HANDBOOK

BACHELOR OF INFORMATICS PROGRAM
DEPARTMENT OF INFORMATICS
FACULTY OF INTELLIGENT ELECTRICAL AND INFORMATICS TECHNOLOGY
INSTITUT TEKNOLOGI SEPULUH NOPEMBER

Module name	**Computational Intelligence**
Module level	Undergraduate
Code	IF184503
Courses (if applicable)	**Computational Intelligence**
Semester	Odd
Contact person	Dr. Eng. Nanik Suciati, S.Kom, M.Kom
Lecturer	Prof.Ir.Handayani Tjandrasa, M.Sc, Ph.D. Dr. Eng. Nanik Suciati, S.Kom, M.Kom Dr. Eng. ChastineFatichah, S.Kom, M.Kom Dini Adni Navastara, S.Kom., M.Sc.
Language	Bahasa Indonesia and English
Relation to curriculum	1. Undergraduate degree program; mandatory; 5^{td}, 7th semester. 2. International undergraduate program; mandatory; 5^{td}, 7th semester.
Type of teaching, contact hours	1. Undergraduate degree program: lectures, < 60 students, 2. International undergraduate program: lectures, < 40 students
Workload	1. Lectures: 3 x 50 = 150 minutes (2 hours 30 minutes) per week. 2. Exercises and Assignments: 3 x 60 = 180 minutes (3 hours) per week. 3. Private study: 3 x 60 = 180 minutes (3 hours) per week.
Credit points	3 credit points (sks).
Requirements according to the examination regulations	A student must have attended at least 80% of the lectures to sit in the exams.
Mandatory prerequisites	Artificial Intelligence

Learning outcomes and their corresponding PLOs	After completing this module, a student is expected to:	
	CO1 Students are able to explain classifiers with linear and non-linear discriminant functions, Perceptron, Support Vector Machine (SVM)	PLO3
	CO2 Students are able to explain the Fuzzy Logic and its use in rule-based systems, examples of the system controllers.	PLO3
	CO3 Students are able to explain the Decision Tree and the establishment of an optimal structure as well as the occurrence of overfitting.	PLO3
	CO4 Students are able to implement the methods that have been discussed such as SVM, Fuzzy Logic, and Decision Tree, in an application.	PLO3
	CO5 Students are able to explain the various methods of clustering and its use.	PLO4
	CO6 Students are able to explain the method of artificial neural networks with backpropagation algorithm, the non-linearly separable problems, neurofuzzy, and SOM	PLO4
	CO7 Students are able to implement the methods of clustering and neural networks in an application.	PLO4
	C08 Students are able to explain the methods of optimization with evolutionary algorithms: Genetic Algorithm (GA), Ant Colony (ACO), and Particle Swarm Optimization (PSO).	PLO4
Content	Knowledge: Mastering concept and principles of Intelligent System such as representation and reasoning techniques, searching technique, intelligent agent, data mining, machine learning, and development of intelligent application in various fields, and also mastering concept and principles of computation science such as manage information, multimedia data processing, and numerical analysis Specific Skill: Able to desain and develop applications using principles of intelligent systems and computing science to produce intelligent applications in various fields	
Study and examination requirements and forms of examination	Mid-terms examination and Final examination.	
Media employed	LCD, whiteboard, websites, books (as references), etc.	
Assessments and Evaluation	CO1: Problem 1 in mid-term exam (5%) and exercise 1 (5%) - 10% CO2: Problem 2 in mid-term exam (5%) and exercise 2 (5%) -	

	10% CO3: Problem 3 in mid-term exam (5%); problem 4 in mid-term exam (5%); assignment 1: make an algorithm and computer program (5%); and exercise 3 (5%) - 20% CO4: Problem 5 in mid-term exam (5%); problem 1 in final exam (5%) and exercise 4 (5%) - 15% CO5: Problem 2 in final exam (5%); assignment 2: make a function and recursive (5%); and exercise 5 (5%) - 15% CO6: Problem 3 in final exam (5%) and exercise 6 (5%) - 10% CO7: Problem 4 in final exam (5%) and exercise 7 (5%) - 10% CO8: Problem 5 in final exam (5%) and assignment 3: make a program based on a real-life problem (5%) - 10%
Reading List	Sergios Theodoridis, Konstantinos Koutroumbas, Pattern Recognition, 4th ed., Elsevier Inc., 2009. R.O. Duda, P.E.Hart, D.G.Stork, Pattern Classfication, John Wiley & Sons, Inc., 2001 Amit Konar, Computational Intelligence, Springer, 2005. C. H. Bishop, Pattern Recognition and Machine Learning, Springer Science, 2006 Simon Haykin, Neural Networks: A Comprehensive Foundation (2nd Edition), Prentice Hall, 1998.