Alanya Alaaddin Keykubat University | Faculty of Engineering
Mechanical Engineering Department
Fall 2024

Syllabus	
Code/Name	MEC 405 / Control Systems
Type	Required
Credit/ECTS	5/5
Hour per Week	3 (3+0+0)
Level/Year	Undergraduate/4
Semester	Fall
Classroom	TTTh | A203
Content	This course introduces the basic concepts of control theory. Review of Laplace transforms. Dynamic models. System response. Feedback control. Root-locus design. Frequency response design. Introduction to state-space control theory.
Prerequisites	MEC 203 Dynamics
Textbooks	***Primary*** G Franklin, JD Powell, A Emami-Naeni, Feedback Control of Dynamic Systems, Pearson, 7th Ed., 2015. ***Supplementary*** K Ogata, System Dynamics, Pearson, 4th Ed., 2004. RC Dorf, Modern Control Systems, 12th Ed., 2011.
Objectives	• To design response analysis of a dynamic system • To calculate Laplace transforms for modelling and analysing linear systems • To formulate dynamic systems using transfer functions
Course Outcomes	In this course you will be able to: CO1 Apply Laplace transform method in analysing linear systems CO2 Analyse response of various mechanical systems CO3 Assemble block diagrams of mechanical systems CO4 Solve transient response analysis problems CO5 Propose automatic controllers C06 Compute response of dynamic systems in the frequency domain

Weekly Schedule of Topics

W	Topic
1	Introduction to analysis and design of dynamic systems
2	Review of Laplace transform, LTI differential equations
3	Mathematical modelling of mechanical systems
4	Dynamic models
5	Transfer functions, block diagrams
6	Transfer functions, response analysis
7	Electromechanical systems
8	Transient response analysis of first and second order systems
9	Time-domain design
10	Automatic controllers
11	Automatic controllers
12	Stability, root-locus

13	Frequency response design
14	Introduction to state-space approach

Professional Contribution	Ability to model, analyse, and control of mechanical systems

Contribution to Program Outcomes*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	5	3	0	2	0	3	0	2	0	2	0
CO2	4	4	4	3	2	5	3	3	3	4	3
CO3	4	5	4	4	2	4	3	3	2	4	2
CO4	5	5	5	4	2	5	5	4	3	4	2
CO5	5	5	5	4	3	5	5	4	3	5	2
CO6	5	4	5	4	2	4	4	4	2	4	2

* Contribution Level | 0: None | 1: Very Low | 2: Low | 3: Medium | 4: High | 5: Very High

Special Conditions	The consequence of violation of the attendance rule is to receive a grade of **DZ.**
Requirements	Intermediate knowledge of Matlab
Course Policy	1. You must attend at least 70% of the sessions including add-drop period. 2. Be in the class on time. 3. English should always be used to communicate with one another. 4. Mobile phone should be switched off and put away during the class. 5. You cannot talk to your friends during class no matter what the subject is.
Cheating & Plagiarism	• Copying or letting someone copy your work on exams, assignments, or reports is cheating. • Cutting and pasting text, figures and tables from web sources or any other electronic source is plagiarism. • The consequence of academic dishonesty is to receive a grade of **FF** for the course.
Evaluation	Midterm Exam 40% Final Exam 60% Total 100%

Instructor

Name/Surname	Akın Oktav	Electronic mail	akin.oktav@alanya.edu.tr
Room	218	Office Hours	T 10:30-11:30 | Th 10:30-11:30

Prepared by Akın Oktav on September 2nd, 2024