

<b>Department of Industrial Engineering</b>			
<b>Control Systems (65461)</b>			
<b>Total Credits</b>	<b>3</b>		
<b>major compulsory</b>			
<b>Prerequisites</b>	P1 : Electrical and Electronic Circuits (63291) OR Electrical Machines (63391) OR Electrical Circuits (65260)		
<b>Course Contents</b>			
Open and closed loops (feedback) control systems. Modeling of physical systems: electrical, Mechanical,. System representations: System block diagrams and signal flow graphs. State variable models. Feedback control system characteristics. Performance of feedback control systems. Steady state error coefficient. Rout locus Method. Controller Design using Root locus. Use MATLAB simulink to model systems, analyze and design controllers.			
<b>Intended Learning Outcomes (ILO's)</b>		<b>Student Outcomes (SO's)</b>	<b>Contribution</b>
1	After finishing the course, a student should be able to: Model physical systems using different modelling techniques including differential equations, state variable, block diagram and signal flow method and obtain the transfer function.	A	25 %
2	Analyzing the characteristics and performance of feedback control systems, perform stability analysis using Routh-Hurwits.	B	30 %
3	Draw Root locus for any system and design controllers using Root locus method	C	35 %
4	Using MATLAB Simulink tool in Control.	K	10 %
<b>Textbook and/ or References</b>			
John J. DAZZO and Constantine H. Houpis. LINEAR CONTROL SYSTEM ANALYSIS AND DESIGN WITH MATLAB, Fifth Edition			
<b>Assessment Criteria</b>		<b>Percent (%)</b>	
First Exam		20 %	
Second Exam		20 %	
Homeworks		10 %	
Final Exam		50 %	
<b>Course Plan</b>			
<b>Week</b>	<b>Topic</b>		
1	Introduction to Control Systems.		
2-4	Mathematical Models of Systems.		
5-6	State Variable Models, Midterm Exam I		
7-8	Feedback Control System Characteristics.		
9-10	The Performance of Feedback Control Systems, Midterm Exam II		
11-12	The Stability of Linear Feedback Systems.		
13-14	The Root Locus Method.		
14	Final Exam		