EE 411- Control Systems (1)

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:
Mathematical modeling of physical systems. Frequency response analysis. Polar plots. Bode diagrams. More topics on Bode diagrams. Concept of stability in control systems. Routh's stability criterion. Nyquist stability criterion. Application of Nyquist stability criterion on Bode plots. Root locus method. More topics on root locus. Types of compensators in control systems. Lead compensation in root locus. Lead compensation in frequency domain. Feed forward control. Lag compensation in frequency domain. PID compensation.

PREREQUISITE:
EE 311

RELATION OF COURSE TO PROGRAM:
Required

COURSE INSTRUCTION OUTCOMES:
The student will attain the ability to analyze and design control systems via classical approaches.

TOPICS COVERED:

- Mathematical modeling of physical systems.
- Frequency response analysis using Polar plots and Bode diagrams.
- Concept of stability in control systems. In time and frequency domain.
- Application of Nyquist stability criterion on Bode plots.
- Lead, lag and lead/lag compensation in time and frequency domain.
- PID compensation.

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.	√