

EEL 6682 Intelligent Control

Credits: 3 credits

Textbook, title, author, and year: Class Notes

Reference materials: N/A

Specific course information

Catalog description:

Recent trends related to learning and decision-making capabilities of intelligent control systems using neural networks and fuzzy logic. Emphasis on controller design for industrial applications.

Prerequisites: Graduate Standing or permission from instructor

Specific goals for the course:

This course aims at providing graduate students a comprehensive view of recent developments in computational intelligent design techniques using neural networks and Fuzzy logic. Various schemes are critically analyzed in order to provide a framework for students' projects. Upon completion of this course, the student should be able to:

- Know the concept of Neural Network, Fuzzy Logic and Evolutionary Computation (EC).
- Learn about the application of NN, FL and EC to industrial process
- Design intelligent Systems.
- Evaluate the design according to the provided criterions

Brief list of topics to be covered:

1. Introduction and motivation.
2. Engineering System design: Conventional approaches.
3. Intelligent Control : Needs, Visions and issues.
4. Learning and decision making for intelligent systems
4. Neural Network and Intelligent Control.
5. Supervised and unsupervised learning.
6. Systems modeling using Neural Networks.
7. Industrial applications of Intelligent Control using NN:
 - * *Temperature control system*
 - * *Inverse pendulum balancer*
 - * *Trailer truck Backer-upper*
 - * *Manufacturing*
 - * *Desalination technology*
 - * *Computer Networking*
 - * *Chemical processes*

- * *Oil refinery processes*
- * *Aircraft control*
- * *Other industrial applications*

8. Fuzzy Set and Fuzzy logic.

9. Knowledge based motion systems with fuzzy logic.

10. Industrial applications of Intelligent Control fuzzy Logic.

- * *Steam Engine: First Application of Fuzzy Control*

- * *Washing Machine*