<table>
<tr><td>Module designation</td><td>Operational Research<br>Indonesian title: Riset Operasi<br>Course code: 8420202004</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td>Semester 4 (Second year)</td></tr>
<tr><td>Person responsible for the module</td><td>Coordinator: Prof. Dr. Raden Sulaiman, M.Si<br>Teaching staff: Dr. Endah Budi Rahaju, M.Pd.; Affiati Oktaviarina, S.Si., M.Sc.; Dr. Nia Wahyu Damayanti, S.Pd., M.Pd.; Novita Vindri Harini, M.Pd.; Dr. Mukhtamilatus Sa'diyah, M.Pd</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory</td></tr>
<tr><td>Teaching methods</td><td>Lectures, tutorial assignments, and individual study<br>Media and tools: Slides and LCD projectors, whiteboard</td></tr>
<tr><td>Workload (incl. contact hours, self-study hours)</td><td>(Estimated) total workload: 3 CU × 170 minutes × 16 weeks = 8,160 minutes = 136.00 hours (≈ 4.77 ECTS)<br>Contact hours: lectures, 3 × 50 minutes per week × 16 weeks = 40.00 hours (class hours per week: 510 minutes = 8.50 hours, including structured activities)<br>Private study including examination preparation: structured assignments, 3 × 60 minutes per week × 16 weeks = 48.00 hours; independent study, 3 × 60 minutes per week × 16 weeks = 48.00 hours (total 96.00 hours)</td></tr>
<tr><td>Credit points</td><td>3 CU (4.77 ECTS)<br>1 CU = 170 minutes per week × 16 weeks = 45.3 hours; 1 ECTS = 28.48 hours (144 CU = 229 ECTS), so 1 CU = 1.59 ECTS (UNESA Rector's Decree No. 736/HK/KM/2023).</td></tr>
<tr><td>Required and recommended prerequisites for joining the module</td><td>Elementary Number Theory Teori Bilangan Elementer</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>Programme learning outcomes (PLO) addressed:<ul><li>PLO-5: Apply the basic principles of mathematics to solve simple mathematical problems.</li><li>PLO-6: Demonstrate mathematical knowledge and insight.</li></ul></td></tr>
<tr><td>Content</td><td>Studying linear program modeling and its solution methods (simplex, Big M, Two Phase, duality), use of computer applications, and application to transportation and assignment methods.</td></tr>
<tr><td>Examination forms</td><td>Final score is calculated from the weekly assessment scheme below (CLO/PLO addressed and weight of each assessment):
<table>
<tr><th>Week</th><th>CLO</th><th>PLO</th><th>Weight (%)</th></tr>
<tr><td>1</td><td>CLO-1</td><td>PLO-6</td><td>5</td></tr>
<tr><td>2</td><td>CLO-1</td><td>PLO-5</td><td>2</td></tr>
<tr><td>3</td><td>CLO-1</td><td>PLO-5</td><td>2</td></tr>
<tr><td>4</td><td>CLO-1</td><td>PLO-6</td><td>5</td></tr>
<tr><td>5</td><td>CLO-1</td><td>PLO-5</td><td>2</td></tr>
<tr><td>6</td><td>CLO-1</td><td>PLO-5</td><td>5</td></tr>
<tr><td>7</td><td>CLO-1</td><td>PLO-5</td><td>5</td></tr>
<tr><td>8</td><td>CLO-1</td><td>PLO-5</td><td>20</td></tr>
<tr><td>9</td><td>CLO-3</td><td>PLO-5</td><td>5</td></tr>
</table></td></tr>
</table>

| | | | |
|---|---|---|---|
| 10 | CLO-2 | PLO-5 | 5 |
| 11 | CLO-2 | PLO-5 | 2 |
| 12 | CLO-2 | PLO-5 | 5 |
| 13 | CLO-2 | PLO-6 | 5 |
| 14 | CLO-2 | PLO-5 | 2 |
| 15 | CLO-3 | PLO-6 | 5 |
| 16 | CLO-3 | PLO-6 | 30 |

**Study and examination requirements**

Students are considered competent and pass if the final score is at least 55 or C.

**Final index (grade conversion):**

| Index | Converted score | Score range (A = final score) |
|---|---|---|
| A | 4.00 | 85 ≤ A ≤ 100 |
| A- | 3.75 | 80 ≤ A < 85 |
| B+ | 3.50 | 75 ≤ A < 80 |
| B | 3.00 | 70 ≤ A < 75 |
| B- | 2.75 | 65 ≤ A < 70 |
| C+ | 2.50 | 60 ≤ A < 65 |
| C | 2.00 | 55 ≤ A < 60 |
| D | 1.00 | 40 ≤ A < 55 |
| E | 0.00 | 0 ≤ A < 40 |

**Reading list**


1. Ravindran, A R., Operations Research and Management Science, 2008, Taylor & Francis Group.
2. M. S. Bazaraa, J. J. Jarvis and H. D. Sherali, 2010, Linear Programming and Network Flows, Fourth Edition, John Wiley & Sons, New York.
3. Thaha, H.A, 2007, Operations Research: An Introduction, Eighth edition, Pearson Education Inc
4. Poler, 2014, Operational Research Problems, Statements and Solutions, Springer.
5. Harini, N. V, 2024, Design Contextual Problems and Solutions Related to Linear Programming Topics with The Help of Geogebra. Noumerico: Journal of Technology in Mathematics Education, 2(2), 156-164.