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Master in Mathematics

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MODULE HANDBOOK

Module Name	**Operations Research (*Riset Operasi Lanjut*)**
Module level, if applicable	Master's degree
Code, if applicable	MMM 5310
Subtitle, if applicable	
Courses, if applicable	**Operations Research**
Semester(s) in which the module is taught	First year
Person responsible for the module	Chair of Applied Mathematics Research Group
Lecturer(s)	Dr. Irwan Endrayanto A., S.Si., M.Sc Dr. Noorma Yulia Megawati, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Elective course
Teaching methods	Lecture, project, seminar
Workload (incl. contact hours, self-study hours)	Total workload is 136 hours per semester, which consists of 150 minutes lectures per week for 14 weeks, 180 minutes structured activities per week, 180 minutes individual study per week, in total is 16 weeks per semester, including mid exam and final exam.
Credit points	3
Required and recommended prerequisites for joining the module	Students should be proficient analysis, optimization, and stochastics processes.

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>After completing the course, the student will have:

CO1. ability to formulate optimization problem based on mathematical programming model.

CO2. ability to analyze and solve the mathematics programming model, analytically or numerically.

CO3. ability to interprete the mathematics programming and to communicate the results to intended users/audiences, both in oral and written languange.</td></tr>
<tr><td>Content</td><td>• Convex Optimization for Linear Programming: simplex and non-simplex methods (Karmarkar’s method).
• Integer Programming: Modelling and Methods for solution: Branch and Bound method, Branch and Cut method, integer programming, dynamic programming, genetic algorithm.
• Inventory Models: Deterministic and Probabilistic Inventory Model.
• Queueing Theory: Birth and death process.</td></tr>
<tr><td>Examination forms</td><td>Written exam, 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:

No Assessment methods (components, activities) Weight

1 Final Examination 30%

2 Mid-Term Examination 30%

3 Class Activities: Presentation, etc 20%

4 Quiz, Homework, etc 20%</td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer, simaster, eLok, zoom</td></tr>
</table>

Reading list	1. Poler, R., et.al., 2014, "*Operations Research Problems: Statements and Solutions*", Springer. 2. Boyd, S., and Vandenberghe, L., 2004, "*Convex Optimization*", Cabridge University Press, United Kingdom. 3. Dantzig, G.B dan Thapa, M.N., 1997, "*Operations Research: Applications and Algorithms*", Springer-Verlag, New York. 4. Melanie, M., 1999, An Introduction to Genetic Algorithm, MIT Press. 5. Papadimitriou, C.H., and Steiglitz, K., 1998, "*Combinatorial Optimization"* Dover Publications, United States. 6. Ross, S. M., 1996, "*Stochastics Processes*", Second Edition, John Wiley and Sons, Inc., United States. 7. Sivanandam, S.N. dan Deepa, S.N, 2008, "*Introduction to Genetic Algorithm*", Springer. United States. 8. Winston,W.L., 2004, "*Operation Research Applications and Algorithms*", Duxbury Press.

CO-PLO Mapping 3 5 6

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

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