

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

Module name	Fuzzy Logic																					
Module level	Undergraduate																					
Code	MII-4405																					
Courses (if applicable)	Fuzzy Logic (Logika Fuzzy)																					
Semester	Odd (Ganjil)																					
Contact person	Aina Musdholifah, S.Kom., M.Kom., Ph.D.																					
Lecturer	Drs. Retantyo Wardoyo, M.Sc. Ph.D. Aina Musdholifah, S.Kom., M.Kom., Ph.D.																					
Language	Bahasa Indonesia and English																					
Relation to curriculum	undergraduate program, election, 5 th semester.																					
Type of teaching, contact hours	Undergraduate program: lectures, < 60 student, Friday, 08.30-11.00. International undergraduate program: lectures, < 20 student, Wednesday, 07.30-10.00.																					
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	<p>After completing this module, a student is expected to:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">CO1</td> <td style="width: 70%;">Be able to design fuzzy membership function</td> <td style="width: 20%; text-align: right;">PLO-4</td> </tr> <tr> <td>CO2</td> <td>Be able to explain and apply the properties of fuzzy sets, operators on fuzzy sets: complement, s-norm and t-norm</td> <td style="text-align: right;">PLO-5</td> </tr> <tr> <td>CO3</td> <td>Be able to explain and apply fuzzy relations, and fuzzy relation compositions, and properties of fuzzy relations.</td> <td style="text-align: right;">PLO-3</td> </tr> <tr> <td>CO4</td> <td>Be able to explain and apply linguistics, fuzzy propositions, operators for fuzzy logics, fuzzy implications fuzzy rules</td> <td style="text-align: right;">PLO-4</td> </tr> <tr> <td>CO5</td> <td>Be able to explain and apply generalised modus ponens; generalised modus tollens; generalised hypothetical syllogism</td> <td style="text-align: right;">PLO-4</td> </tr> <tr> <td>CO6</td> <td>Be able to explain and apply fuzzy systems, fuzzification and defuzzification.</td> <td style="text-align: right;">PLO-4</td> </tr> <tr> <td></td> <td></td> <td style="text-align: right;">PLO-5, PLO-9</td> </tr> </table>	CO1	Be able to design fuzzy membership function	PLO-4	CO2	Be able to explain and apply the properties of fuzzy sets, operators on fuzzy sets: complement, s-norm and t-norm	PLO-5	CO3	Be able to explain and apply fuzzy relations, and fuzzy relation compositions, and properties of fuzzy relations.	PLO-3	CO4	Be able to explain and apply linguistics, fuzzy propositions, operators for fuzzy logics, fuzzy implications fuzzy rules	PLO-4	CO5	Be able to explain and apply generalised modus ponens; generalised modus tollens; generalised hypothetical syllogism	PLO-4	CO6	Be able to explain and apply fuzzy systems, fuzzification and defuzzification.	PLO-4			PLO-5, PLO-9
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Content	Fuzzy logics is a course in the field of Intelligent Systems. Fuzzy logics is a development of classical logics in which it contains 2 truth values only: True/False, 1/0. The truth value in fuzzy logics is extended in a certain interval, especially [0, 1]. This extension values cause different interpretation of the logical operators: not, and,																					

	or. It also causes different interpretation of implications, modus ponens, and so on. Fuzzy logics is very useful in control systems, expert systems, and classification systems.																																																																				
Study and examination requirements and forms of examination	Midterms examination and Final examination.																																																																				
Media employed	LCD, blackboard, and websites.																																																																				
Assessments and Evaluation	<table border="1"> <thead> <tr> <th>CO</th> <th>Evaluation Methodes</th> <th>PLO</th> <th>Type</th> <th>Percentage</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td rowspan="2">CO-1</td> <td>HW 1</td> <td>PLO-4</td> <td>Formatif</td> <td>7.5%</td> <td rowspan="2">15%</td> </tr> <tr> <td>Problem 1 in midterm exam</td> <td>PLO-5</td> <td>Summatif</td> <td>7.5%</td> </tr> <tr> <td rowspan="2">CO-2</td> <td>Problem 2 in midterm exam</td> <td>PLO-3</td> <td>Summatif</td> <td>7.5%</td> <td rowspan="2">15%</td> </tr> <tr> <td>Quiz 1</td> <td>PLO-4</td> <td>Formatif</td> <td>7.5%</td> </tr> <tr> <td>CO-3</td> <td>Problem 3 in midterm exam</td> <td>PLO-4</td> <td>Formatif</td> <td>7.5%</td> <td>7.5%</td> </tr> <tr> <td rowspan="3">CO-4</td> <td>Problem 4 in midterm exam</td> <td>PLO-4</td> <td>Formatif</td> <td>5%</td> <td rowspan="3">22.5%</td> </tr> <tr> <td>Quiz 2</td> <td>PLO-4</td> <td>Formatif</td> <td>7.5%</td> </tr> <tr> <td>Problem 1 in final exam</td> <td>PLO-4</td> <td>Summatif</td> <td>10%</td> </tr> <tr> <td rowspan="2">CO-5</td> <td>Quiz 3</td> <td>PLO-4</td> <td>Formatif</td> <td>7.5%</td> <td rowspan="2">17.5%</td> </tr> <tr> <td>Problem 2 in final exam</td> <td>PLO-4</td> <td>Summatif</td> <td>10%</td> </tr> <tr> <td rowspan="2">CO-6</td> <td>Problem 3 in final exam</td> <td>PLO-5</td> <td>Summatif</td> <td>10%</td> <td rowspan="2">22.5%</td> </tr> <tr> <td>Project 1</td> <td>PLO-5</td> <td>Formatif</td> <td>5%</td> </tr> <tr> <td></td> <td>PLO-9 Formatif 7.5%</td> </tr> </tbody> </table>	CO	Evaluation Methodes	PLO	Type	Percentage	Total	CO-1	HW 1	PLO-4	Formatif	7.5%	15%	Problem 1 in midterm exam	PLO-5	Summatif	7.5%	CO-2	Problem 2 in midterm exam	PLO-3	Summatif	7.5%	15%	Quiz 1	PLO-4	Formatif	7.5%	CO-3	Problem 3 in midterm exam	PLO-4	Formatif	7.5%	7.5%	CO-4	Problem 4 in midterm exam	PLO-4	Formatif	5%	22.5%	Quiz 2	PLO-4	Formatif	7.5%	Problem 1 in final exam	PLO-4	Summatif	10%	CO-5	Quiz 3	PLO-4	Formatif	7.5%	17.5%	Problem 2 in final exam	PLO-4	Summatif	10%	CO-6	Problem 3 in final exam	PLO-5	Summatif	10%	22.5%	Project 1	PLO-5	Formatif	5%		PLO-9 Formatif 7.5%
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Reading List	<p>Wang, L., 1997, "A Course in Fuzzy Systems and Control", Prentice-Hall International, Inc., New Jersey.</p> <p>Zimmerman, H.J., 1991, "Fuzzy Set Theory and Its Applications", Kluwer Publishing Co, Amsterdam.</p> <p>Kaufmann, A. and M.M. Gupta, 1991, "Introduction to Fuzzy Arithmetic Theory and Applications", Van Nostrand Reinhold, New York.</p> <p>Klir, G.J. and T.A. Folger, 1988, "Fuzzy Sets, Uncertainty, and Information", Prentice-Hall, New Delhi.</p>																																																																				