EE 412- Control Systems (2)

CREDIT HOURS
3 Hours

CONTACT HOURS (Hours/week)
Lecture: 2; Tutorial: 2

COURSE COORDINATOR
Dr Hassan Ibrahim

TEXT BOOK:
Benjamin C. Kuo, "Automatic Control Systems", Prentice Hall

COURSE DESCRIPTION:
Introducing the topic and stating the definitions of new terminology. State model of linear systems using physical variables. State - space representation using phase variables. State - space representation using canonical variables. Properties of transition matrix and solution of state equation. Poles - zeros, eigenvalues and stability in multivariable system. Introduction to pole placement in state feedback in state feedesign. Introduction to pole - placement in state feedback design. Introduction to nonlinear control systems. Nonlinear systems theory and common non-linearities. Describing function method. Nature and stability of limit cycle. The phase- plane method.

PREREQUISITE:
EE 411

RELATION OF COURSE TO PROGRAM:
Required

COURSE INSTRUCTION OUTCOMES:
The student will attain the ability to analyze and design of control system via modern approaches and using matrix manipulation techniques.

TOPICS COVERED:

- Modelling of linear systems.
- Representation using phase variables.
- State space using canonical form.
- Properties of state transition matrix.
- Pole/Zero eigen values.
- Pole placement in state feedback.
- Introduction to non linearity.
- Common non linearity.

- Describing function method.
- Limit cycle.
- Phase plane method

CONTRIBUTION OF COURSE TO MEET THE REQUIREMSNTS OF CRITERION 5:

Professional Component Content			
Math and Basic Sciences	**Engineering Topics**	**General Education**	**Engineering Design**

RELATIONSHIP OF COURSE TO STUDENT OUTCOMES:

Student Outcomes		Course Outcomes
a.	An ability to apply knowledge of mathematics, science, and engineering.	√
b.	An ability to design and conduct experiments, analyze and interpret data.	
c.	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	√
d.	An ability to function on multi-disciplinary teams.	
e.	An ability to identify, formulate, and solve engineering problems.	√
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 societal 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.	