# MMAE 443: Systems Analysis and Control

## Syllabus

**Goal** Understand Properties of Differential Equations. Understand how Feedback Changes these Properties

**Instructor** Matthew M. Peet, Assistant Professor of Aerospace Engineering. Office: E1-252B.

**Office Hours** TTh 3:00-4:30 in E1-252B

**Teaching Assistant** Reza Kamyar, Office: 030, Office Hours: TBD.

**Content** Calculate the response of a system to an input. Calculate properties of the step-response of a system such as settling time, rise time, steady-state error and percent overshoot. Use Nyquist, Bode and Root Locus techniques to design PID and lead-lag compensators in order to achieve performance specifications.

**Homework** Homework will typically be due on Friday and should be submitted in the TA's box in E1-251.

**Schedule** Class meets on Monday and Wednesday from 3:15-4:30 in Stuart 104. There will be an in-class midterm exam and a final exam.

**Prerequisites** Course in Differential Equations. Access to Matlab.

**Text** The textbook is "Feedback Control of Dynamical Systems" by Franklin Powell and Enami-Naeini, 6th edition.

**Notes** Copies of Lecture notes will be distributed in class and also posted on Blackboard within 1 week of class.

**Evaluation** Homework will be the basis for 30% of the grade. Problem sets will be given on an approximately bi-weekly basis. An in-class midterm will be given for 35% of the grade. A final exam will be given, also for 35%. **Note:** These percentages are approximate and are subject to change based on performance. Grade distribution is at the discretion of the instructor.

**Academic Honesty** Discussion of the homework problems is permitted, although the writing must be independent - NO COPYING. Use of a solutions manual is prohibited. Warning - solutions manuals have built-in errors to detect copying. Cheating on exams is will result in automatic failure of the course and referral of the student to Designated Dean for Academic Discipline and MMAE Chair of the Academic Honesty Committee.

**Other References** Aside from the text, there are several excellent sources which may be consulted. Although not directly required for the course, students are encouraged to browse the following references.

The following is an introduction to classical control and state-space theory.

- Nise. "Control Systems Engineering", Addison-Wiley, 1994.

The following is a curiously titled text on complex analysis - the mathematical foundation for frequency-domain methods.

- Marsden. "Basic Complex Analysis", Freeman 1998.