

1.	Title of the course	Process Control and Instrumentation
2.	Course number	CH3204
3.	Status of the course	Core
4.	Structure of credits	2-1-0-3
5.	Offered to	UG
6.	New course/modification to	New course
7.	To be offered by	Department of Chemical Engineering
8.	To take effect from	January 2022
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	Course Objective(s): To develop dynamic models of process systems and instruments. To analyse their dynamic characteristics, assess stability and design a feedback controller.	
12.	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.	
13.	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).	
14.	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).	