EE 419- MODERN CONTROL SYSTEMS

CREDIT HOURS

3 Hours

CONTACT HOURS (Hours/week)

Lecture: 2; Tutorial: 2; Lab: 2

TEXT BOOK

G. F. Franklin & J.D. Powell & A.E. Naeinin, "Feedback Control of Dynamic Systems", Addison Wesley Publisher, latest edition

COURSE DESCRIPTION

General revision for root locus and frequency response. Lead compensator design by root locus method. Lag compensator design by root locus method. Lag lead compensator design by root locus method. Lead compensator design by frequency response technique. Lag compensator design by frequency response technique. Introduction to state space representation. Methods of writing state equation. Solution of the state equation. Controllability and observability. State variable feedback. Introduction to digital control systems. The z- transform. Block diagram representation digital systems. Time response of digital systems. Stability analysis for digital systems.

PREREQUISITE:

EE 418

RELATION OF COURSE TO PROGRAM

Required

COURSE INSTRUCTION OUTCOMES

The student will be able to:

get acquainted with the classical methods of design the state space method of design for both continuous and discrete time systems.

TOPICS COVERED

- Lead compensation design.
- Lag compensation design.
- Lag-Lead compensation design.
- Lead compensation by frequency response.
- Lag compensation by frequency response.
- Introduction to state-space.
- Methods of state space representation.
- Solution of state equation.
- Controllability – observability.
- State variable feedback.

- Introduction to digital control systems.
- The z-transform
- Block diagram of digital systems.
- Time response of digital systems.
- Stability analysis for digital systems.

CONTRIBUTION OF COURSE TO MEET THE REQUIREMENTS OF CRITERION 5:

Professional component Content			
Math and Basic Sciences	**Engineering Topics**	**General Education**	**Other**
	✓		

RELATIONSHIP OF COURSE TO STUDENT OUTCOMES:

Student Outcomes		Course aspects
A	An ability to apply knowledge of mathematics, science, and engineering	a_1 a_2
B	An ability to design and conduct experiments, analyze and interpret data.	b_1 b_2 b_3 b_4
C	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economics, environmental, social, political, ethical, health, and safety, manufacturability, and sustainability	c_1 c_2 c_3
D	An ability to function on multi-disciplinary teams.	
E	An ability to identify, formulate, and solve engineering problems	e_1 e_2 e_3
F	An understanding of professional and ethical responsibility	
G	An ability to communicate effectively	
H	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and social content	
I	A recognition of the need for, and an ability to engage in life-long learning.	
J	A knowledge of contemporary issues within and outside the electrical engineering profession.	
k	An ability to use the techniques, skills, and modern engineering tools necessary for electrical engineering practice.	k