

1.	Title of the course	Process Control and Instrumentation
2.	Course number	CH307L
3.	Structure of credits	2-1-0-3
4.	Offered to	UG
5.	New course/modification to	Modification To CH3204/12
6.	To be offered by	Department of Chemical Engineering
7.	To take effect from	January 2022
8.	Prerequisite	Nil
9.	Course Objective(s): To develop dynamic models of process systems and instruments. To analyse their dynamic characteristics, assess stability and design a feedback controller.	
10.	Course Content: First principles model development; Process dynamics for first, second and higher order systems: linearization, transfer function, effect of poles, zeros and time delays on system response; Empirical models; Control system instrumentation: level, flow, temperature, pressure, valves and actuators; Piping & instrumentation diagrams (P&ID); Open and closed loop systems; Feedback control, concepts of proportional-integral-derivative (PID) controller; Stability analysis of closed loop systems: root locus, Bode and Nyquist plots; Tuning rules; Feed forward and cascade controller; Introduction to multivariable control.	
11.	Textbook(s): 1. Seborg D E, Edgar T F, Mellichamp D A and Doyle F J, <i>Process Dynamics and Control</i> , 3rd Edition, Wiley India (2011). 2. Stephanopoulos G, <i>Chemical Process Control: An Introduction to Theory and Practice</i> , 1st Edition, Pearson Education India (2015).	
12.	Reference(s): 1. Coughanowr D R and LeBlanc S E, <i>Process Systems Analysis and Control</i> , 3rd Edition, Tata McGraw Hill (2013). 2. Ogunnaike B and Ray W H, <i>Process Dynamics, Modelling and Control</i> , 1st Edition, Oxford University Press (1994). 3. Sinnott R K and Towler G, <i>Coulson and Richardson's Chemical Engineering: Chemical Engineering Design, Volume 6</i> , 3rd Edition, Butterworth-Heinemann (2015).	