### Module Handbook

**Module name**: Introduction to Graph Theory  
**Module level**: Bachelor  
**Code, if applicable**: MMM-2206  
**Subtitle, if applicable**:  
**Courses, if applicable**: Introduction to Graph Theory  
**Semester(s) in which the module is taught**: 4th (fourth)  
**Person responsible for the module**: Chair of the Lab. of Algebra  
**Lecturer(s)**:  
- Dr. rer. nat. Indah Emilia, M.Si.  
- Dr. rer. nat. Yeni Susanti, M.Si.  
- Dr. Budi Surodjo, M.S.  
**Language**: Bahasa Indonesia  
**Relation to curriculum**: Bachelor Degree, Elective Course, 4th semester  
**Type of teaching, contact hours**: 150 minutes lectures, 180 minutes structured activities.  
**Workload**: 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  
**Requirements according to the examination regulations**: Students have taken Introduction to Graph Theory course (MMM-2206) and have an examination card where the course is stated on.  
**Recommended prerequisites**: Students have taken Discrete Mathematics II course (MMM-2207) and have participated in the final examination of the course.  
**Module objectives/intended learning outcomes**: After completing this course the students should have:  
- CO 1. ability to prove some properties of graph.  
- CO 2. ability in problem solving skill using procedure in graph theory  
- CO 3. ability to apply graph theory in simple mathematical modelling  
**Content**: Basic concept of graph theory, Simple Graph, Multiple Graph, Isomorphic Graph, Types of Graph, Complement of Graph, Planar Graph, Euler Formula, Subgraph, Connected Graph, Path, Trail, Circuit, Cut sets, Bridge of Konigsberg, Eulerian Graph, Eulerian Trail, Hamiltonian Graph, Tree, Minimum spanning tree, Kruskal Algorithm, Prim Algorithm, Planarity and Duality, Coloring of Graph, Directed Graph, Pruning Algorithm, Matrix and Graphs/Digraphs, PERTH-Graph and Shortest Distance Tree.  
**Study and examination requirements and forms of examination**: The final mark will be weighted as follows:  
<table>
<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>40%</td>
</tr>
<tr>
<td>2</td>
<td>Mid-Term Examination</td>
<td>30%</td>
</tr>
<tr>
<td>3</td>
<td>Class Activities: Quiz, Homework, etc.</td>
<td>30%</td>
</tr>
</tbody>
</table>

The initial cut-off points for grades A, B, C, and D should not be less than 80%, 70%, 50%, and 40%, respectively.  
**Media employed**: Projector, Board  
**Reading List**:  

<table>
<thead>
<tr>
<th></th>
<th>PLO 1</th>
<th>PLO 2</th>
<th>PLO 3</th>
<th>PLO 4</th>
<th>PLO 5</th>
<th>PLO 6</th>
<th>PLO 7</th>
<th>PLO 8</th>
<th>PLO 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>v</td>
<td></td>
</tr>
</tbody>
</table>