



***Strategic Plan for Learning and Teaching
Department of Chemical Engineering***

Branch Name:	Chemical Engineering (CHE)	Session :	2018-2019
Subject Name:	Instrumentation & Process Control	Year:	4 th
Subject Code:	CHE 702	Semester :	7 th

Course Objective:	<ul style="list-style-type: none"> • With an objective to develop the knowledge to gain the knowledge of different process instruments • To understand dynamic modeling of a physical process using first principles, • To convert the model to a form amenable to solution and analysis, • To design various control schemes, and To apply the control system in various processes
Course Outcome:	Knowledge of field instrumentations, dynamic modeling and system behavior study for the designing of controllers and the application of control systems in processes

Teaching-Learning Plan:

Lecture Class No.	Reference to the WBUT Syllabus	Subject Topics to be discussed/ covered/ delivered	Text book / Referred book Sl.No.	
1	Module-I	Principles of measurement, Error analysis of Instruments, Static & Dynamic Characteristics of Instruments		
2		Temperature measurement: Filled system Thermometer, Thermocouples, RTD, Pyrometers		
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8				Manometers : Pressure measurement ;U-Tube manometer, Inclined limb manometer, ring balance; Elastic deformation: bourdon, bellow, diaphragm; Electrical gauges: strain gauges, piezoelectric, pressure transducer
9				Vacuum Gauges: mechanical, electrical and ionization types
10				Flow measurement, Liquid-level measurement
11	Module-II		Linearization and concept of deviation variables, Laplace transform	
12		Forcing function step, impulse, ramp, sinusoidal etc.		
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15			First order system; transfer function ,response of different forcing functions;	
16			Two first order systems in series: interacting & non-interacting	
17			Second order system: under-damped, critically damped & over-damped,	
18			Transportation lag, Lumped and distributed system	
19			Revision class with problems	
20				
21	Module-III		P, PI, PD, PID & their transfer function	
22		Different types of control valves; characteristic curve & transfer function, servo & regulatory control		
23				
24			Elementary idea of feed forward, feed back, cascade, ratio.	
25			Block diagram of different chemical process units, open loop & closed loop transfer function	
26				

27		Simple models : stirred tank, shell & tube heat exchanger, distillation column, different types of controllers	
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30			
31	Module-IV	Definition of stability, concept of unbound function	
32		Routh Array, Bode stability analysis	
33		Nyquist stability criteria, Root Locus method, Zeigler-Nichols controller settings,	
34			
35		Adaptive & digital control. Concept of PLC & DCS	
36			
37		Application of MATLAB for analyzing stability of the system	
38			
39		Practice session with problems	
40			

Recommended Text/ Reference Books:

Sl.No.	Name of Text/ Reference Book	Name of Author	Publisher & edition
1	Process system analysis & Control	D. R. Coughnowr	MGH
2	Chemical Process Control	G. Stephenopoulus	PHI
3	Principles of Industrial Instrumentation	D. Patranabis	Tata McGraw Hill

Course Co-ordinator / Faculty

Sl. No.	Name of the Course Co-ordinator / Faculty	Signature of Course coordinator / Faculty		Signature of HOD	
1	Prof. (Dr.) A.K. Das				
2	Dr. Debasish Ghosh				