



INSTITUT TEKNOLOGI SEPULUH NOPEMBER (ITS)
FAKULTAS TEKNOLOGI ELEKTRO DAN INFORMATIKA CERDAS
DEPARTEMEN TEKNIK ELEKTRO
Program Studi Sarjana (S1) Teknik Elektro

INSTITUT TEKNOLOGI SEPULUH NOPEMBER (ITS)
FACULTY OF INTELLIGENT ELECTRICAL & INFORMATICS TECHNOLOGY
DEPARTMENT OF ELECTRICAL ENGINEERING
Bachelor Degree Program in Electrical Engineering

1	Nama Mata Kuliah / Course Name : Dasar Sistem Elektronika Cerdas / <i>Basic Intelligent Electronic System</i>
2	Kode Mata Kuliah / Course Code : EE234551
3	Kredit / Credits : 2 SKS
4	Semester / Semester : 5

Deskripsi Mata Kuliah / Course Description

Mata kuliah Dasar Sistem Elektronika Cerdas mempelajari prinsip dasar dari komponen-komponen dalam sistem cerdas seperti machine learning (neural network, visual recognition), machine reasoning (fuzzy system), dan optimisasi (genetic algorithm). / *The Basic Smart Electronics Systems course covers the fundamental principles of components in smart systems such as machine learning (neural networks, visual recognition), machine reasoning (fuzzy systems), and optimization (genetic algorithms).*

Capaian Pembelajaran Lulusan (CPL) Yang Dibebankan Mata Kuliah / Program Learning Outcomes Charged to The Course

- CPL 6 Mampu mengkaji dan memanfaatkan matematika, ilmu pengetahuan alam dan teknologi serta mengidentifikasi, memformulasikan dan menyelesaikan permasalahan di bidang teknik elektro / *Able to evaluate and utilize mathematics, natural sciences, and technology, as well as identify, formulate, and solve problems in the field of electrical engineering.*
- CPL 7 Mampu mengetahui dan mengaplikasi metode, keahlian sesuai perkembangan terkini di bidang ilmu pengetahuan dan teknologi untuk menyelesaikan permasalahan teknik elektro dengan mengedepankan nilai-nilai universal / *Able to understanding and applying the latest methods and skills in the field of science and technology to solve electrical engineering problems while emphasizing universal values.*

Capaian Pembelajaran Mata Kuliah / Course Learning Outcomes

1. Menguasai konsep dan metode pembelajaran dalam neural network / *Mastering the concepts and learning methods in neural networks.*
2. Menguasai metode dalam visual recognition / *Mastering methods in visual recognition.*
3. Menguasai konsep fuzzy logic dan fuzzy inference system / *Mastering the concept of fuzzy logic and fuzzy inference systems.*
4. Menguasai konsep genetic algorithm / *Mastering the concept of genetic algorithms.*

Pokok Bahasan / Contents

1. Dasar neural network / *Basics of neural networks*
2. Metode pembelajaran dalam neural network / *Learning methods in neural networks*
3. Topik dalam rekognisi visual / *Topics in visual recognition*
4. Fuzzy logic dan fuzzy inference system / *Fuzzy logic and fuzzy inference systems*
5. Genetic algorithm / *Genetic algorithms*

Prasyarat / Pre-requisite

Metode Numerik / *Numerical Methods*

Pustaka / Reference

1. Martin T. Hagan, Howard B. Demuth, Mark Hudson Beale, Orlando De Jesus, "Neural Network Design", 2014
2. Frederic M Hum, and Ivica Kostanic, "Principles of Neurocomputing for Science & Engineering", McGraw Hill Inc., 2001.
3. JSR Jang, CT Tsun, "Neuro-Fuzzy and Soft Computing", Prentice Hall Inc., 1997.
4. T. Ross, "Fuzzy Logic with Engineering Applications", McGraw Hill Inc., 1995.
5. James M. Keller, Derong Liu, David B. Fogel, "Fundamentals of Computational Intelligence: Neural Networks, Fuzzy Systems, and Evolutionary Computation", Wiley-IEEE Press, 2016

COURSE	Name	: Basic Intelligent Electronic System
	Code	: EE184940
	Credits	: 3
	Semester	: Elective

Description of Course

Basic Intelligent Electronic System course discusses the basic principles of components in intelligent systems such as machine learning (neural network, visual recognition), machine reasoning (fuzzy system), and optimization (genetic algorithm). In this lecture, the design of intelligent electronics systems for particular applications, and an implementation of intelligent systems in microcontroller-based embedded systems (e.g., raspberry pi, Arduino, and so forth), will also be studied.

Learning Outcomes

Knowledge

(P03) Mastering the concepts and principles of design procedure in power systems, control systems, multimedia telecommunications, or electronics.

(P05) Mastering the factual knowledge about information and communication technology, and the latest technology and its applications in power systems, control systems, multimedia telecommunications, or electronics.

Specific Skill

(KK03) Able to describe system design for problem solving in power systems, control systems, multimedia telecommunications, or electronics by concerning technical standards, performance aspect, reliability, ease of application, and assurance of sustainability.

(KK05) Able to utilize analytical and engineering design tools based on appropriate information and computation technology to perform engineering activities in power systems, control systems, multimedia telecommunications, or electronics.

General Skill

(KU01) Able to apply logical, critical, systematic and innovative thinking in the context of development or implementation of science and technology that concerns and implements the value of humanities in accordance with their area of expertise.

Attitude

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

Course Learning Outcomes

Knowledge

Mastering the basic principles of the components in an intelligent system.

Specific Skill

Able to design and realize intelligent electronics systems for specific applications.

General Skill

Able to use electronic devices and software to realize an intelligent system.

Attitude

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

Main Subjects

1. Fundamentals of neuroscience and neuron modeling, neural network feedforward model and feedback propagation.
2. Learning methods in neural network.
3. Topics on visual recognition.
4. Fuzzy logic and fuzzy inference system.
5. Genetic algorithm.
6. Design and implementation of intelligent electronics systems.

Reference(s)

- [1] NK Bose, and P. Liang, "Neural Network Fundamental", McGraw Hill Inc., 1996.
- [2] Frederic M Hum, and Ivica Kostanic, "Principles of Neurocomputing for Science & Engineering", McGraw Hill Inc., 2001.
- [3] JSR Jang, CT Tsun, "Neuro-Fuzzy and Soft Computing", Prentice Hall Inc., 1997.
- [4] T. Ross, "Fuzzy Logic with Engineering Applications", McGraw Hill Inc., 1995.
- [5] David B Fogel, "Evolutionary Computation", IEEE Press.

Prerequisite(s)

EW184004 Numerical Methods
