

ESE 553 – **Nonlinear Dynamic Systems** – **Spring 2009**

Tu, Th 4:00 – 5:30

Cupples II, rm 217

Instructor: Heinz Schättler,
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Office Hours: Tuesday, 2:00-4:00, and by appointment

Prerequisites:

1. Familiarity with basic knowledge of Advanced Calculus is desired: topological concepts like open and closed sets in \mathbb{R}^n , compactness, uniform convergence, norms, completeness, implicit function theorem - I also will give a brief review, mostly since it is the reasoning used in those proofs that we will need as well.
2. ESE 551 Linear Systems is helpful; but all I really need is the stability theory for time-invariant linear systems and I also will review this in class.

Grading:

Your grade will be based on Homework (15%), one Midterm (35%), and a comprehensive Final Exam (50%). The Midterm will be closed book, but you will be allowed to bring in a cheat-sheet (one letter-size page on which you may write whatever you want). The midterm will be on Thursday, March 5. The Final exam is tentatively planned (i.e., subject to change) as a Take Home Exam. Your Homework score will be based on graded solutions to homework problems which will be assigned on a biweekly basis throughout the semester.

Web page: There is a web page for this course accessible through my homepage at

http://ese.wustl.edu/~heinz/Spring09_ese553

or through

<http://classes.engineering.wustl.edu/ese553>

I will post handouts, homework, and other relevant material as we go along.

Textbook: Hassan Khalil, *Nonlinear Systems*, 3rd ed., Prentice Hall

We will more or less cover Chapters 1-4 and do some bifurcation theory (saddle-node and Hopf-bifurcations). This will leave some free time and I have not fully decided yet what to do towards the end. We might just do some center manifold theory, an advanced topic in stability theory, (Chapter 8), as in previous years, or we may discuss more some nonlinear control related aspects.