

Course Description Form

1. Course Name:	
Graph Theory /1	
2. Course Code:	
ScMath 3305	
3. Semester / Year:	
1 st Semester / 2024-2025	
4. Description Preparation Date:	
20/9/2024	
5. Available Attendance Forms:	
Official working hours/lectures	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 Hours / 4 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ameen Shaman Ameen Email: amensh66@uoanbar.edu.iq	
8. Course Objectives	
Course Objectives	<p>1. The student acquires knowledge about the history of the beginning of Graph Theory and some concepts such as (degree, subgraph, basic types of graph, etc.). Explaining the operations on the graph.</p> <p>2. Giving the student information related to the concept of Connectivity and the concept of Traversability in graph. In addition to studying the concept of directed graph and its applications in communication networks.</p>
9. Teaching and Learning Strategies	
Strategy	<p>1. Managing the lecture in an applied manner linked to the real of daily life to attract the student to the topic of the lesson without straying from the core of the topic so that the material is flexible and amenable to understanding.</p> <p>2. Assigning the student to some group activities and duties.</p> <p>3. Allocating a percentage of the grade to daily assignments and tests.</p>

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Introduction to Graphs.	1. Basic Definitions. 2. Degrees and Degree Sequences in Graphs. 3. Subgraphs and Spanning Subgraphs. 4. Fundamental Graph Classes. 5. Isomorphic Graphs	Lecture in classroom	Questions & discussion
2	4	Graphs and Their Operations.	1. Union, Intersection and Ringsum of Graphs. 2. Complement of Graphs. 3. Join of Graphs.	Lecture in classroom	Questions, discussion & Quiz
3	4	Graphs and Their Operations. Connectedness of Graphs.	4. Deletion and Fusion. 5. Subdivision and Smoothing. Connectedness of Graphs: 1. Paths, Cycles and Distances in Graphs.	Lecture in classroom	Questions & discussion
4	4	Connectedness of Graphs.	2. Connected Graphs. 3. Edge Deleted and Vertex Deleted Subgraphs.	Lecture in classroom	Quiz
5	4	Traversability in Graphs.	1. Königsberg Seven Bridge Problem. 2. Eulerian Graphs. 3. Chinese Postman Problem.	Lecture in classroom	Questions & discussion

6	4	Traversability in Graphs.	4. Hamiltonian Graphs. 5. Some Illustrations.	Lecture in classroom	Questions & discussion
7	4	Traversability in Graphs.	6. Weighted Graphs. 7. Travelling Salesman's Problem.	Lecture in classroom	Questions & discussion
8	4	Directed Graphs.	Exam 1 1. Directed Graphs. 2. Types of Directed graphs.	Lecture in classroom	Questions & discussion Monthly exam
9	4	Directed Graphs.	3. Networks	Lecture in classroom	Questions & discussion Quiz
10	4	Connectivity in Graphs.	Connectivity in Graphs: 1. Cut-Vertices and Vertex-Cuts of a Graph	Lecture in classroom	Questions & discussion Quiz
11	4	Connectivity in Graphs.	2. Cut-Sets of a Graph 3. Fundamental Cut-Sets 4. Connectivity in Graphs	Lecture in classroom	Questions & discussion
12	4	Tree	Properties of Trees Distances in Trees	Lecture in classroom	Questions & discussion Quiz
13	4	Tree	Degree Sequences in Trees On Counting Trees	Lecture in classroom	Questions & discussion
14	4	Tree	Spanning Trees Fundamental Circuits Exam 2	Lecture in classroom	Questions & discussion Monthly exam
15	4	Tree	Rooted Tree Binary Tree	Lecture in classroom	Questions & discussion

11. Course Evaluation

Quiz & Daily oral 10%
 Monthly exam 40%
 Final exam 50%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Introduction to Graph Theory Fourth edition By Robin J. Wilson
Main references (sources)	R. Balakrishnan and K. Ranganathan, (2012). A textbook of graph theory, Springer, New York. 2) J.A. Bondy and U.S.R Murty, (2008). Graph theory, Springer.
Recommended books and references (scientific journals, reports...)	None
Electronic References, Websites	None