds. I will give a makeup exam for illness or other emergencies. Please notify me that you will miss an exam by e-mail or voice mail *before* the exam if possible. I may give an exam the day before Thanksgiving; if so you may take the exam early on the Tuesday before Thanksgiving.

Academic Honesty: Do not look at other people's exams during tests. You may not use cell phones or other electronic communication devices during the exams (see next bullet). You may seek help from others for the homework, but please do your own work.

Department of Mathematics & Statistics Portable electronic device policy Cell phones, mp3 players and portable electronic communication devices, including but not limited to smart phones, cameras and recording devices, must be turned off and inaccessible during in-class tests. Any violation of this policy will be treated as academic dishonesty.

In class devices on non-test days: You may not text, do Facebook, etc. during class. You MAY use a mobile device to take notes, work on your WeBWorK problems during class, or check wikipedia pages that are relevant to the class.

Department and University Policies: Our class web site has links to the Departmental and University Policies at
www.nau.edu/Jim.Swift/classes/MathDepartmentPolicies.pdf and
http://www4.nau.edu/avpaa/UCCPolicy/plcystmt.html.

Amendments: Any changes to this syllabus will be announced in class, and an updated version will be posted on my website.