THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Digital Control Engineering

MECHENG 7290

Credit Hours:
3.00 - 3.00

Course Levels:
Graduate (5000-8000 level)

Course Components:
Lecture

Course Description:
Theory of digital control engineering and its applications to the control of engineering systems including machines, vehicles, and processes.

Prerequisites and Co-requisites:
Prereq: 3360 and 3361, or 482 and 571, or Grad standing in MechEng, or permission of instructor.

Course Goals / Objectives:
- Given a sampled-data system, students will be able to obtain the discrete-time model transfer function using using transform techniques as well as state-space methods
- Given a sampled-data system, students will be able to characterize the transient response, frequency response, and stability of the system using analytical approaches as well as computer tools such as Matlab
- Given a continuous-time process, students will be able to synthesize a digital controller using transform techniques as well as state-space methods
- Given a design, students will be able to evaluate the performance of the control system using computer simulation

Course Topics:

- Discrete time signals and Z-transform
- Discrete time systems and transfer functions
- Discrete models of sample-data systems
- Frequency response & time response
- Block diagram & selection of sampling rate
- Stability of digital control systems
- Digital control system design (lead/lag compensators, direct design, internal model control, motion tracking)
- State-space representation
- Properties of state-space models (stability, controllability, observability)
- State feedback control (pole placement, state estimation, observer state feedback)
- Optimal control
- Repetitive control
- Other special topics

Designation:

Elective