STATE INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Electrical Engineering

LESSON PLAN

Faculty Name: Dr. Monika Gaba (Assistant Professor)
Subject Name:-Control System **Subject Code: B24-EE-301**
Year:-3rd Year **Semester: 5th**

Lecture No	Unit No	Topic	COs Covered
L 1	Unit-I	Control Systems: Basics & Components	CO1
L 2		Industrial Control examples	
L 3		Mathematical models of physical systems (Translational)	
L 4		Mathematical models of Rotational Mechanical systems	
L 5		Mathematical models of Levered Mechanical systems	
L 6		Mathematical models of Thermal, Fluid and Pneumatic Mechanical systems	
L 7		Force-Torque-Voltage Analogy and Force-Torque-Current Analogy, Electrical and Mechanical Analogue of the system	
L 8		Control hardware and their models	
L 9		Feedback Control: Open-Loop and Closed-loop systems	
L 10		Transfer function models of linear time-invariant systems	
L 11		Benefits of Feedback	
L 12		Block diagram algebra	
L 13		Signal Flow graph	
L 14	Unit-II	Standard test signals, Time response of first and second order systems for standard test inputs	
L 15		Application of initial and final value theorem	
L 16		Time Response of second-order system	
L 17		Steady State Error and Error Constants	
L18		Design Specifications of Second Order System	
L19		Concept of Stability, Hurwitz Stability Criteria	
L 20		Routh Stability criteria, Relative Stability analysis	
L 21		Root-Locus technique, Discussion of Rules for Construction	
L 22		Discussion of Rules for Construction	
L 23		Numerical	
L24		Revision	

L 25	Unit -III	Relationship between time and frequency response	
L 26		Polar plot and construction of Polar plots for different Type and order of the system	
L 27		Nyquist stability criterion	
L 28		Construction of Nyquist plots	
L 29		Relative stability using Nyquist criterion – gain and phase margin	
L 30		Closed-loop frequency response	
L 31		Closed-loop frequency response	
L32		Numerical	
L33		Revision	
L34	Unit-IV	Concepts of state variables	CO4
L35		State space model for linear Continuous-time system using physical variables	
L36		State space model for linear Continuous-time system using phase variables	
L 37		State space model for linear Continuous-time system using canonical variables	
L 38		Derivation of transfer function from state Model	
L 39		Eigen values and vectors, Solution of State space equations	
L 40		Computation of state transition matrix	
L 41		Concept of controllability	
L 42		Concept of observability	
L 43		Numerical	
L 44		Revision	
L 45		Discussion of Previous Year Question Papers	
L 46		Revision of Important concepts from all the units	

Text Books:

1. Ogata K., "Modern Control Engineering," Prentice Hall, 5th Edition, 2010.
2. Nagrath I.J. and Gopal M., "Control System Engineering," New Age International Publishers, 3rd Edition, 2003.

References:

1. Kuo B.C., "Automatic Control System," Prentice Hall, 9th Edition, 2014.
2. Dorf R.C. and Bishop R.H., "Modern Control Systems," Addison-Wesley, 11th Edition, 2008.
3. Nise N.S., "Control Systems Engineering," Wiley, 7th Edition, 2015.'

Web resources:

1. https://nptel.ac.in/courses/107106081
2. https://nptel.ac.in/courses/108102043