University of Toronto  
Department of Electrical and Computer Engineering  
ECE311H1S – Dynamic Systems and Control  

Information Sheet

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**Lectures:**  
Monday, 5-6, GB220  
Wednesday, 5-6, GB220  
Thursday, 5-6, GB220

**Course Outline**

- Introduction to feedback, block diagrams, and state models
- Linearization of a nonlinear system at an equilibrium
- Review of Laplace transforms and their use in solving linear constant coefficient differential equations
- Transfer functions and block diagram manipulations
- The time response of a linear time invariant system
- Stability
- The concept of feedback. Proportional control design
- Asymptotic tracking: the internal model principle
- The Nyquist stability criterion
- Frequency response and Bode plots
- Lead, lag, and PID compensator design
- Robust control and loop shaping
**Textbook**: There is no required textbook. Course notes by Prof. Bruce Francis will be provided on Blackboard. They are self-contained and serve as the textbook for this course. You may also consider consulting the following reference: Astrom, Murray, *Feedback Systems*, Princeton University Press, 2012.

**Labs**: All labs are held in BA3114. There will be five labs in alternating weeks, starting January 19, 2016. Labs are performed in groups of two students. You’ll form lab groups at the beginning of the first lab. All labs require a preparation and a report. At the beginning of each lab, each group submits to the TA a preparation (except in lab 1, where each student submits an independent preparation). One week after the lab, each lab group submits a lab report.

**Lab Policies**: There are no makeup labs. Your TAs will mark down attendance. You cannot switch lab sessions.

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**Tutorial**: TUT0101, Thursdays, 3-4, HA410, start January 14. TUT0102, Tuesdays, 3-4, HA410, start January 12.

**Homeworks**: There will be 6 homeworks, to be submitted to the tutorial TA at the beginning of each tutorial. Homeworks will not be graded but you will get credit (1 / 0) for submitting them.

**Midterms**: There will be two midterms administered as follows:

- Midterm 1: Friday, February 12, 6-8pm, EX300
- Midterm 2: Friday, March 18, 6-8pm, EX300

**Grading**

- Labs 10%
- Homeworks 5%
- Midterm 1 15%
- Midterm 2 20%
- Final Exam 50%