هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification
(Bachelor)

Course Title:	Graph theory
Course Code:	MTHS 325
Program:	**Applied Statistics & Data Management**
Department:	**Mathematics**
College:	**College of Science**
Institution:	**College of Science**
Version:	**Majmaah University, Saudi Arabia**
Last Revision Date:	319-2023

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (.....)

2. Course type

A.	☐University	☐College	☐Department	☐Track	Others
B.	☐Required		☒Elective		

3. Level/year at which this course is offered: elective

4. Course general Description: **Introduction to graph theory,Basic concepts (complete graphs- sub graphs- spanning sub graphs n-partite graphs complete bipartite graphs – complementary graphs)- Operations on graphs- Sequences and graphs- Matrices and graphs- Paths, circuits, cycles and connected graphs- Eulerian and Hamiltonian graphs- Trees- minimal spanning trees-Planar and non-planar graphs- Graph- Graph coloring (complete graphs- Trees – Cubes – partite graphs-Applications- shortest path problems**

5. Pre-requirements for this course (if any)**: MTHS 122**

6. Co-requisites for this course (if any)**:**

7. Course Main Objective(s):

To discuss some of the major results of graph theory, and to provide an introduction to the language, methods and terminology of the subject. Second, to emphasize various approaches (algorithmic, probabilistic, etc) that have proved fruitful in modern graph theory: these modes of thinking about the subject have also proved successful in other areas of mathematics, and we hope that students will find the techniques learnt in this course to be useful in other areas of mathematics such as computer science (studies networks), bioinformatics, statistical physics, chemistry, sociology, etc.
More precisely In this module we will focus on results from structural graph theory and its applications in related areas, in particular, in algorithm design and number theory. The module should provide an overview of main techniques with their potential applications. We will focus, in

particular, our attention on networks and give real world examples of networks include transport networks such as the Gautrain rail system, electric networks, social networks and the internet

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	75%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning	10	25%

3. Contact Hours (based on the academic semester)

No	Activity	Con40tact Hours
1.	**Lectures**	40
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	20
Total		

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	• Acquisition of the principal concepts of the theory of graphs.	K.3	**Direct teaching**: Inquiry-based instruction Power Points and discussions	• E-exam • Oral Exam • Homework • Quiz • Midterms

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
				• Final Exams
1.2	• Acquisition of the principal concepts of the theory of graphs.	K.3	**Direct teaching**: Inquiry-based instruction Power Points and discussions	• E-exam • Oral Exam • Homework • Quiz • Midterms • Final Exams
...				
2.0	**Skills**			
2.1	To be able to transcript the life problems and then representing in graph theory in order to apply the acquired knowledge to solve them	S.3	**Direct teaching**: Lectures Differentiation **Aimed teaching**: Discovery and oral questions **Indirect teaching**: Peer Learning	• Homework • Quiz • Midterms • Final Exams
2.2				
...				
3.0	**Values, autonomy, and responsibility**			
3.1	The student discovers the importance of Mathematics in solving problems of life. The student will also discover that the theory of graphs can be useful for any other branch of sciences	V.3	• Group discussion	• Exercise Electronic MCQ Test
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to graphics theory, basic concepts (perfect graphs - partial graphs - generated graphics - split graphs - perfect split graphs - complementary graphs)	5
2.	Operations on fees (cubes) - the relationship between fees and sequences - the relationship between fees and matrices	5
3	- Corridors and courses - connected fees	5
4	Euler's fee - Hamilton's fee	4
5	Trees- the smallest breeding trees	4
6	Flat Fee and Uneven Fee (Kratovsky Fee)	4
7	Coloring of drawings (coloring solids - trees - cubes - split drawings)	3
Total		30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm	7th, week	30 %
2.	Activities	Through of semester	10 %
3.	Quizzes	Through of semester	%10
4	Electronic Test	10th week	10 %
5	Final exam	End of semester	40 %

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Introduction to Graph Theory ;2nd edition
Supportive References	Introduction to Graph Theory ;2nd edition
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom with capacity of 20 -students.
Technology equipment (projector, smart board, software)	projector, smart board
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching and assessment	Students/ internal committee	Direct (Students evaluation electronically organized by Deanship of registration and admission)/ Verification of students' papers
Extent of achievement of course learning outcomes	Staff members (Peer Reviewer)	Indirect (Frequent meetings consultation among the teaching staffs)
Quality of learning resources.	Staff members (course coordinators)	Direct (Meeting between course coordinators and the tutors)
Effectiveness of teaching and assessment	Students/ internal committee	Direct (Students evaluation electronically organized by Deanship of registration and admission)/ Verification of students' papers
Extent of achievement of course learning outcomes	Staff members (Peer Reviewer)	Indirect (Frequent meetings consultation among the teaching staffs)

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	