ENG321 Digital Control System Design

Level: 3
Credit Units: 5 Credit Units
Language: ENGLISH
Presentation Pattern: EVERY JAN

Synopsis:

This course provides students with the analytical tools to understand systems from digital control engineering perspective and the tools and technologies to solve such problems.

It guides students to identify relevant system properties and parameters and to formulate mathematical models that allow the use of either classical or modern control theories to evaluate system performances and to design feedback control solutions to meet performance specifications.

It can be applied to sensors and transducer systems, to modeling and understanding of biomedical systems as well as in the manufacturing of batch products (pharmaceutical and drugs), discrete components and systems (disk drives, automation and MEM) and flow processes (petrol-chemical and oil and gas).

Students will also be introduced to Computer simulation Design Tools such as Matlab/Quanser.

Topics:

- Introduction to Discrete-Time Control Systems.
- Properties and Theorems of z-transforms.
- z-plane analysis of Discrete-Time Control Systems.
- Design of Discrete-Time Control Systems by conventional methods.
- State -Space analysis.
- Pole placement and Observer Design.

Textbooks:

Ogata, K: Discrete-Time Control Systems Prentice-Hall
ISBN-13: 9789810676117

Ogata, K: Discrete-Time Control Systems Prentice-Hall
ISBN-13: 9789810676117-AA

Learning Outcome:

- Discuss the discrete-time control system theory, transfer function and state-space equation of control systems.
- Analyze the discrete-time control systems in the z-plane.
- Determine the transfer function, stability and the transient/ steady-state response of a digital control system.
- Calculate settling time, feedback gain and other parameters associated with digital control systems.
- Construct the controllability matrix, observability matrix and other matrices associated with control system design.
- Design a digital control system meeting the required specifications.
- Use software tools to study digital control system design.

Assessment Strategies:

Continuous Assessment Component	**Weightage (%)**
PRE-CLASS QUIZ	2
CLASS TEST	8
PRE-CLASS QUIZ	2
CLASS TEST	8
PRE-CLASS QUIZ	2
LAB TEST	8
Sub-Total	**30**

Examinable Component	**Weightage (%)**
Written Exam	70
Sub-Total	**70**

Weightage Total	**100**