COURSE	Name	: Intelligent System and Control
	Code	: EE185522
	Credit(s)	: 2
	Semester	: (Elective Course)

Description of Course

The course of Intelligent Systems and Control studies system design methods and controls using fuzzy control methods and neural networks and genetic algorithms. Fuzzy systems and controls based on the Takagi-Sugeno model are used to represent the dynamics of a nonlinear system with a rule basis for controllers using the concept of Parallel Distributed Compensation. Fuzzy system design validation is applied to the real system. Neural network methods are also discussed and used for the purposes of designing a system and its controls, while genetic algorithms are used to solve optimization problems in the control system.

Learning Outcomes

Knowledge

(P02) Mastering engineering concepts and principles to develop the necessary procedures and strategies for systems analysis and design in the areas of power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

(P03) Mastering the factual knowledge of information and communication technology as well as the latest technology and its utilization in the field of power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

Specific Skill

(KK01) Being able to formulate engineering problems with new ideas for the development of technology in power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

(KK03) Being able to produce system design for problem solving by utilizing other fields of study and concerning technical standards, performance aspect, reliability, ease of application, and assurance of sustainability.

General Skill

(KU07) Being able to improve the capacity of learning independently.

(KU11) Being able to implement information and communication technology in the context of execution of his/her work.

Attitude

(S09) Demonstrating attitude of responsibility on work in his/her field of expertise independently.

(S12) Working together to be able to make the most of his/her potential.

Course Learning Outcomes

Knowledge

Mastering the concepts and principles of intelligent systems and control for real system analysis and design with the help of Matlab / Simulink.

Specific Skill

Able to design smart systems and controls for real systems with the help of Matlab / Simulink.

General Skill

Able to increase self-capacity in overcoming system design problems and self-regulation through system design and intelligent control using Matlab / Simulink to perform system design simulation.

Attitude

Demonstrate an attitude of being responsible for the tasks given independently and able to work together in teams to obtain good system design and control.

Main Subjects

1. Introduction to Intelligent System and Control
2. Fuzzy Systems
3. The aplication of fuzzy control to pendulum-cart system
4. Neural Network and its aplication in control systems
5. Optimization using Genetic Algorithm

Reference(s)

[1] Kevin M. Passino and Stephen Yurkovich, “Fuzzy Control,” Addison-Wesley Longman Inc., 1998.
[2] Kazuo Tanaka, Hua O. Wang, “Fuzzy Control Systems Design and Analysis: A Linear Matrix Inequality Approach,” John Wiley & Sons, 2001
[3] Stuart J. Russell and Peter Norvig, “Artificial Intelligence: A Modern Approach,” 3rd Edition., Pearson Education, Inc., 2010
[4] Melanie Mitchell., An Introduction to Genetic Algorithms., the MIT press, 1996
[5] Stephen I. Gallant, “Neural Network Learning and Expert Systems,” the MIT press, London,1993

Prerequisite(s)

--