School of Professional Education and Executive Development

SEHS4653 Control System Analysis
Semester 1, Academic Year 2024/2025

Tentative Teaching Plan

Subject Leader

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Prior knowledge

Calculus at engineering degree level

(Note: The above is not a pre-requisite for taking the subject but is for students' reference of the scope of basic knowledge required. It is the responsibility of students to ensure their fulfillment of the prior-knowledge required for the subject.)

Objectives

This subject aims to introduce the principles and techniques used in the analysis and design of feedback control systems. It also provides the foundation for the later subjects in the areas of power systems, drives and control.

Subject Intended Learning Outcomes

Upon completion of this subject, students will be able to:

- analyse the stability, transient response and steady-state response of continuous time systems;
- design compensators and controllers for control systems with suitable parameters;
- create control system model by using block diagram and signal flow graph;
- interpret experimental findings through written report.

Respective Scheme/ Programme Intended Learning Outcomes

This subject contributes to the respective Scheme/ Programme Intended Learning Outcomes in the following way:

(1) Students of BEng (Hons) in Electrical Engineering

(Row extracted from the Curriculum Map of BEng (Hons) in Electrical Engineering)

Subject Code	Subject Title	PILO-A1	PILO-A2	PILO-A3	PILO-A4	PILOA5	PILO-A6	PILO-A7	PILO-A8	PILO-A9	PILO-B1	PILO-B2	PILO-B3
SEHS4653	Control System Analysis	TP	TP	TP M	TP	TP			TP M	TP M	TP		

* Please refer to the programme requirement document for the full version of the Outcome Statements.
T: The learning leading to the particular outcome is introduced in that subject
P: The learning leading to the particular outcome is reinforced in that subject
M: The learning leading to the particular outcome is assessed in that subject

Teaching and Learning Approach

Please refer to the Subject Description Form.

Weekly Teaching Pattern

3 hours of lecture/tutorial
6 hours of laboratory (3 hours per session in Week 7 and 9)

Tentative Teaching Schedule

Lecture			Tutorial		
No	**Content/ Topics**	**Readings/ Remarks**	**No**	**Content/ Topics**	**Readings/ Remarks**
1	Introduction to Control Systems and Elementary Mathematics		1	Introduction to Control Systems and Elementary Mathematics	
2	Mathematical Modelling of Dynamic Systems		2	Mathematical Modelling of Dynamic Systems	
3	Mathematical Modelling of Dynamic Systems		3	Mathematical Modelling of Dynamic Systems	
4	Transient and Steady-state Responses Analysis		4	Transient and Steady-state Responses Analysis	
5	System Stability and Root Locus Method		5	System Stability	
6	Frequency Response Analysis (I)		6	Root Locus Method	
7	Laboratory Session I	Submission of Take-home Assignment	7	Laboratory Session I	
8	Frequency Response Analysis (II)		8	Frequency Response Analysis (I)	
9	Laboratory Session II		9	Laboratory Session II	
10	Frequency Response Analysis (II)		10	Frequency Response Analysis (II)	
11	Control System Method (I)		11	Control System Method (I)	
12	Control System Method (II)	Submission of Laboratory Report	12	Control System Method (II)	

13	State-space Analysis		13	State-space Analysis	

Assessment Weighting

Continuous Assessment:	40%
Examination:	60%
	100%

Assessment Methods for Continuous Assessment

Continuous Assessment	Percentage	Brief Description
Test	50%	Related to Unit 1 to 4 of the lecture note in Week 10
Individual Assignment	25%	Related to Unit 1 to 4 of the lecture note
Group Project	25%	Submit a Lab report in Week 12
	100%	

Attendance and Other Rules/ Regulations

It is important that students attend classes and study-related activities regularly and punctually. Participation forms a critical part in the learning process, contributing to the desired learning outcomes. Absence will affect study progress and students should not be absent without good reason.

For the practical training subject, students are required to achieve 100% attendance in order to pass the subject.

Some subjects offered by this Programme are reimbursable under the Continuing Education Fund (CEF). To be eligible for CEF reimbursement claims, students are required to fulfil the attendance requirement, in addition to other requirements as stipulated by the Office of CEF.

Lecture/ Tutorial Notes and Assignments

Students are required to download lecture/ tutorial notes and assignments from the e-Learning platform.

Textbook and References

Recommended Textbook:
There is no prescribed textbook for this subject. Readings can include materials from the Internet and/or other materials from libraries.

References:
[1] K. Ogata, Modern Control Engineering, 5th Edition, Prentice-Hall, 2010. (TJ213.O28)
[2] M.F. Golnaraghi and B.C. Kuo, Automatic Control Systems, 9th Edition, Prentice-Hall, 2010. (TJ213.K8354)
[3] R.C. Dorf and R.H. Bishop, Modern Control Systems, 13th Edition, Pearson, 2016. (TJ216.D672)
[4] M. Gopal, Control Systems: Principles and Design, 4th Edition, McGraw-Hill, 2012. (TJ213.G66)

Journals:
Automatica
Foundations and Trends in Systems and Control
IEEE Transactions on Automatic Control

Plagiarism

You are strongly advised to pay attention to the rules and guidance notes regarding plagiarism, how sources should be referred to, and bibliography referencing as stipulated in the Student Handbook.

The School may take disciplinary actions against students when there is evidence of collusion between individuals. The work of others which is included in the assignment must be attributed to its source (a full bibliography and a list of references must be submitted). Failure to observe such requirements may lead to serious consequences for your study in this subject and your registration at the School. Please refer to the Section "Penalties for Offences" in the Student Handbook for details.

You are also strongly advised to review the hot tips about plagiarism and how to avoid it with reference to the following document: https://www.polyu.edu.hk/ogur/docdrive/Academic_Integrity/Plagiarism_Booklet.pdf.

In principle, CPCE considers GenAI tools as positive and creative forces in education and encourages their use in learning, teaching, and assessment. However, extensive copy-pasting from AI-generated content without citation is considered plagiarism.