King Saud University
Mechanical Engineering Department
ME 364 – System Dynamics and Control
First Semester, 1442H

Modeling of physical systems: mechanical, electrical, hydraulic, pneumatic, and thermal systems; Laplace transformation; Transfer functions and block diagrams; basic concepts of automatic control; Dynamic system response and stability.

Text Books: Nise N. "Control Systems Engineering," Wiley and Sons, 6th edition.
Ogata K." System Dynamics" Pearson, Prentice Hall, 4th Edition.
Reference: Palm W.J., *Modeling, Analysis and control of dynamic systems*, Wiley and Sons, 2nd edition.

Pre-requisites: GE 202 (Dynamics)

Objectives:
1. To develop student's skills in proper modeling of mechanics to model mechanical, electrical, hydraulic, pneumatic and thermal systems.
2. To develop student's skills in analyzing dynamics systems.
3. To provide the student with some knowledge and skills associated with using computer software (MATLAB) in analyzing dynamics systems.
4. To understand professional and ethical responsibilities of an engineer.

Topics Covered:

WEEK	DESCRIPTION
1	Introduction to modelling of physical systems.
2, 3 & 4	Mathematical modeling of mechanical and electrical Systems
5 & 6	Mathematical modeling of Hydraulic, Pneumatic and a Thermal systems
7	The Laplace Transform, Solving Linear, Time-Invariant, Diff. Eqs
8 & 9	Transfer Functions, Block diagram models
10	Characteristics and performance of feedback systems. Closed-open loop comparison, Performance measures
11	System Stability, Routh Hurwitz criterion
12	Root Locus
13 & 14	Compensator design, P, PI and PID control

Evaluation:

Quizzes and Homeworks and Computer Assignments	%10
Midterm I,	%20
Midterm II,	%20
Project	%10
Final Exam	%40

1st mid-term exam Monday 25/2/1442 (12/10/2020) 6:00 PM
2nd mid-term exam Monday 8/4/1442 (23/11/2020) 6:00 PM

The first, second and final exams will be in class.