



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:	Stochastics Optimization																																							
Module level, if applicable:	Doctoral																																							
Code, if applicable:	MMM 7302																																							
Semester(s) in which the module is taught:	1 st (first) year																																							
Person responsible for the module:	Chair of Applied Mathematics Research Group																																							
Lecturer(s):	Dr. Irwan Endrayanto Aluicius, S.Si., M.Sc.																																							
Language:	Bahasa Indonesia																																							
Relation to curriculum:	Doctoral Degree in Mathematics, Elective Course																																							
Credit points:	3 Semester Credit Unit																																							
Type of teaching, contact hours:	3x50 minutes lectures, 3x60 minutes structured activities. 3x60 minutes individual self-study per week.																																							
Workload:	3 hours lectures, 3 hours structured activities, 3 hours individual study, 16 weeks per semester (including mid-term and final examinations), 144 hours per semester.																																							
Recommended prerequisites:	Students have learned about stochastics processes and optimization theory.																																							
Module objectives/intended learning outcomes:	After completing this course the students have ability to : CO 1. verify various types of stochastic optimization problems CO 2. compare various types of stochastic optimization algorithms CO 3. design specific algorithm for stochastic optimization in specific problems																																							
Content:	<ol style="list-style-type: none"> 1. Overview of stochastics optimization problems. 2. Exact optimization algorithms 3. Optimization heuristics. 4. Applications to stochastics optimization problems. 																																							
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 (percentage)</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>25</td> </tr> <tr> <td>3</td> <td>Presentation</td> <td>25</td> </tr> <tr> <td>4</td> <td>Assignments</td> <td>20</td> </tr> </tbody> </table> <p>Final grade will be determined as follows:</p> <table border="1"> <thead> <tr> <th>Grade</th> <th>Criteria</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>$95 \leq \text{final mark} \leq 100$</td> </tr> <tr> <td>A-</td> <td>$90 \leq \text{final mark} \leq 94$</td> </tr> <tr> <td>A/B</td> <td>$85 \leq \text{final mark} < 90$</td> </tr> <tr> <td>B+</td> <td>$80 \leq \text{final mark} \leq 84$</td> </tr> <tr> <td>B</td> <td>$75 \leq \text{final mark} < 80$</td> </tr> <tr> <td>B-</td> <td>$70 \leq \text{final mark} \leq 74$</td> </tr> <tr> <td>B/C</td> <td>$65 \leq \text{final mark} < 70$</td> </tr> <tr> <td>C+</td> <td>$60 \leq \text{final mark} \leq 64$</td> </tr> <tr> <td>C</td> <td>$55 \leq \text{final mark} < 60$</td> </tr> <tr> <td>C-</td> <td>$50 \leq \text{final mark} \leq 54$</td> </tr> <tr> <td>C/D</td> <td>$45 \leq \text{final mark} < 50$</td> </tr> </tbody> </table>	No	Assessment methods (components, activities)	Weight (percentage)	1	Final Examination	30	2	Mid-Term Examination	25	3	Presentation	25	4	Assignments	20	Grade	Criteria	A	$95 \leq \text{final mark} \leq 100$	A-	$90 \leq \text{final mark} \leq 94$	A/B	$85 \leq \text{final mark} < 90$	B+	$80 \leq \text{final mark} \leq 84$	B	$75 \leq \text{final mark} < 80$	B-	$70 \leq \text{final mark} \leq 74$	B/C	$65 \leq \text{final mark} < 70$	C+	$60 \leq \text{final mark} \leq 64$	C	$55 \leq \text{final mark} < 60$	C-	$50 \leq \text{final mark} \leq 54$	C/D	$45 \leq \text{final mark} < 50$
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	D+ $40 \leq \text{final mark} < 45$ D $35 \leq \text{final mark} < 40$ E $0 \leq \text{final mark} < 35$
Media employed:	White Board, LCD Projector, Laptop/Computer
Reading List:	<ol style="list-style-type: none"> 1. Lawyer, G.F., (2006), <i>Introduction to Stochastic Processes</i>, Chapman & Hall/CRC Probability Series. 2. Ross, S. M. (1996). <i>Stochastic Processes</i>. 2nd editon. John Wiley & Sons, Inc. 3. Schneider, J., and Kirkpatrick, S., (2006), <i>Stochastic Optimization</i>, Springer. 4. Zhigljavsky, A., and Žilinskas, A., (2008), <i>Stochastic Global Optimization</i>, Springer.

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		v	v			
CO 2		v	v			
CO 3	v				v	

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.