ELEC 360: Control Theory and Systems: I

Term – Spring 2016 (201601)

Instructor
Dr. Stephen W. Neville
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Office Hours
Days: Wed.
Time: 2:30pm to 3:20 pm (or by appointment)
Location: EOW 441 or ELW A228

Note: All course emails MUST have “Elec360:” in the subject line and MUST be sent from UVic email accounts. Emails without proper subject lines or sent from off-campus email accounts will likely be dropped by UVic’s email spam filters or be automatically redirected to junk email folders.

Course Objectives
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.

Learning Outcomes
1. Apply Laplace transforms to solve linear differential equations describing linear systems
2. Give examples of physical systems, block diagrams and state-space description
3. Analyse transient and steady state system response of linear continuous systems
4. Assess closed-loop system performance using Root-Locus analysis
5. Assess closed-loop system performance using frequency response
6. Evaluate closed-loop stability using the Nyquist method
7. Design of PID controllers, lead and lag compensators

Syllabus
1. Linear Systems, Laplace Transforms, and System Analysis
2. Modeling of Dynamic Systems
3. Transient Response Analysis
4. Stability Analysis of Linear Systems
5. Steady-state Error Analysis
6. Root Locus
7. Closed Loop Systems
8. Frequency Response Methods
9. Nyquist Stability Criterion
10. Compensation Techniques
11. Implementation of Control Systems
Lectures:
A-Section(s): A01, A02 / CRN 21142, 21143

Days: Tues., Wed., Fri.
Time: 9:30 am - 10:20 am
Location: Elliott Building 062

Labs:

B01 Tue 13:30-16:20 ELW A317
B02 Tue 13:30-16:20 ELW A317
B03 Tue 13:30-16:20 ELW A317

Dates for Labs:
Section B01: Jan. 26th, Feb. 15th, Mar. 1st, and Mar. 15th
Section B02: Feb. 2nd, Feb. 23rd, Mar. 8th, and Mar. 22nd
Section B03: Jan. 29th, Feb. 19th, Mar. 4th, and Mar. 18th

Full details of all official course locations and times are available from UVic’s Timetable web page (https://www.uvic.ca/BAN2P/bwckschd.p_disp_dyn_sched). In the case of any discrepancies between the above denoted times and places and the official UVic timetable web page, the official UVic web page is authoritative.

Required Text
Title: Modern Control Engineering (5th Edition)
Author: Katsuhiko Ogata
Publisher: Prentice Hall
Year: 2009

Note: All assignments will come from the North American edition of this text and expressly not from any International additions. The end-of-chapter questions may be different between North American and International editions. It is solely the students’ responsibility to ensure that they are doing the correct questions from the correct North American edition.

Course Web Site: http://www.ece.uvic.ca/~sneville/Teaching/Elec360

Assessment:
Assignments: 10% Due Dates: One week after assignment date – all late assignments will not be marked and will receive a zero grade.
Labs 10%
Mid-term 30% Date: Wed., Feb. 24th
Final Exam 50%

Note:
Failure to complete and pass 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.

Assignment of E grade and supplemental examination for this course will be at the discretion of the Course Instructor. The rules for supplemental examinations can be found in the current Undergraduate Calendar.
http://web.uvic.ca/calendar/FACS/UnIn/UARE/Grad.html
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 Secretary to set up an appointment.

Accommodation of Religious Observance
http://web.uvic.ca/calendar/GI/GUPo.html

Policy on Inclusivity and Diversity
http://web.uvic.ca/calendar/GI/GUPo.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 the University, the Faculty, and the Department. You should consult the entry in the current Undergraduate Calendar for the UVic policy on academic integrity.
http://web.uvic.ca/calendar/FACS/UnIn/UARe/PoAcI.html

Course Lecture Notes
Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and 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 constitute a breach of academic integrity as defined in the UVic Calendar as well as the Standards of Professional Behaviour required of all Faculty of Engineering students.