King Saud University
Mechanical Engineering Department
ME 365 – Dynamics of Mechanical Systems
Second Semester, 1442H

Introduction to physical systems; Modeling of mechanical, electrical, hydraulic, pneumatic and thermal systems; Response of first order systems; Free and forced vibration of second order systems; Free vibration and steady state response of two-degree-of-freedom systems.

Text Book: Palm W.J., *System Dynamics*, McGraw Hill, N.Y, 2005.

Reference: Ogata, *System Dynamics*, Prentice-Hall, Inc., N.Y., 4th edition
Franklin G. and Emami P., *Feedback Control of Dynamic Systems*, Prentice-Hall, Inc., N.Y., 7th edition

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Pre-requisites: GE 202 (Dynamics) & MATH 204

Objectives:

(a) Obtain adequate mathematical models for mechanical and electrical systems.
(b) Obtain adequate mathematical models for hydraulic, thermal and pneumatic systems.
(c) Demonstrate the mechanical/electrical analogy.
(d) Obtain the response via different techniques.
(e) Choose a suitable approach to solve a specific problem
(f) Introduction to vibration

Topics Covered:

WEEK	DESCRIBTION
1	Introduction to modeling of physical systems.
2, 3 & 4	Mathematical modeling of mechanical systems
5 & 6	Mathematical modeling of electrical systems
7	Mathematical modeling of hydraulic systems
8 & 9	Mathematical modeling of pneumatic and thermal systems
10	Response of first order system
11	Response of second order system
12	Free and forced vibration of second order systems
13 & 14	Free vibration and steady state response of two degree of freedom systems

Evaluation:

Tutorial	%10
Midterm I	%25
Midterm II	%25
Final Exam	%40