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### ECE 360 – Control Theory and Systems I

Term – Fall 2018 (201809)

#### Instructor

Dr. Ilamparithi Thirumarai Chelvan  
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#### Office Hours

Days: Mondays & Thursdays  
Time: 2:30 to 3:30 PM  
Location: EOW 407

#### Course Objectives

- Introduction in the theory and practice of control engineering.
- Understanding the mathematical tools used in control system analysis and design.
- Designing closed-loop control system and evaluating their performance.
- Introduction to MATLAB as a tool for control design

#### Learning Outcomes

- Derive transfer function of separately excited DC motor
- Analyze transient and steady state system response of linear time invariant systems
- Sketch root-locus and Bode plots
- Evaluate closed loop stability using root-locus, Bode plot and Nyquist method
- Design PID controllers and lead/lag compensators
- Utilize MATLAB to validate calculations

#### Syllabus

Characterization of systems; linearity, time invariance and causality. General feedback theory; time and frequency domain analysis of feedback control systems; Routh-Hurwitz and Nyquist stability criteria; root locus methods; modeling of dc servo; design of simple feedback systems; introduction to state-space methods. (Prerequisite:260)

#### Lecture

A-Section(s): A01 / CRN **10959**  
Days: Tuesdays, Wednesdays & Fridays  
Time: 09:30 to 10:20 AM  
Location: Hickman Building 105

#### Laboratory

To be announced using CourseSpace

#### Required Text

Title: Modern Control Engineering  
Author: Katsuhiko Ogata  
Publisher: Prentice Hall  
Edition: 5<sup>th</sup> Edition

## Required Software

MATLAB, Student version (<https://matlab.engr.uvic.ca/>)

### Assessment:

Assignments:	4 x 2.5 = 10%	Due Dates: To be announced using CourseSpace
Labs	4 x 2.5 = 10%	
Mid-term	2 x 10 = 20%	Dates: To be announced using CourseSpace
MATLAB Project	1 x 10 = 10%	Due Date: To be announced using CourseSpace
Final Exam	1 x 50 = 50%	Date: To be announced using CourseSpace

### Note:

- Failure to complete all laboratory requirements will result in a grade of N being awarded for the course.
- Failure to pass the final exam will result in a failing grade for the course.

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Undergraduate Calendar.

<https://web.uvic.ca/calendar2018-09/undergrad/info/regulations/grading.html>

**There will be no supplemental examination for this course.**

**Note to students:** Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair of the Department by email or the Chair's Assistant to set up an appointment.

### Accommodation of Religious Observance:

<https://web.uvic.ca/calendar2018-09/undergrad/info/regulations/religious-observanc.html>

### Policy on Inclusivity and Diversity:

<https://web.uvic.ca/calendar2018-09/general/policies.html>

**Standards of Professional Behaviour:** You are advised to read the Faculty of Engineering document Standards for Professional Behaviour, which contains important information regarding conduct in courses, labs, and in the general use of facilities.

<https://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf>

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult the entry in the current Undergraduate Calendar for the UVic policy on academic integrity.

<https://web.uvic.ca/calendar2018-09/undergrad/info/regulations/academic-integrity.html>

**Equality:** This course aims to provide equal opportunities and access for all students to enjoy the benefits and privileges of the class and its curriculum and to meet the syllabus requirements. Reasonable and appropriate accommodation will be made available to students with documented disabilities (physical, mental, learning) in order to give them the opportunity to successfully meet the essential requirements of the course. The accommodation will not alter academic standards or learning outcomes, although the student may be allowed to demonstrate knowledge and skills in a different way. It is not necessary for you to reveal your disability and/or confidential medical information to the course instructor. If you

believe that you may require accommodation, the course instructor can provide you with information about confidential resources on campus that can assist you in arranging for appropriate accommodation. Alternatively, you may want to contact the Resource Centre for Students with a Disability located in the Campus Services Building.

The University of Victoria is committed to promoting, providing, and protecting a positive, and supportive and safe learning and working environment for all its members.

**Course Lecture Notes:** Unless otherwise noted, all course materials supplied to students in this course are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.

**Course Evaluation:** Towards the end of term, as in all other courses at UVic, you will have the opportunity to complete an anonymous survey regarding your learning experience (CES). The survey is vital in providing feedback to me regarding the course and my teaching, as well as to help the department improve the overall program for students in future. When it is time for you to complete the survey you will receive an email inviting you to do so. You will need to use your UVic Netlink ID to access the survey, which can be done on your laptop, tablet, or mobile device. I will remind you and provide you with more detailed information nearer the time but please be thinking about this important activity during the course.

**Continuous Feedback:** I am committed to a memorable learning experience for my students, and I will try my best to help out in whatever way I can. For that I need to receive your input throughout the course. Oral/written/email feedback anytime during the course is welcome.