MATH 0290: Applied Differential Equations <small>(Spring 2014, 3 credits)</small>

Class meetings:	Mondays and Wednesdays 6:00-7:15pm Thackeray Hall Room 704
Instructor:	Ashok Litwin-Kumar `alk92@pitt.edu` Thackeray Hall Room 504
Office hours:	Tuesdays 2:00-3:00pm or by appointment
Teaching assistant:	Yong Li `yol34@pitt.edu`
Web page:	`http://www.pitt.edu/~alk92`
Textbook:	Polking, Boggess, & Arnold, *Differential Equations with Boundary Value Problems* (2nd Ed.) Optional: Polking & Arnold, *Ordinary Differential Equations using MATLAB* (3rd Ed.)

Description

Catalog description: This course presents an introduction to the theory of differential equations from an applied perspective. Topics include linear and nonlinear ordinary differential equations, Laplace transform, and introduction to partial differential equations.

Differential equations are ubiquitous in all fields of science and engineering, having been used to model many phenomena including the dynamics of species in an environment, the spread of disease, stresses in a structure, fluctuations in the stock market, or chemical reactions. This course will present an introduction to the theory of *Ordinary Differential Equations* (ODEs), which are functions of one variable and often used to model how a quantity of interest changes in time. The course will cover methods of solution for ODEs, including both analytical methods and numerical methods on the computer using MATLAB. After taking this course, you should be able to:

1. Determine the appropriate method of solution and solve linear first and second order ODEs
2. Analyze systems of linear ODEs both analytically and using a geometrical intuition
3. Analyze nonlinear systems of ODEs by linearizing them
4. Use MATLAB to visualize two-dimensional systems of ODEs

Requirements and Grading

The course will involve the following:

1. **Homework assignments** (30% of total grade). Rather than giving extensions, I will determine your score by choosing the top eight grades out of the ten homework assignments. If you turn in your homework late, you will be eligible to earn 75% of the points within the first day after the deadline,

50% within the second, and 25% within the third. Homeworks will be collected at the beginning of class when due. You will need to show all your work to receive full credit. No extra credit will be given.
2. **Two mid-term exams** (35% of total grade; 17.5% each). The midterms will be in-class. The second midterm will cover only the material not covered on the first midterm.
3. **Final exam** (35% of total grade). The final exam will be cumulative.

Grading scale: A/A- (90% or above), B/B$\pm$ (80-89%), C/C$\pm$ (70-79%), D/D+ (60-69%), F (below 60%). According to department policy, your grade in the course cannot exceed your final exam grade by more than one letter. So if you receive a C on the final, your final grade in the course will be at most a B. I will also allow for the reverse: your grade in the course will not be less than your final exam grade by more than one letter. So if you receive an A- on the final, your final grade in the course will be at least a B-. Keep in mind that the first of these occurs more often than the second, so don't blow off the homework and midterms expecting to ace the final!

Course Policies

Collaboration and plagiarism: You are encouraged to discuss the homework with other students. However, you must write up your assignments yourself. Copying solutions from other students is considered plagiarism, and evidence of plagiarism will be reported to the university and may result in a zero grade for that assignment. If you have any questions about this collaboration policy, please talk to me.
Academic Integrity: The Pitt academic integrity guidelines can be found at:
http://www.as.pitt.edu/fac/policies/academic-integrity
Classroom policy: Please be respectful of other students in class and remember to keep your cell phones on silent. Unless you contact me beforehand to make arrangements, please do not use electronics like laptops, tablets, or cell phones in class.
Attendance: Attendance is not required except to hand in work, but the material covered in class will be necessary to complete the homework assignments and exams. You will need to show up within five minutes of the beginning of the class to hand in your homework. Even if no homework is due, please try to be on time.
Special accomodations: Special accomodations can be made due to disability, for religious reasons, or for other circumstances. Please talk to me or the Office of Disability Resources and Services as soon as possible if these are required. The Office of Disability Resources and Services can be contacted at 140 William Pitt Union, by phone at (412) 624-7890, or online at http://www.studentaffairs.pitt.edu/drswelcome.

Course Materials

Course materials, including the schedule, homeworks, and other handouts, will be posted on the class website at http://www.pitt.edu/~alk92/.