جـامعـة الشـارقـة
UNIVERSITY OF SHARJAH

College of Engineering

Department of Electrical Engineering

Digital Control Systems

Course Description:

Discrete-time systems and the Z-transform. Sampling and reconstruction. Open-loop and closed-loop discrete-time systems. System time-response characteristics. Stability analysis techniques. Digital controller design. State-space representations of discrete-time systems. Pole-assignment design and stat estimation. Linear quadratic optimal Control.

Course Learning Outcomes:

By the end of successful completion of this course, the student will be able to:

1. Apply the mathematics of sampled-data control systems
2. Analyze digital control systems in time domain
3. Analyze digital control systems in frequency domain
4. Perform classical digital controller design
5. Perform pole assignment design and state estimation on digital control systems

Alignment of Course Student Learning Outcomes to Program Student Learning Outcomes

SN	Program SLOs	Course SLOs
(1)	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	- Apply the mathematics of sampled-data control systems - Analyze digital control systems in time domain - Analyze digital control systems in frequency domain - Perform classical digital controller design - Perform pole assignment design and state estimation on digital control systems

SN	Program SLOs	Course SLOs
(2)	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	- Analyze digital control systems in time domain - Analyze digital control systems in frequency domain - Perform classical digital controller design - Perform pole assignment design and state estimation on digital control systems - Perform pole assignment design and state estimation on digital control systems
(3)	Communicate effectively with a range of audiences	
(4)	Describe ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
(5)	Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	- Apply the mathematics of sampled-data control systems
(6)	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	- Analyze digital control systems in time domain - Analyze digital control systems in frequency domain - Perform classical digital controller design - Perform pole assignment design and state estimation on digital control systems - Perform pole assignment design and state estimation on digital control systems
(7)	Apply new knowledge as needed, using appropriate learning strategies	