No	Course Information	
1	Unit name:	Modern Control System I
2	Code:	EP- 51017
3	Classification:	Engineering subject
4	Credit value:	2.5
5	Semester/ Year Offered:	1/5
6	Pre-requisite:	Linear Control System
7	Mode of delivery:	Lecture, Tutorial
8	Assessment system and breakdown of marks:	
	Test	20%
	Mid-term Examination	30%
9	Academic staff teaching unit:	
10	Course outcome of unit: In this course students will be able – to define a control system, describe some applications, the basic features, design objectives and a control system's design process – to find the transfer function from a differential equation and solve the differential equation using the transfer function for linear, time-invariant electrical, mechanical, and electromechanical systems – to analyze the modeling of electrical and mechanical system in state space and convert a state-space representation to a transfer function – to analyze the system transient response and demonstrate application of the system model.	
11	Synopsis of unit: The course introduces students to the theory and practice of control systems engineering. This course is designed to provide the electrical engineering students with an understanding of the modern control system. Each chapter begins with a list of chapter learning outcomes, followed by a list of case study learning outcomes that	

	relate to specific student performance in solving a practical case study problem, such as an antenna azimuth position control system.
	Topic: **Chapter Title** **1. Introduction** - A History of Control System - System configurations - Analysis and Design Objectives - Design Process - Computer- Aided Design - Control System Engineer **2. Modeling in the Frequency Domain** -Introduction -Laplace Transform Review -The transform Function -Electrical Network Transform Function -Translational mechanical System Transfer Function - Rotational mechanical System Transfer Function -Transfer Function for System With Gears - Electromechanical System Transfer Function -Electrical Circuit Analogs -Nonlinearities -Linearization **3. Modeling in the Time Domain** -Introduction -Some observations -The General State-Space Representation -Appling the State-space Representation -Converting a Transfer Function to State Space -Converting from State Space to transfer Function -Linearization

	4. Time Response -Introduction -Poles, Zeros, and System Response -First-Order Systems -Second-Order System -The General Second- Order System -Underdamped Second- Order System -System Response With Additional Poles - System Response With Zeros -Effects of Nonlinearities Upon Time Response -Laplace Transform Solution of State Equations -Time Domain Solution of State Equations
14	Main references: (1) Control Systems Engineering, Sixth Edition, Norman S. Nise California State Polytechnic University, Pomona
15	Additional references: Linear Control system Analysis and Design With Matlab, Fifth Edition, Revised and Expanded John J. D'Azzo and Constantine H. Houpis, and Stuart N. Sheldon