



# UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Department of Mathematics

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## Master in Mathematics

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## MODULE HANDBOOK

Module Name	Fuzzy Logic
Module level, if applicable	Master
Code, if applicable	MMM 5214
Subtitle, if applicable	
Courses, if applicable	
Semester(s) in which the module is taught	Second year
Person responsible for the module	Budi Surodjo
Lecturer(s)	All eligible lecturers
Language	Indonesia
Relation to curriculum	Elective courses
Teaching methods	Lecture, presentation
Workload (incl. contact hours, self-study hours)	3 hours lectures, 3 hours supervised activities, 3 hours individual learning per week, 14 weeks per semester, total 9 hours x 14 weeks = 126 hours per semester.
Credit points	3
Required and recommended prerequisites for joining the module	Before taking this course, students must have knowledge of conventional logic (binary logic), tautology, basic theory of analysis, and probability theory.

Module objectives/intended learning outcomes	<p>Upon successful completion of this course, students are able to:</p> <p>CO1: Prove the fundamental properties of fuzzy sets and fuzzy logic.</p> <p>CO2: Generalize the classical algebraic system into a fuzzy algebraic system and prove the applicable properties</p> <p>CO3: Prove the importance of fuzzy inference and being able to apply it to other fields and the real world, especially the design of intelligent systems or humanistic systems.</p> <p>CO4 : Prove the fuzzy arithmetic properties</p>															
Content	<p>Fuzzy sets and related concepts (membership functions, algebraic operations), fuzzy mapping and extension principles, fuzzy numbers and relations. Binary logic, fuzzy logic, and their relationship. Classical and fuzzy propositions. Classical inference and fuzzy inference, fuzzy arithmetic systems, and fuzzy logic applications.</p>															
Examination forms	Oral presentation, essay, project															
Study and examination requirements	<p>The final mark will be weighted as follows:</p> <table border="1"> <thead> <tr> <th>No</th> <th>Assessment methods (components, activities)</th> <th>Weight(%)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Final Examination</td> <td>35%</td> </tr> <tr> <td>2</td> <td>Mid-Term Examination</td> <td>30%</td> </tr> <tr> <td>3</td> <td>Projects (Presentation)</td> <td>25%</td> </tr> <tr> <td>4</td> <td>Peer Assessment/Quiz</td> <td>10%</td> </tr> </tbody> </table>	No	Assessment methods (components, activities)	Weight(%)	1	Final Examination	35%	2	Mid-Term Examination	30%	3	Projects (Presentation)	25%	4	Peer Assessment/Quiz	10%
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1	Final Examination	35%														
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3	Projects (Presentation)	25%														
4	Peer Assessment/Quiz	10%														
Media employed	LCD, Laptop, Zoom media															
Reading list	<p>Barnabas Bede, 2012, <i>Mathematics of Fuzzy set and Fuzzy Logic</i>, Springer</p> <p>Chen, G. and Tat Pham, T. , 2001, <i>Introduction to Fuzzy Sets, Fuzzy Logic, and Fuzzy Control Systems</i>, CRC Press LLC,  <a href="http://sc.uaemex.mx/xose/html/clases/logica/articles/libro_fuzzy_logic.pdf">http://sc.uaemex.mx/xose/html/clases/logica/articles/libro_fuzzy_logic.pdf</a></p> <p>James J. Buckley, J.J. and Eslami, E., 2002, <i>An Introduction to Fuzzy Logic and Fuzzy Sets</i>, Springer  <a href="https://link.springer.com/book/10.1007%2F978-3-7908-1799-7">https://link.springer.com/book/10.1007%2F978-3-7908-1799-7</a></p> <p>Klir, G.J., and Bo Yuan, 1995, <i>Fuzzy Sets and Fuzzy Logic.</i>, Prentice Hall</p> <p>Setiadji, 2009, <i>Himpunan dan Logika Samar dan Aplikasinya</i>, Graha Ilmu</p>															

### CO-PLO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
CO 1		V	V			
CO 2				V	V	V
CO 3		V	V		V	V
CO 4		V	V			

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