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MODULE HANDBOOK

Module Name	**Topic in Optimization Theory**
Module level, if applicable	Doctoral Program
Code, if applicable	MMM 7315
Subtitle, if applicable	-
Courses, if applicable	Topic in Optimization Theory
Semester(s) in which the module is taught	1st or 2nd
Person responsible for the module	Chair of Applied Mathematics Research Group
Lecturer(s)	Prof. Dr. Salmah, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Doctoral Degree in Mathematics, ~~Compulsory /~~ Elective Course
Teaching methods	Lectures, structured activities (assignments, team-project)
Workload (incl. contact hours, self-study hours)	• 3x50 minutes lectures, • 3x60 minutes structured activities, • 3x60 minutes individual study, In 16 weeks per semester (including assignments and examinations)
Credit points	3
Required and recommended prerequisites for joining the module	Students should have competences in Optimization Theory

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>On successful completion of this course, students should be able:

CO 1: to understand basic concept in non linear optimization problems such as convex set, convex function, quasiconvex function and theorems related to optimization problems with convex functions and quasiconvex function.

CO2. to solve optimization problems analitically such as optimization problem without constraints, optimization problem with equation constraints, and optimization problems with inequality constraints.

CO3. to solve optimization problem numerically.

CO4. to relate the theory and applications of optimization problem, and to interpret the solutions.

CO5. to recognize about introduction to advance theories in optimization.</td></tr>
<tr><td>Content</td><td>In this lecture, students must carry out several academic activities under the supervision of the lecturer. Academic activities are carried out based on literature studies to competences one or more of the topics in optimization theory, including:
Optimization without constraints, optimization with constraints, existence theorems of optimal solutions concerning convex functions and its generalization, fuzzy optimization theory, numerical methods of local and global optimization, numerical methods of nondifferentiable optimization, multi objective optimization theories to find the solutions, application of optimization theory to real problems.</td></tr>
<tr><td>Examination forms</td><td>Written assignments, written exams, class engagement, presentation, case-based project</td></tr>
<tr><td>Study and examination requirements</td><td>To pass the course, the minimum grade is B.
The final mark will be weighted as follows:
<table>
<tr><th>No</th><th>Assessment methods (components, activities)</th><th>Weight (percentage)</th><th>Cognitive</th><th>Case/Project Based</th></tr>
<tr><td>1.</td><td>Final Examination</td><td>25</td><td>20</td><td>5</td></tr>
<tr><td>2.</td><td>Mid-Term Examination</td><td>25</td><td>20</td><td>5</td></tr>
<tr><td>3.</td><td>Homework</td><td>20</td><td>10</td><td>10</td></tr>
<tr><td>4.</td><td>Presentation</td><td>30</td><td></td><td>30</td></tr>
<tr><td></td><td>TOTAL</td><td>100%</td><td>50%</td><td>50%</td></tr>
</table></td></tr>
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Media employed	Board, LCD Projector, Laptop/Computer
Reading list	1. Mokhtar S Bazaraa, Hanif D. Sherali, C.M.Shetty, 2006, *Nonlinear Programming. Theory andAlgorithms* 3rd Edition, John Wiley and Sons. 2. Edwin K.P. Chong, and Stanislaw H. Zak, 2008, *An Introduction to Optimization* 3rd Edition, John Wiley & Sons. 3. Boyd, S., Vandenberghe, L., 2004, *Convex Optimization,* Cambridge University Press. 4. Sakawa, M., 1993, *Fuzzy Sets and Interactive Multiobjective Optimization*, Springer. 5. Andrew, R. C, Katya, S., Luis, N., V., 2009, *Introduction to Derivative-Free Optimization*, MOS-SIAM Series on Optimization.

CO-PLO Mapping

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO 6**
CO 1	√	√				
CO 2	√	√				
CO 3	√	√				
CO 4	√	√			√	√
CO 5	√	√	√	√		√

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.

Compilation Date : July 16, 2022

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