ECE362-B1: Fundamentals of Control Systems Engineering

Instructor information	Name: Mahdi Tavakoli Office: ECERF W6-007 Telephone: 780-492-8935 E-mail: mahdi.tavakoli@ualberta.ca Office hours: Mon, Wed, Fri 10:00-11:00 am; you are welcome to drop by at other times or (preferably) send me an email to arrange an appointment
Lab instructor	Lab Instructor: Ali Jazayeri (ali.jazayeri@ualberta.ca) Teaching Assistant: Saman Jahani (sjahani@ualberta.ca)
Schedule information	Lecture times: Mon, Wed, Fri 11:00-11:50 am Lecture location: NRE 1-143 Midterm exam: Fri March 1; 11:00-11:50 am in the lecture room
Course webpage	• https://eclass.srv.ualberta.ca/portal/ • A number of PowerPoint presentations have been posted on this website already. They are incomplete now, will be completed in class, and re-posted to the website. I recommend that you print and bring your copy of the incomplete notes to the class, and add your notes on them as I am writing on the slides.
Course content	The overall objective of this course is to introduce the students to the study of control systems. As future engineers, the students will study the tools needed to evaluate the performance of a given system, and to design a feedback controller to achieve a set of desired performance goals. To this end, the course will introduce: • The basic concepts of dynamic systems and how to describe them via mathematical models. • Analysis of the fundamental characteristics of feedback control systems. • The classical control techniques for designing feedback controllers. • The modern control techniques for designing feedback controllers. The course and its lab will repeatedly use the knowledge of and skills in mathematics, signals and systems theory, and Matlab programming.
Marking scheme	• Assignments: 10% • Laboratories: 15% • Midterm exam: 25% • Final exam: 50%
Textbook and references	*Textbook:* • Norman S. Nise. Control Systems Engineering, 5th or 6th edition, Wiley. • The Student Companion Site http://bcs.wiley.com/he-bcs/Books?action=index&itemId=0471794759&bcsId=4135 for this textbook contains useful resources including computer programs for use with MATLAB, additional appendices, and complete solutions to skill-assessment exercises. Other references for your interest: • Karl J. Åström and Richard M. Murray. Feedback Systems: An Introduction for Scientists and Engineers, 2008, Princeton University Press. This book is available online for free: http://www.cds.caltech.edu/~murray/amwiki. • Richard C. Dorf and Robert H Bishop. Modern Control Systems, 11th edition, 2008, Prentice Hall. • Gene F. Franklin, J. David Powell, and Abbas Emami-Naeini. Feedback Control of Dynamic Systems. 4th edition, 2002, Prentice-Hall.

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<tr><td>MATLAB / Simulink</td><td>

MATLAB/Simulink is extensively used throughout the course. We will be using the Control Systems Toolbox and the Symbolic Math Toolbox.
You should already be familiar with MATLAB basics. Basic reviews of MATLAB/Simulink are contained in Appendices B and C of Nise. You can become more familiar with MATLAB by running the control demonstrations (In Matlab prompt, type demo and follow Toolboxes >> Control Systems). Nise's Student Companion Site has additional appendices regarding Matlab, too.

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<tr><td>Assignments</td><td>

There are six sets of assignments to be posted on the course website. Assignments should be put into the ECE 362 assignment box outside the ECERF reception area. The solution to each assignment will also be posted on the website after its due date.
The Lab Instructor and the Teaching Assistant will mark your assignments.

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<tr><td>Lab</td><td>
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<tr><th></th><th>Section H1 (Wednesday)</th><th>Section H2 (Thursday)</th></tr>
<tr><td>Lab1</td><td>February 13</td><td>February 14</td></tr>
<tr><td>Lab2</td><td>February 27</td><td>February 28</td></tr>
<tr><td>Lab3</td><td>March 13</td><td>March 14</td></tr>
<tr><td>Lab4</td><td>March 27</td><td>March 28</td></tr>
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You must attend all of the four lab sessions in your Section. The lab is ETLE 5-012.
A lab report is due by 4:00 pm, one week after you perform the lab, and should be put into the ECE 362 laboratory box outside the ECERF reception area.
Lab reports put in the box after 4:00 pm on the due date and before they are picked up will receive a 25% penalty. No late reports will be accepted once the box is emptied.
Lab reports should be clear, clean and stapled.
The Lab Instructor and the Teaching Assistant will mark your lab reports.

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<tr><td>Important policies</td><td>

Policy about course outlines can be found in Section 23.4(2) of the University Calendar.
The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at http://www.uofaweb.ualberta.ca/secretariat/studentappeals.cfm) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.
Missed midterm exam and missed final exam can only be justified by documented medical evidence.
You may use approved non-programmable calculators (with a gold sticker) in the midterm and final exams as long as in compliance with the Faculty of Engineering's Calculator Policy: http://www.engineering.ualberta.ca/calculator.cfm. Obviously, calculators must not be used for any kind of cheating or communication with other students during exams.
In the midterm exam, you can bring one formula sheet (letter-size, two-sided), but no books, notes, or other materials.
In the final exam, you can bring two formula sheets (letter-size, two-sided), but no books, notes, or other materials.
Recording is permitted only with the prior written consent of the professor or if recording is part of an approved accommodation plan.

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