UNDERGRADUATE PROGRAM IN COMPUTER SCIENCE
DEPARTMENT OF COMPUTER SCIENCE AND ELECTRONICS
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS GADJAH MADA

Module name	**Artificial Neural Network**
Module level	Undergraduate
Code	MII-4403
Courses (if applicable)	Artificial Neural Network
Semester	Odd (Ganjil)
Contact person	Prof. Sri Hartati, M.Sc., Ph.D
Lecturer	Prof. Sri Hartati, M.Sc., Ph.D
Language	Bahasa Indonesia and English
Relation to curriculum	1. Undergraduate degree program, elective, 5th or 7th semester. 2. International undergraduate program, elective, 5th or 7th semester.
Type of teaching, contact hours	1. Undergraduate degree program: lectures, < 60 students, Wdnesday, 12.30-15 2. International undergraduate program: lectures, < 30 student, Monday, 09.30-12.00.
Workload	1. Lectures: 3 x 50 = 150 minutes (2.5 hours) 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 75% of the lectures to sit in the exams.
Recommended prerequisites	Artificial Intelligence
Learning outcomes and their corresponding PLOs	After completing this module, a student is expected to: ***CO1*** Understand about the tendency of science and technology development especially related to the development of Artificial Neural Network — PLO2 ***CO2*** Understand about the issues of learning and generalizations on neural computing — PLO3 ***CO3*** Understand about the different kind of artificial neural network — PLO3 ***CO4*** Understand about the Support Vector Machine network — PLO3 ***CO5*** Understand about the Hopfiled network — PLO3 ***CO6*** Be able to apply the known architecture of ANN using the available packages. — PLO4
Content	This course covers the theoretical and practical aspects of ANN. Topics to be covered by this course include • The basics of neural network computing, which differs from the algorithmic approach, the traditional AI problem solving, and the Von Neumann architecture. • Important neural network models, such as Adaline and Perceptron, feedforward and network feedback, repeating networks, self-regulating networks (Kohonen Model and ART model from Grossberg), and thermodynamic networks (Hopfield Model, Boltzmann / Gauss / Cauchy machines). • Learning methods, such as the Hebbian learning, Perceptron learning theorem,

	backward propagation learning, uncompetitive competitive learning. Emphasis is on the basics of related models and techniques. In this course we will also analyze the mathematical properties of some network models, and their limitations. Applications and practical considerations of this technique will be discussed. This course deals mainly with aspects of JST computation, therefore, familiarity with data structures, algorithmic analysis, linear algebra and differential equations are helpful, no knowledge of biological / psychological / cognitive science is required.
Study and examination requirements and forms of examination	Midterms examination and Final examination.
Media employed	LCD, blackboard, websites, and big data tools.
Assessments and Evaluation	

CO	PLO	Metode EvalFinal Exami	Tipe	Persentase	Total
CO-1	PLO2	Exercise 1 in Midterm	Summative	10%	10%
CO-2	PLO3	Assignment 1	Formative	5%	15%
		Exercise 2 in Midterm	Summative	10%	
CO-3	PLO3	Assignment 2	Formative	5%	25%
		Exercise 3 in Midterm	Summative	10%	
		Exercise 4 in Midterm	Summative	10%	
CO-4	PLO3	Exercise 1 in Final Exam	Summative	10%	20%
		Exercise 2 in Final Exam	Summative	10%	
CO-5	PLO3	Assignment 3	Formative	5%	15%
		Exercise 3 in Final Exam	Summative	10%	
CO-6	PLO4	Assignment 4	Formative	5%	15%

Reading List	**a.** Laurene Fausett, 2004, Fundamentals of Neural Networks: Architecture, Algorithms, and Application b. Simon Haykin, 2002, Neural Networks a Comprehensive Foundation, Pearson Education