MA (OR) 731

Time: 10:15 - 11:30 TH

Place: HA 274

Instructor: Ralph Smith

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Email: rsmith@eos.ncsu.edu

Web: `http://www4.ncsu.edu/~rsmith/`

Texts: *Optimal Control* by Frank L. Lewis and Vassilis L. Syrmos, 1995

Supplemental Texts: *Applied Nonlinear Control* by Jean-J. Slotine and Weiping Li, 1991.
Linear Systems by Panos J. Antsaklis and Anthony N. Michel, 1997

Computing: We will use Matlab.

Grades: The gradescale is: 90-100 A-,A; 80-89 B-,B,B+; 70-79 C-,C,C+; 60-69 D-,D,D+; below 60: F. The grades are based on the following coursework:

Homework and Projects (Matlab):	40 %
Exams (1-2):	35 %
Final Exam (May 5, 2009):	25 %

Course Topics:

- Stability of Linear and Nonlinear Systems
  - Lyapunov theory (Direct and indirect)
  - Lyapunov-like analysis using Barbalat's lemma
  - Positive systems (Kalman-Yakubovich Lemma)
  - Input-output stability
- Optimal Control
  - Calculus of variations
  - Dynamic programming (HJB equations)
  - Constrained optimal control (Pontryagin Maximum Principle)
  - Infinite dimensional systems
    - Approximation and experimental implemention
- Adaptive Control
  - Adaptive control with full state and output feedback
  - Model Reference Adaptive Control (MRAC)
  - Robustness issues concerning adaptive systems

Academic Integrity and Disabilities Information: This information is provided at the following web sites:

`http://www.ncsu.edu/provost/academic_regulations/integrity/reg.htm`
`http://www2.ncsu.edu/ncsu/stud_affairs/counseling_center/dss/`