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### Module Handbook

Module Name :	<i>Riset Operasi</i> Operation Research
Module level :	Bachelor degree/Undergraduate Program
Course Code :	4420103115
Abbreviation, if applicable:	-
Courses included in the module, if applicable:	Not Applicable
Semester/Term	3 <sup>rd</sup> / Second year
Module coordinator(s)	Dr. Yusuf Fuad, M.AppSc
Lecturer(s):	Yuliani Puji Astuti, M.Si Dimas Avian Maulana, M.Si
Language:	Bahasa Indonesia (Indonesian Language)
Classification within the curriculum:	Compulsory/ <del>Elective</del>
Teaching format/class hours per week during the semester:	3 contact hours of lectures ( <i>sks</i> or credit unit*)
Workload :	3 x 50 minutes lectures, 3 x 60 minutes structured activity, and 3 x 60 minutes individual activity per week, 14 weeks per semester 119 total hours per semester ~ 4.77 ECTS**
Credit Unit:	3 credit unit (4.77 ECTS)
Requirements:	Elementary Linear Algebra



<p>Learning goals/competencies:</p>	<p><b>Knowledge (KNO-2)</b></p> <p>CLO-1 : Identify and explain variables and arrange them in linear programming model, using various solving methods of two variables or more of linear programming, and solve problem of linear programming.</p> <p><b>Skill (SKI-1, SKI-2)</b></p> <p>CLO-2: Formulate and solve problem of fundamental mathematics of basic solution of linear inequality system using basis solution as a basic in feasible solution in simplex method.</p> <p>CLO-3: Apply method in finding solution of mathematics problem in linear programming involving simplex method, BigM and two-phase methods, duality, solving linear programming using application Solver, sensitivity analysis, North West Corner, Minimum Cost, and Vogel's Approximation Method, Modified Distribution, Stepping Stone, Hungarian Method, Branch and Bound Method.</p> <p><b>Competency (COM-3)</b></p> <p>CLO-4: Use application Solver in Microsoft Excel for finding solution in linear programming problem.</p> <p><b>Social (SOC-2)</b></p> <p>CLO-5: Finish tasks on time.</p>
<p>Content</p>	<p>This course discusses about linear programming model, graphical method and search line, basis solution in linear equality system, simplex method, BigM and two-phase method, duality, solving linear programming using application Solver, sensitivity analysis, North West Corner, Minimum Cost, and Vogel's Approximation Method, Modified Distribution, Stepping Stone, Hungarian Method, Branch and Bound Method. Lecture activities are carried out in a student center with discussions, project assignments, and presentations.</p>

<p>Attribute Soft skill:</p>	<p>Active communication; Discipline; Collaboration; Responsibility; and Argumentation in class</p>					
<p>Study/exam achievements:</p>	<p>The final grade (NA) is calculated based on the following ratio:</p> <table border="1" data-bbox="542 1870 1348 2000"> <thead> <tr> <th data-bbox="542 1870 941 1937">Assessment Components</th> <th data-bbox="941 1870 1348 1937">Percentage of contribution</th> </tr> </thead> <tbody> <tr> <td data-bbox="542 1937 941 2000">Participation</td> <td data-bbox="941 1937 1348 2000">20%</td> </tr> </tbody> </table>		Assessment Components	Percentage of contribution	Participation	20%
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	Assignment	30%																													
	Mid-semester test	20%																													
	Final semester test	30%																													
	Grade conversion of 0-100 scale into 0-4 scale is set as below:																														
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Learning Methods :	Student-centered approach; project-based learning; lecturer and discussion; and presentations (structured activities)																														
Form of Media:	Power point slides; video; worksheets, and textbooks																														
Literature (primary references):	<ol style="list-style-type: none"> <li>1. Ravindran, A R., Operations Research and Management Science, 2008, Taylor &amp; Francis Group</li> <li>2. M. S. Bazaraa, J. J. Jarvis and H. D. Sherali, 2010, Linear Programming and Network Flows, Fourth Edition, John Wiley &amp; Sons, New York.</li> <li>3. Thaha, H.A, 2007, Operations Research: An Introduction, Eighth edition, Pearson Education Inc.</li> <li>4. Poler, 2014, Operation Research Problems, Statements and Solutions, Springer.</li> <li>5. Hira D.S., Gupta P.K., 2015, Operations Research, S. Chand Publisher.</li> </ol>																														



Notes:	*1 credit unit or <i>sks</i> in learning process = three periods consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.
	**1 credit unit or <i>sks</i> = 1.59 ECTS according to Rector Decree Of Universitas Negeri Surabaya No. 598/UN38/HK/AK/2019