Differential Equations (MATH 623)
Winter 2013
Syllabus

Instructor: J. Douglas Wright
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Office Hours: MWF 9-10. (You may also drop by my office at your leisure; if I am there and not too busy with other things, I’ll be happy to talk with you.)

Text: There is no required text. I will make course notes available at the course website. The following books available might be useful for you: Differential Equations by Blanchard, Devaney and Hall. Differential Equations, Dynamical Systems and an Introduction to Chaos by Smale, Hirsch and Devaney. Nonlinear Oscillations, Dynamical Systems and Bifurcations of Vector Fields by Guckenheimer and Holmes. Ordinary Differential Equations with Applications by Chicone.

Website: http://www.math.drexel.edu/~jdoug/623W13

Grading: Your grade is based entirely on your homework assignments. Homework is assigned (roughly) weekly.

Prerequisites: Students are expected to be familiar with the content of a typical undergraduate course in ordinary differential equations: exact solutions of constant coefficient linear equations; the role of eigenvalues and eigenvectors in solving linear systems; variation of constants; integrating factors; phase planes; separation of variables; exact equations. Students are also expected to be familiar with concepts from advanced calculus (real analysis), complex variables, linear algebra.

Description, purpose, expectations: This course is an introductions to the core concepts of ordinary differential equations (ODE). Topics may include: existence and uniqueness theorems, properties of solutions, asymptotic behavior, phase space, linear autonomous systems, non-linear systems, stability theory, Lyapunov’s methods, construction of Lyapunov’s function, boundedness, limit sets, Floquet theory, and stability of periodic solutions. This course introduces the key ideas of ODE in a theoretical framework. The following outcomes are expected: (a) students can solve linear systems (b) they can construct invariant manifolds for nonlinear equations (c) they can prove the fundamental well-posedness results (d) they can compute stability of equilibria and periodic orbits.
**Academic Policies:** Students should be familiar with Drexel policies on dropping courses. See:

http://www.drexel.edu/provost/policies/course_drop.asp

Students should be familiar with Drexel policies on academic integrity, plagiarism and cheating. See:

http://www.drexel.edu/studentlife/judicial/honesty.html

http://www.drexel.edu/provost/policies/academic_dishonesty.asp