

<b>Department of Chemical Engineering</b>			
<b>Process Control (64453)</b>			
<b>Total Credits</b>	<b>3</b>		
<b>major compulsory</b>			
<b>Prerequisites</b>	P1 : Process Modeling in Chemical Engineering (64452)		
<b>Course Contents</b>			
<p>This course helps students to acquire the necessary knowledge in chemical process control. Topics covered include a review of process modeling, Laplace transformations and transfer functions, dynamic response of first and second order process, controllers, dynamic response of closed loop feedback loops and open-loop and closed-loop stability analysis using different techniques</p>			
<b>Intended Learning Outcomes (ILO's)</b>		<b>Student Outcomes (SO's)</b>	<b>Contribution</b>
1	Students should be able to demonstrate adequate mathematics knowledge (calculus, differential equations, linear algebra, complex variables, Laplace transforms) for the solution of dynamic system problems in chemical engineering.	A	40 %
2	students should be able to identify, formulate, & solve engineering problems process control in chemical engineering	E	40 %
3	students should be able to demonstrate an understanding of the strategies and methods considered in the design of a system and/or system components	C	10 %
4	students should be able to use computers and software effectively	K	10 %
<b>Textbook and/ or References</b>			
<p>)Textbook( Seborg D.E., Edgar T.F., and Mellichamp D.A., Process Dynamics and Control, Wiley, 2004 )References( Stephanopoulos G., Chemical Process Control - An Introduction to Theory and Practice, Prentice Hall, 1984. Coughanowr D.R., Process systems Analysis and Control, Second Edition, McGraw Hill, 1991. Luyben W.L., Process Modeling, Simulation and Control for Chemical Engineers, Second Edition, McGraw-Hill, 1990 Marlin T. E, Process Control, McGrawHill Book Company, Singapore, 1995</p>			
<b>Assessment Criteria</b>		<b>Percent (%)</b>	
First Exam		25 %	
Second Exam		25 %	
Homeworks		10 %	
Final Exam		40 %	
<b>Course Plan</b>			
<b>Week</b>	<b>Topic</b>		
1	Introduction to process control		
2	Theoretical Models of Chemical Processes		
3-4	Laplace Transforms		
5	Development of Transfer Function		
6	Dynamic Behavior of First and Second Order Processes First Midterm Exam		
7-8	The Response of First and second Order Process		
9	Dynamic Response Characteristics of More Complicated Processes		
10	Approximation of Higher-Order Systems Second Midterm Exam		
11	Feedback Controllers		

12	Control System Instrumentation
13-14	Dynamic Behavior of Closed-Loop Control Systems
15	Final Exam