

Year & Sem: E2S1	Course Code:CH2105	Course Name: Process Dynamics & Control	No. of Credits: 4	L 2	T&PS 2	P 0
UNIT I: Instrumentation: Characteristics Of Measurement System- Pressure Measurement- Temperature Measurement - Flow Measurement- Measurement- Instruments For Analysis UNIT II: Introduction to process dynamics and control: Laplace transforms, Inverse Laplace transform, Response of First Order Systems. Physical examples of first order systems- Liquid level, Mixing process, R- C circuit, Linearization. Response of first order systems in series-interacting and non- interacting systems, second order systems, transportation lag. UNIT III: Control system: Components of a control system, Servo Vs regulator problem, development of block diagram. Controllers and final control elements: Control valve and its construction, sizing and characteristics, P, PD, PI, PID controllers. UNIT IV: Stability: Concept of Stability, Stability criterion, Routh test for stability Root locus: concept of root locus, plotting the root locus diagram. Introduction to frequency response, Bode diagrams. Control systems design by frequency response: Bode stability criterion, Gain and Phase margins. UNIT V: Process identification: Step, frequency and pulse testing, process identification using response curve, tangent method. Tuning of P, PD, PI, PID controllers, trial and error method, Ultimate gain and ultimate period, Ziegler- Nichols technique, Cohen and Coon rules. UNIT VI: Advanced control strategies, Cascade control, feed forward control, ratio control, Smith predictor, dead time compensation, internal model control. References/Text Books: 1. Process Systems Analysis and Control, 2nd ed., D.R. Coughanowr, McGraw-Hill, 1991 2. Chemical Process Control, G. Stephanopoulos, PHI Learning Pvt. Ltd., New Delhi, 2010 3. Process Control, B.W. Bequette, PHI Learning Pvt. Ltd., New Delhi, 2010 Lecture Plan: Unit-I & -II syllabus for MID-I, Unit-III & -IV syllabus for MID-II and Unit-V & -VI syllabus for MID-III examinations.						