



MODULE HANDBOOK

Fuzzy Logic

BACHELOR DEGREE PROGRAM
DEPARTMENT OF MATHEMATICS
FACULTY OF SCIENCE AND DATA ANALYTICS
INSTITUT TEKNOLOGI SEPULUH NOPEMBER

MODULE HANDBOOK

FUZZY LOGIC

Module name	Fuzzy Logic	
Module level	Undergraduate	
Code	KM184829	
Course (if applicable)	Fuzzy Logic	
Semester	Spring (Genap)	
Person responsible for the module	Prof. Dr. Mohammad Isa Irawan, MT	
Lecturer	Prof. Dr. Mohammad Isa Irawan, MT	
Language	Bahasa Indonesia and English	
Relation to curriculum	Undergraduate degree program, elective , 8 th semester.	
Type of teaching, contact hours	Lectures, <60 students Tuesdays, 11.00-12.50 (GMT+7)	
Workload	<ol style="list-style-type: none"> 1. Lectures : 2 x 50 = 100 minutes per week. 2. Exercises and Assignments : 2 x 60 = 120 minutes (2 hours) per week. 3. Private learning : 2 x 60 = 120 minutes (2 hours) per week. 	
Credit points	2 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	Math logic	
Learning outcomes and their corresponding ILOs	<p>Course Learning Outcome (CLO) after completing this module,</p> <p>[CLO-1] Students are good at explaining the concept of crisp set in set theory</p> <p>[CLO-2] Students are able to explain the concept of fuzzy set, how relationships and fuzzy membership value mechanism</p> <p>[CLO-3] Students are able to explain the algebra of the fuzzy set (T-norm and T-conorms), Hedges, fuzzy arithmetic, fuzzy reasoning and propositions</p> <p>[CLO-4] Students are able to explain the concept of rule based system characteristics, production system,</p>	

	<p>fuzzification and data-system defuzzification. driven, and expert system rule base</p> <p>[CLO-5] Students are able to explain the concept of rule based expert system, forward and backward chaining, and overcome the uncertainty in rule based system.</p> <p>[CLO-6]Students are able to explain the concept of uncertainty in a rule-based system, a combination of fuzzy numbers and membership, Bayes method and Dempster-shafer</p> <p>[CLO-7]Students are able to explain data modification and truth value, selection of reasoning type, fuzzification and defuzzification</p> <p>[CLO-8]Students are able to explain fuzzy applications for pattern recognition including fuzzy clustering, fuzzy time series, fuzzy pattern recognition.</p> <p>[CLO-9]Students are able to explain fuzzy decision making, including multi criteria, multi person and multi stage, fuzzy staged decision making, fuzzy ranking method and fuzzy linear programming</p>	
Content	<p>This lecture aims to provide the basic concepts of fuzzy logic and its applications. This lecture consists of two parts: a theory section and an application section. The first part (theory section) covers the basic concepts of fuzzy sets and operations, fuzzy measures and measurement fuzziness, extension of fuzzy theory to numbers and functions, fuzzy relations and fuzzy graphs, development of fuzzy properties to probability and fuzzy sets. The second part is an application part consisting of fuzzy inference techniques, inference applications for fuzzy logic, and fuzzy set models in operations research.</p>	
Study and examination requirements and forms of examination	<ul style="list-style-type: none"> • In-class exercises • Assignment 1, 2, 3 • Mid-term examination • Final examination 	
Media employed	<p>LCD, whiteboard, websites (myITS Classroom), zoom.</p>	
Reading lists	<p>Main :</p> <ol style="list-style-type: none"> 1. Kwang H. Lee, "First Course on Fuzzy Theory and Applications", Penerbit Springer Verlag Berlin, 2005 <p>Supporting :</p> <ol style="list-style-type: none"> 1. Zimmerman, "Fuzzy Set and Fuzz Logic", Kluwer Publishing, 1991 2. William Siler and James J. Bookley, "Fuzzy Expert System and Fuzzy Reasoning", Penerbit Wiley and Sons, Inc, 2006 	

	3. George J. Klir dan Bo Yuan, "Fuzzy Set and Fuzzy Logic", Prentice Hall, 1995
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