1. Subject Code: EP-314 Course Title: Instrumentation and Control

2. Contact Hours : L : 3 T : 1 P : 0
3. Examination Duration (Hrs.) : Theory : 3 Practical : 0
4. Relative Weight : CWS : 25 PRS : 0 MTE : 25 ETE : 50 PRE : 0
5. Credits : 4
6. Semester : EVEN
7. Subject Area : DEC-4
8. Pre-requisite : Nil

S. No.	Contents	Contact Hours
1.	**Instrumentation:** Transducers, classification & selection of transducers, strain gauges, inductive & capacitive transducers, piezoelectric and Hall-effect transducers, thermisters, thermocouples, photo-diodes & phototransistors, encoder type digital transducers, signal conditioning and telemetry, basic concepts of smart sensors and application	**12**
2.	Control System:Linear, Non Linear, Time Varying and Linear Time Invariant System, Servomechanism, Historical Development of Automatic Control and Introduction to Digital Computer Control, Mathematical Models of Physical Systems, Differential Equations of Physical Systems, Transfer Functions, Block Diagram Algebra and Signal Flow Graphs. Feedback and Non-feedback Systems Reduction of Parameter Variations By Use of Feedback Control Over System Dynamics By Use of Feedback Control of Effects of Disturbance Single By Use of Feedback and Regenerative Feedback.	**12**
3.	**Time and frequency response Analysis:** Standard test signals, Time responseofFirst order Systems, Time Response of Second-Order Systems, Steady-State Error and Error Constants, Effect of Adding a Zero to a System, P, PI and PID Control Action and Their Effect, Design Specifications of Second-Order Systems and Performance Indices. Correlation Between Time and Frequency Response, Polar Plots, Bode Plots, and All Pass and Minimum-Phase Systems.	**10**
4.	The Concept of Stability, Necessary Conditions for Stability, Hurwitz Stability Criterion, Routh Stability Criterion and relative Stability Analysis. The Root Locus Concept, Construction of Root Loci, Root Contours, Systems with Transportation Lag, Sensitivity of the Roots of the Characteristic equation, Mathematical Preliminaries, Nyquist Stability Criterion, Definition of Gain Margin and Phase Margin, Assessment of Relative Stability Using Nyquist Criterion and Closed-Loop Frequency Response.	**8**
	Total	**42**

9. Objective : Develop detailed knowledge of instruments and Control
10. Details of Course:

11.Suggested Books

S. No.	Name of Books/ Authors	Year of Publication/ Reprint
1.	Modern Electronic Instrumentation and Measurement Techniques by Helfrick and Cooper Prentice- Hall of India, Reprint	1988.
2.	Electrical Measurement and Measuring Instruments by Golding, E.W. 3rd Edition; Sir Issac Pitman and Sons,	1960.
3.	Control Systems Engineering by Nagrath& Gopal New Age International. Publishers	6th Edition
	Instrumentation Measurement and Feedback" by Jones,	1986