22PCM401T					Process Control					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hours/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
2	0	0	2	2	25	50	25	--	--	100

COURSE OBJECTIVES:

- Understanding of types of controllers and their selection.
- To learn controller tuning techniques.
- To understand multivariable controllers and their tuning.
- To illustrate various advanced control strategies like feed forward control, cascade control, ratio control, etc and their applications.
- To understand distributed control system and their applications.

UNIT I: I**ntroduction of Controller** **7 Hr.**

Review of Controller selection and design for feedback control loops. Feedback controllers, actions, types, reset windup. Tuning of feedback controllers, tuning controllers for integrating processes, synthesis of feedback controllers, tuning rules. Controller design issues, Analysis of typical control loops.

UNIT II: Controller Design **6 Hr.**

Multi variable process control, Interaction analysis and multiple single loop design, relative gain array, loop pairing, design and tuning of multivariable controller. Multivariable controller trouble shooting.

UNIT III: Advanced Control Strategy **6 Hr.**

Advanced control strategies, feed forward, cascade, advanced supervisory, model predictive control, multivariable control, introduction to digital control principles, microprocessor-based control.

UNIT IV: Application of Control Systems **7 Hr.**

Control loop hardware and troubleshooting. Aspects of distributed control systems, programmable logic controllers, fieldbus technology. Actuator systems, Sensor systems. Troubleshooting control loops.

Max 26 Hr.

COURSE OUTCOMES

On completion of the course, the student will be able to

CO1: Select controllers based on system requirements.
CO2: Develop capability to tune based on process response
CO3: Analyse multi loop and multivariable control strategies
CO4: Understand distributed and digital control
CO5: Apply advanced control strategies to implement in operating decisions
CO6: Utilise process control hardware effectively

TEXT BOOK (S) & REFERENCE BOOKS

1. D. R. Coughnowr, Process System Analysis and Control, 3rd Ed., McGraw-Hill Inc., 2013.
2. W. B. Bequette, Process Control: Modeling, Design and Simulation, Prentice Hall, 1998.
3. G. Stephanopoulos, Chemical Process Control: An Introduction to Theory & Practice, PHI, 1983.
4. D.Seborg, T.F. Edgar Duncan, A. Mellichamp, Process Dynamics and Control,3rd Ed., John Wiley & Sons, Inc, 2010.
5. B.Roffel, B.Betlem, Process Dynamics and Control: Modeling for Control & Prediction, John Wiley & Sons, 2006.

END SEMESTER EXAMINATION QUESTION PATTERN

Max. Marks: 100 **Exam Duration: 3Hrs**

Part A/Question: Four questions from each unit 40 Marks

Part B/Question: Four questions from each unit 60 Marks