No	Course Information	
1	Unit name:	Linear Control System I
2	Code:	EP 41027
3	Classification:	Engineering subject
4	Credit value:	2.5
5	Semester/ Year Offered:	1/4
6	Pre-requisite:	3011(EECA)
7	Mode of delivery:	Lecture, Tutorial
8	Assessment system and breakdown of marks:	
	Test	20%
	Mid-term/ final Examination	30%
9	Academic staff teaching unit:	
10	Course outcome of unit: In this course students will be able ➢ to describe the definitions of the components of the functional block diagram for Control System ➢ to apply the loop and node equations with the state and output equations of the electric and mechanical circuit with independent variables ➢ to apply state transition matrix(STM) in State-Variable Equations	
11	Synopsis of unit: The course covers the linear system. The course introduces students to control system, definitions of control system, electric circuit and components, state concepts, transfer function and block diagram, Lagrange's equation, standard input to control systems, transient response: classical method, CAD accuracy checks (CADAC), state-variable equations, evaluating the transition matrix and complete solution of the state equation.	

Topic:

Chapter	Title
1.	**Introduction**
	1.1 Introduction 1.2 Introduction to Control Systems 1.3 Definitions 1.4 Historical Background 1.5 Digital Control Development 1.6 Mathematical Background 1.7 The Engineering Control Problem 1.8 Computer Literacy 1.9 Outline of Text
2	**Writing System Equations**
	2.1 Introduction 2.2 Electric Circuits and Components 2.3 State Concepts 2.4 Transfer Function and Block Diagram 2.5 Mechanical Translation Systems 2.6 Analogous Circuits 2.7 Mechanical Rotational Systems 2.8 Effective Moment of Inertia and Damping of a Gear Train 2.9 Thermal Systems 2.10 Hydraulic Linear Actuator 2.11 Liquid-Level System 2.12 Rotating Power Amplifiers 2.13 DC Servomotor 2.14 AC Servomotor 2.15 Lagrange's Equation
3	**Solution of Differential Equations**
	3.1 Introduction 3.2 Standard Inputs to Control Systems 3.3 Steady-State Response: Sinusoidal Input

	3.4 Steady-State Response: Polynomial Input 3.5 Transient Response: Classical Method 3.6 Definition of Time Constant 3.7 Example: Second-Order System Mechanical 3.8 Example: Second-Order System Electrical 3.9 Second-Order Transients 3.10 Time-Response Specifications 3.11 CAD Accuracy Checks (CADAC) 3.12 State-Variable Equations 3.13 Characteristic Values 3.14 Evaluating the State Transition Matrix 1 3.15 Complete Solution of the State Equation
14	Main references: 1 D'Azzo, J.J., and C.H. Houpis: Linear control system analysis and design: conventional and modern, 4th ed., McGraw- Hill, New York, 1995
15	Additional references: Fundamentals of Electric Circuits, 3rd Edition, Alexander and Sadiku