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Master in Mathematics

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MODULE HANDBOOK

Module Name	Fuzzy Multi-objective Linear Programming
Module level, if applicable	Master Program
Code, if applicable	MMM 6306
Subtitle, if applicable	
Courses, if applicable	Fuzzy Multi-objective Linear Programming
Semester(s) in which the module is taught	1st(first)
Person responsible for the module	Chair of the Lab. of Applied Mathematics
Lecturer(s)	Dr.Indarsih
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the first year (1st semester) Master in Mathematics.
Teaching methods	Lectures, structured activities (assignments, quizzes, team-project), seminar.
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week, in total is 16 weeks per semester, including mid-term exam and final exam.
Credit points	*3*
Required and recommended prerequisites for joining the module	Students have taken the course of Linear programming.

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>After completing this course the students should have:

• CO1 ability to solve fuzzy linear programming
• CO2 ability to solve multi-objective linear programming with fuzzy approach.
• CO3 ability to solve the fuzzy multi-objective linear programming.
• CO4 ability to apply the fuzzy multi-objective linear programming in the real problem.</td></tr>
<tr><td>Content</td><td>Introduction: fuzzy set, fuzzy number, fuzzy arithmetic, fuzzy rangking, fuzzy decision.
The relationship beetween goal programming and fuzzy programming.
Multi-objektif linear programming (MOLP): optimal solution, optimal pareto, goal programming, fuzzy goal programming for solving MOLP.
Fuzzy linear programming: Decision making under fuzzy environment and fuzzy linear programming.
Fuzzy MOLP: MOLP with fuzzy right hand side and fuzzy technology coefficient, Fuzzy Decisive Set Method, deviation degree measures and weighted max–min method, linear membership function.
Fuzzy goal programming (FGP): method for solving FGP
Application of Fuzzy MOLP: case study</td></tr>
<tr><td>Examination forms</td><td>Written assignments, written exams, case-based assignments, quizzes, oral presentation.</td></tr>
<tr><td>Study and examination requirements</td><td>To pass the course, the minimum grade is C.

The final mark will be weighted as follows:

<table>
<tr><th>No</th><th>Assessment methods (components, activities)</th><th>Weight (percenta-ge)</th><th>Cogni-tive</th><th>Case/Pr oject Based</th></tr>
<tr><td>1.</td><td>Final Examination</td><td>25</td><td>15</td><td>10</td></tr>
<tr><td>2.</td><td>Mid-Term Examination</td><td>25</td><td>15</td><td>10</td></tr>
<tr><td>3.</td><td>Quiz, Homework,</td><td>30</td><td>20</td><td>10</td></tr>
<tr><td>4.</td><td>Presentation</td><td>20</td><td>-</td><td>20</td></tr>
<tr><td></td><td>TOTAL</td><td>100%</td><td>50%</td><td>50%</td></tr>
</table>
</td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer, e-learning, zoom, LINGO</td></tr>
</table>

Reading list	1. Bector, C.R. and Chandra, S., 2005, *Fuzzy Mathematics Programming and Fuzzy Matrix Games*, Springer. 2. Sakawa, M, 1993, *Fuzzy Sets and Interactive Multi-objective Optimization*, Plenum Press, New York. 3. Mohamed, R.H., 1997, The relationship beetween goal programming and fuzzy programming, *Fuzzy Sets and Systems*, Vol 89, pp. 215-222. 4. Veeramani,C., Duraisamy,C. and Nagoorgani,A., 2011, Solving Fuzzy Multi-Objective Linear Programming Problems with Linear Membership Functions, *Australian Journal of Basic and Applied Sciences*, 5(8), pp.1163-1171. 5. Cheng, H., Huang, W., Zhou, Q., and Cai, J., 2013, Solving fuzzy multi-objective linear programming problems using deviation degree measures and weighted max–min method, *Applied Mathematical Modelling* , Vol 37, pp. 6855–6869, Elsevier. 6. Fu-Liang,T., 2006, Applying Fuzzy Multi-objective Linear Programming to Transportation Planning Decision, *Journal of Information and Optimization Sciences*, Vol 27, No.1, pp.107-126. 7. Tanino, T., Tanaka, T. and Inuiguchi, M., 2003, *Multi-objective Programming and Goal Programming*, Springer, Berlin. 8. Collette, Y and Sarry Patrick, 2004, *Multiobjective Optimization*, Springer.

CO-PLO

	CO 1	**CO 2**	**CO 3**	**CO4**
PLO 1				
PLO 2				
PLO 3	**V**	**V**	**V**	
PLO 4				
PLO 5				**V**
PLO 6	**V**	**V**	**V**	**V**

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