Module Description of Graph Theory

Module Name	:	Graph Theory
Module Level	:	Bachelor
Code, if applicable	:	23H01120403
Subtitle, if applicable	:	-
Courses, if applicable	:	Graph Theory
Semester(s) in which the module is taught	:	3 (Third Semester)
Module coordinator(s)	:	Prof. Dr. Hasmawati, M.Si.
Lecturer(s)	:	Prof. Dr. Hasmawati, M.Si. Prof. Dr. Nurdin, S.Si., M.Si.
Language	:	Bahasa (Indonesian language)
Relation to curriculum	:	Compulsory course in the second year for Bachelor Degree
Type of teaching/teaching method	:	Lecturing, Small Group Discussion, Cooperative Learning, Self-Directed Learning
Contact hours	:	150 minutes lectures per week, 180 minutes structured activities per week, and 180 minutes independent study per week
Workload	:	Total workload is 135 hours per semester which consists of 40 hours per semester for Learning and Teaching, 47.5 hours per semester for Self-Study, and 47.5 hours per semester for Structured Works
Credit points	:	3 (4.8 ECTS)
Requirements according to the examination regulations	:	Students are required to attend at least 80% of the total meetings which is recorded via the attendance menu at https://sikola-v2.unhas.ac.id/, complete all mandatory assignments, and obtain permission from the lecturer to participate in the written examination.
Recommended prerequisites	:	Students have taken Discrete Mathematics, and have participated in the examination of the course.
Module objectives/intended learning outcomes	:	After completion of this module, students will be able to: CLO 1. understand the basic concepts of graphs and several operations in graphs and can construct a graph through an operation; CLO 2. enumerate tree graphs using matrix cofactors and determine the center and centroid.; CLO 3. develop basic knowledge of graph theory to understand graph coloring, location coloring and fuzzy coloring; CLO 4. determine decomposition and factorization of a graph; CLO 5. determine the connectivity of the vertices and edges of a connected graph

<table>
<tr><td></td><td></td><td>The following is the mapping of the ILO and the CLO of this course:
<table>
<tr><th></th><th>ILO 3</th><th>ILO 5</th><th>ILO 7</th><th>ILO 9</th></tr>
<tr><td>CLO 1</td><td></td><td>X</td><td></td><td></td></tr>
<tr><td>CLO 2</td><td>X</td><td>X</td><td></td><td></td></tr>
<tr><td>CLO 3</td><td></td><td></td><td>X</td><td>X</td></tr>
<tr><td>CLO 4</td><td>X</td><td></td><td></td><td></td></tr>
<tr><td>CLO 5</td><td></td><td></td><td>X</td><td></td></tr>
</table></td></tr>
<tr><td>Content</td><td>:</td><td>This course teaches about isomorphism, matrix in graphs, and using matrix graphs to do enumeration, the definition and properties of Euler graphs, Hamiltonian graphs, planar graphs, and directed graphs. This course also learns about special types of some subgraphs. In addition, the students study the connectivity graph, matching, factorization, graph coloring, and the basic concept of Ramsey's theory or labeling.</td></tr>
<tr><td>Study and examination requirements</td><td></td><td>Study and examination requirements:
Students must attend 15 minutes before the class starts.
Students must switch off all electronic devices.
Students must inform the lecturer if they will not attend the class due to sickness, etc.
Students must submit all class assignments before the deadline.
Students must attend the exam to get final grade.</td></tr>
<tr><td>Exams and assessment formats</td><td></td><td>The weight of each assessment component is 5% for quizzes, 25% for assignments, 15% for presentation, 40% for report, and 15% for Written Exam.

Assignments assess student's ability to apply concepts independently, while Reports measure analytical and writing skills. Presentations evaluate oral communication, organization of ideas, and confidence in delivering academic material. Quizzes are used to test continuous understanding of weekly content. The Written Exam assesses comprehension and synthesis of all materials discussed during the semester. Altogether, these components account for 100% of the final grade.

Students are marked based on their percentage of points obtained and based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>85 – 100</td><td>A</td><td>4.00</td></tr>
<tr><td>80 - <85</td><td>A-</td><td>3.75</td></tr>
<tr><td>75 - < 80</td><td>B+</td><td>3.5</td></tr>
<tr><td>70 - < 75</td><td>B</td><td>3.0</td></tr>
<tr><td>65 - < 70</td><td>B-</td><td>2.75</td></tr>
<tr><td>60 - < 65</td><td>C+</td><td>2.5</td></tr>
</table></td></tr>
</table>

			50 - < 60	C	2.00	
			40 - < 50	D	1.00	
			< 40	E	0.00	
Reading list		1. J.A.Bondy and U.S.R. Murty (1982), Graph Theory with Applications, The Macmilan Press Ltd. 2. Gary Chartrand dan Ping Zhang (2005), Introduction to Graph Theory, Mc-GRAW-HILL INTERNATIONAL EDITION. 3. Reinhard Diestel (2000), Graph Theory: Graduste Texts In Mathematics, Springer. 4. Gary Chartrand, Ortrud R. Oellermann, (1993), Applied and algorithmic Graph Theory, McGRAW-HILL 5. Prof. Dr. Hasmawati, M.Si (2023), PENGANTAR TEORI DAN JENIS-JENIS GRAF, UPT Unhas Press. 6. Lase, Dermawan, Nurdin Hinding, and Amir Kamal Amir. "Modular Irregular Labeling on Firecrackers Graphs." Proximal: Jurnal Penelitian Matematika dan Pendidikan Matematika 6.1 (2023): 94- 102.			
Last revision date	:	July 28th, 2025				