MODULE HANDBOOK
Master Program in Computer Science
Department of Computer Science and Electronics
Faculty of Mathematics and Natural Sciences
Universitas Gadjah Mada

Computational Intelligence and Machine Learning

Module name	**Computational Intelligence and Machine Learning**		
Module level	Master		
Code	MII 6452		
Courses (if applicable)	Computational Intelligence and Machine Learning (Kecerdasan Komputasional dan Pembelajaran Mesin)		
Semester	Even (Genap)		
Contact person	Wahyono, S.Kom., Ph.D Afiahayati, S.Kom., M.Cs., Ph.D		
Lecturer	Wahyono, S.Kom., Ph.D Afiahayati, S.Kom., M.Cs., Ph.D		
Language	Indonesia		
Relation to curriculum	Master program, elective, 2nd semester		
Type of teaching, contact hours	Master program : lectures, <17 student		
Workload	1. Lectures: 3×50 = 150 minutes (2.5 hours) per week 2. Exercises and Assignments: 3×60 = 180 minutes (3 hours) per week 3. Private study: 3×60 = 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	MII 5051 Artificial Intelligence		
Learning outcomes and their corresponding PLOs	After completing this module, a student is expected to:		
	CO	**Description**	**Supported PLO**
	CO-1	Students are able to explain the different characteristics of soft computing and artificial intelligence, soft computing methods and their applications	PLO2, PLO9
	CO-2	Students are able to explain the basic concepts of evolutionary computing and apply them effectively to build efficient and appropriate solutions to the real problems.	PLO2, PLO4, PLO5, PLO8

	CO-3	Students are able to explain the definition and examples of swarm intelligence algorithms and apply one of the swarm intelligence algorithms namely PSO for real problems	PLO2, PLO4
	CO-4	Students are able to explain the SVM mechanism and kernel functions used in SVM and ANN as well as deep learning and apply it effectively for real problems and analyze the results comprehensively	PLO2, PLO4, PLO5, PLO7, PLO8
	CO-5	Students are able to explain the basic concepts, types and applications of hybrid systems and apply it for real problems.	PLO2, PLO4, PLO9
Content	Computational intelligence and machine learning courses are designed to provide knowledge of artificial intelligence, especially those related to soft computing and its applications. The material discussed includes soft computing and AI characteristics, soft computing methods, soft computing applications, genetic algorithms, genetic programming, definition and examples of swarm intelligence algorithms, PSO, SVM, ANN and deep learning, hybrid systems and their applications		
Study and examination requirements and forms of examination	Mid-term examination Final examination Assignments		
Media employed	LCD, blackboard, websites, and books		

Assessments and Evaluation

CO	Assessment Methods	Supported PLO	Type	Percentage	Total
CO-1	Problem 1 of midterm exam	PLO2	Summative	7,5%	12,5%
	Assignment/ Quiz	PLO9	Formative	5%	
CO-2	Problem 2 of midterm exam	PLO2	Summative	7,5%	22,5%
	Project/ Group Task	PLO4	Summative	5%	
		PLO5		2,5%	
		PLO8		2,5%	
	Problem 1 of final exam	PLO4	Summative	5%	
CO-3	Problem 3 of midterm exam	PLO2	Summative	5%	10%
	Assignment/ Quiz	PLO4	Summative	5%	
CO-4	Problem 4 of midterm exam	PLO2	Summative	5%	40%

		Problem 2 of final exam	PLO2	Summative	10%	
		Problem 3 of final exam	PLO4	Summative	10%	
		Assignment/ Quiz	PLO4	Formative	5%	
		Project/ Group Task	PLO5	Formative	2,5%	
			PLO7		2,5%	
			PLO8		2,5%	
			PLO9		2,5%	
	CO-5	Problem 4 of final exam	PLO4	Summative	5%	15%
		Assignment/ Quiz	PLO2	Formative	5%	
			PLO4		2,5%	
			PLO9		2,5%	
Reading List	• E. Russell, Computational Intelligence: Concept to Implementation, Morgan Kaufmann, 2007. • I. Goodfellow, Y. Bengio, A. Courville: Deep Learning, MIT, 2015 • R. Leszek, Computational Intelligence Methods and Techniques, SpringerVerlag, 2010. • Marsland, S., Machine Learning: An Algorithmic Perspective. CRC Press. 2009. • A.E. Elben and J.E. Smith, Introduction to Evolutionary Computing, Springer, 2010. • D.E. Goldberg, Genetic Algorithm in search, optimization, and machine learning, Addison-Wiley, 1989. • Simon O. Haykin, Neural Networks and Machine Learning, 3rd Edition, Prentice Hall, 2008.					