



UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Mathematics Department

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Doctoral Program in Mathematics

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MODULE HANDBOOK
Doctoral in Mathematics

Module name:	Fuzzy Multi-objective Linear and Non-linear Programming (Program Linear dan Non Linear Multi-objective Fuzzy)												
Module level, if applicable:	Doctoral Program												
Code, if applicable:	MMM 7305												
Semester(s) in which the module is taught:	I (First Year)												
Person responsible for the module:	Chair of Applied Mathematics Research Group												
Lecturer(s):	1. Dr. Indarsih												
Language:	Bahasa Indonesia												
Relation to curriculum:	Doctoral Degree in Mathematics, Compulsory / Elective Course												
Credit points:	3 Semester Credit Unit												
Type of teaching, contact hours:	3x50 minutes lectures, 3x60 minutes structured activities.												
Workload:	<ul style="list-style-type: none"> • 3x50 minutes lectures, • 3x60 minutes structured activities, • 3x60 minutes individual study, • In 16 weeks per semester (including assignments and examinations) 												
Recommended prerequisites:	Students have understanding on linear programming, multi-objective linear programming and fuzzy set.												
Module objectives/intended learning outcomes:	On successful completion of this course, students should be able to: CO 1: solve the fuzzy multi-objective linear programming. CO 2: solve the fuzzy multi-objective non linear programming. CO 3: apply the fuzzy multi-objective linear programming in real problems. CO 4: apply the fuzzy multi-objective non linear programming in real problems.												
Content:	Fuzzy multi objektif linear programming : interactive method, M-Pareto optimal, α -Pareto optimal and application. Fuzzy multi-objektif non linear programming : interactive method and application in production planning.												
Study and examination requirements and forms of examination:	<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>30%</td> </tr> <tr> <td>2</td> <td>Mid-Term Examination</td> <td>30%</td> </tr> <tr> <td>3</td> <td>Homework, Presentation</td> <td>40%</td> </tr> </tbody> </table> <p>Final grade will be determined as follows: Grade Criteria The initial cut-off points for grades A, B, C, and D should not be less than 80%, 65%, 50%, and 40%, respectively.</p>	No	Assessment methods (components, activities)	Weight	1	Final Examination	30%	2	Mid-Term Examination	30%	3	Homework, Presentation	40%
No	Assessment methods (components, activities)	Weight											
1	Final Examination	30%											
2	Mid-Term Examination	30%											
3	Homework, Presentation	40%											
Media employed:	Board, LCD Projector, Laptop/Computer												

Reading List:	<ol style="list-style-type: none"> 1. Bector, C.R. and Chandra, S., 2005, <i>Fuzzy Mathematical Programming and Fuzzy Games</i>, Springer, Germany. 2. Sakawa, M. and Yano, H., 1989, Interactive Decision Making for Multiobjective Nonlinear Programming Problems with Fuzzy Parameters, <i>Fuzzy Sets and Systems</i>, 29: 315-326. 3. Sakawa, M., 1998, <i>Fuzzy Nonlinear Programming with Single or Multiple Objective Functions</i>, Springer. 4. Sakawa, M, 1993, <i>Fuzzy Sets and Interactive Multi-objective Optimization</i>, Plenum Press, New York.
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Mapping of The COs and PLOs

	PLO - 1 S3 Mat	PLO - 2 S3 Mat	PLO - 3 S3 Mat	PLO - 4 S3 Mat	PLO - 5 S3 Mat	PLO -6 S3 Mat
CO 1	√	√	√			
CO 2	√	√	√			
CO 3					√	
CO 4					√	

Programme Learning Outcomes (PLO) Doctoral Programme in Mathematics

PLO-1	:	Attitude: Devote to God Almighty, uphold the humanity values, internalize academic values and ethics, responsible in working in the area of expertise independently.
PLO-2	:	Knowledge: Mastering philosophy of mathematics and one of the fields in mathematics (algebra, analysis, applied mathematics, statistics, computational mathematics, computational statistics).
PLO-3	:	Knowledge: Able to think logically, analytically, inductively, deductively, and structured; having the ability to manage, lead, and develop research programs independently, and able to communicate the thoughts as well as his work to the scientific community and the general public.
PLO-4	:	Skill: Creating new concepts and / or new methods (original) in the field of mathematics that are recognized nationally and internationally.
PLO-5	:	Skill: Able to apply mathematics according to their field of expertise to solve problems including those that require a multidisciplinary, cross-disciplinary, or trans-disciplinary approach.
PLO-6	:	Life Long Learning: Having lifelong learning skills and adaptive to the development of science and technology, especially in fields related to Mathematics and its applications.