

**SYLLABUS**

<b>Code/Name</b>	MCE 405 / Control Systems
<b>Type</b>	Required
<b>Credit/ECTS</b>	3/4
<b>Hour per Week</b>	3 (3+0+0)
<b>Level/Year</b>	Undergraduate/4
<b>Semester</b>	Fall
<b>Classroom</b>	D204
<b>Content</b>	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.
<b>Prerequisites</b>	MEC 203 Dynamics
<b>Textbooks</b>	<p><b>Primary</b> G Franklin, JD Powell, A Emami-Naeni, Feedback Control of Dynamic Systems, Pearson, 7th Ed., 2015.</p> <p><b>Supplementary</b> K Ogata, System Dynamics, Pearson, 4th Ed., 2004. RC Dorf, Modern Control Systems, 12th Ed., 2011.</p>
<b>Objectives</b>	<ul style="list-style-type: none"> <li>• To design response analysis of a dynamic system</li> <li>• To calculate Laplace transforms for modelling and analysing linear systems</li> <li>• To formulate dynamic systems using transfer functions</li> </ul>
<b>Course Outcomes</b>	<p>In this course you will be able to:</p> <p>C01 Apply Laplace transform method in analysing linear systems  C02 Analyse response of various mechanical systems  C03 Assemble block diagrams of mechanical systems  C04 Solve transient response analysis problems  C05 Propose automatic controllers  C06 Compute response of dynamic systems in the frequency domain</p>

**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	110	Office Hours	

Prepared by Akın Oktav