# MATH 4997-2        SYLLABUS        FALL 2010

**Course Title, Location, Time, Disclaimer, and Web Page.** Vertically Integrated Research, MATH 4997-2, 244 Lockett, Louisiana State University (LSU). We will meet MW 1:40-2:30PM. In addition, we may meet 1:40-2:30PM on selected Fridays. If there is a class meeting on a Friday, then I will let you know about that Friday meeting in class on the preceding Monday. The location and other policies for this course are subject to change by LSU. The class web page is `https : //www.math.lsu.edu/dept/Fall2010ControlSystemsVIRCourse`.

**Professor and Office Hours.** My name is Prof. Malisoff. I am the lead instructor for this course. The other non-lead instructors are Profs. Marcio de Queiroz and Peter Wolenski who will be assisting with the course planning, lectures, and mentoring of students. My office hours are MW 2:40-3:30PM and MWF 8:30-9:00AM in 252 Lockett and by appointment. You can make an appointment by calling my office at LSU-6714 or leaving a message at LSU-1665. Always feel free to come to my office hours to ask me about the course, or any other issues that may arise related to your school work.

**Coverage, Text, and Prerequisites.** This course is an element of the LSU VIGRE project. The project combines graduate and undergraduate education and research, and the course is in the general area of mathematical control theory. Mathematical control theory is one of the most central and fast growing areas of applied mathematics. This course will help prepare students for research at the interface of engineering and applied mathematics. The first part provides a self-contained introduction to the mathematics of control systems, focusing on feedback stabilization and Lyapunov functions. The second part will be a series of lectures by students and control engineering faculty. The faculty presentations will discuss open problems in control. The third part will explore ways of solving problems. One problem will involve adaptive control where the objectives are to estimate unknown model parameters and force the solutions of the system to track a reference trajectory.

Students from engineering or mathematics are encouraged to enroll. The prerequisites for graduate students are MATHs 7320, 7386, or permission of the lead instructor. The prerequisites for undergraduates are MATHs 4027, 4340, or permission of the lead instructor. Much of the material from the first part of the course will come from the following text: [M. Malisoff and F. Mazenc, *Constructions of Strict Lyapunov Functions*. Communications and Control Engineering Series, Springer-Verlag London Ltd., London, UK, 2009. ISBN: 978-1-84882-534-5] The text has been ordered by the LSU Union Bookstore. All students are encouraged but not required to purchase the text. The exact coverage will depend on the progress of the class and will be announced later.

**Evaluation, Grading, and Student Conduct.** The two components of the evaluation will be (a) class participation including an in-class presentation and (b) an oral final exam. Each student will give an in-class oral presentation about a paper in the control literature. Students will be able to select the paper from a list that the lead instructor will make available later. The oral final exam will cover the complete contents of the course and will be done outside class during finals week. Each of the two components is worth one half of your grade. However, I will replace your lower grade on either of these components with your higher one. For example, a student with an A in class participation and a C on the final exam has an A average and therefore gets an A in the course. Please comply with the LSU Code of Student Conduct at `http : //appl003.lsu.edu/slas/dos.nsf/index`.