

EE 516- Modern Control Systems

CREDIT HOURS

3 Hours

CONTACT HOURS (Hours/week)

Lecture: 2; Tutorial: 2

COURSE COORDINATOR

Dr Hassan Ibrahim

TEXT BOOK:

K. Ogata, "Modern Control Engineering", Prentice Hall

COURSE DESCRIPTION:

Further state-space analysis: Linear systems with multiple eigenvalues, Non linear state-space representation, Linearization, Jacobian matrices, Decomposition of system into controllable and uncontrollable parts, Deadbeat response-pole assignment with state and with output feedback. Use of observer. Introduction to advanced control topics: optimal control. Adaptive control systems. System identification of dynamic systems, least squares, Theory and implementation for system estimation.

PREREQUISITE:

EE 412 or EE 418

RELATION OF COURSE TO PROGRAM:

Elective

COURSE INSTRUCTION OUTCOMES:

The student is capable of extending state-space analysis and gains an appreciation of recent advances in control engineering such as pole assignment, observers design, introduction to optimal, adaptive and identification techniques.

TOPICS COVERED:

- State-space analysis: Linear systems with multiple eigenvalues,
- Non linear state-space representation
- Linearization and Jacobian matrices,
- Decomposition of system into controllable and uncontrollable parts
- Deadbeat response-pole assignment with state and with output feedback
- Introduction to advanced control topics: optimal control. Adaptive control systems.
- System identification of dynamic systems, least squares,
- Theory and implementation for system estimation

**CONTRIBUTION OF COURSE TO MEET THE REQUIREMENTS 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 context	
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.	√