Course Specification
(Postgraduate)

Course Title: **Graph Theory**	
Course Code: **MATH647**	
Program: **Master Program in Mathematics**	
Department: **Mathematics**	
College: **Science**	
Institution: **University of Tabuk, KSA**	
Version: **2**	
Last Revision Date:**1/12/1443 H**	

Table of Contents

A. General information about the course:

Course Identification	
1. Credit hours:	3 H

2. Course type

a.	University ☐	College ☐	Department ☒	Track ☐	Others ☐
b.	Required ☐	Elective ☒			

3. Level/year at which this course is offered:
Level-2 or higher

4. Course general Description
In this course, we will study various concepts of Galois Theory. Furthermore, related important properties, theorems, problems, and other applications of Galois Theory will also be discussed.

5. Pre-requirements for this course (if any): None

6. Co- requirements for this course (if any): None

7. Course Main Objective(s)

1. Identify and recall the concepts on Graphs and related results to develop the interest of concerned subject
2. Describe the definitions and Theorems on directed and non-directed graph.
3. Discuss the concept of complete graphs, order of a graph, complement of a graph and related concepts.
4. Introduce the concepts of walk, path, circuits, connected graphs, Eulerian and Hamiltonian graphs.
5. Explain the basic definitions and Theorems on colouring of graphs, matching and b-matching.
6. Introduce the notion of planer graphs and their related results.
7. Explain the concepts of independent sets and cliques, Graph factorizations and graph labellings.

1. Teaching mode(mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	45	100 %

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No	Mode of Instruction	Contact Hours	Percentage
2.	E-learning		
3.	Hybrid ● Traditional classroom ● E-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	3 H /week
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	45

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 The students will be able to:			
1.1	Demonstrate various concepts of graphs and related topics.	K1	Lectures, Group works, Presentations, Classroom discussion, Seminar, Case study, problem solving session	Exams, Quizzes, Research projects, presentations, interactive discussion, and participation, Survey
1.2	Enhance an advance understanding of the definitions, relations, and application of graph theory.	K3		
2.0	Skills The students will be able to:			
2.1	Apply the daily life applications of graph theory.	S1	Lectures, Group works, Presentations, Classroom discussion, Seminar, Case study, problem solving session	Exams, Quizzes, Home works, Assignments, Research project, presentation, interactive
2.2	Analyze the results in practical examples.	S2		
2.3	Using advanced mathematical concepts effectively through mathematical problems.	S3		

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Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
				discussion and participation, Surveys.
3.0	Values, autonomy, and responsibility The students will be able to:			
3.1	Perform academic integrity and professional ethics when dealing with academic issues.	V1	Lectures, Group works, Presentations, Classroom discussion, Seminar, Case study, problem solving session	Research project, Home works, Assignments, presentation, interactive discussion and participation, Surveys.
3.2	Demonstrate and managing their time and duties with friends and with groups	V2		

C. Course Content

No	List of Topics	Contact Hours
1	Basics concepts on Graphs and related results,	3
2	Directed and non-directed graph.	3
3	Regular graphs and results,	3
4	Complete graphs, order of a graph.	3
5	Complement of a graph and related concepts.	3
6	Walk, path, circuits and connected graphs.	3
7	Eulerian and Hamiltonian graphs.	3
7	**Mid-Exam #**	--
8	Colouring of graphs.	3
9	Matching and b- matching	3
10	Planer graphs and results,	3
11	The notion of planer graphs and their related results.	3
12	The notion of planer graphs and their related results.	3
13	Independent Sets and Cliques.	3
14	Graph Factorizations and results.	3

15	Graph labellings.	3
16+17	**Revision & Final Exam**	
Total		**45**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Home works and Assignments	Weekly basis	20%
2.	Mid-term exam	7th week	25%
3.	Presentation and discussion	During the Semester	15%
4.	Final Exam	At 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	1. Schaum's Outline of Graph Theory, Publishing McGraw Hill (2020). 2. Berge C, Graphs, Third revised edition, North-Holland, Elsevier Science Publishing Co., 1991.
Supportive References	Reinhard Diestel, Graph Theory, Fourth edition, Graduate Texts in Mathematics 173, Springer-Verlag, 2010.
Electronic Materials	Saudi Digital Library
Other Learning Materials	NA

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture Room with capacity of 30 students and equipped with White Board, Library
Technology equipment (Projector, smart board, software)	Overhead projector and internet connection.
Other equipment (Depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Direct and Indirect
Effectiveness of students assessment	Teacher	Direct
Quality of learning resources	Students	Indirect
The extent to which CLOs have been achieved	Teacher, Quality Committee	Direct and Indirect
Other		

Assessor (Students, Faculty members, Program Leaders and Peer Reviewers.

Assessment Methods(Direct, Indirect)

G. Specification Approval Data

Council / Committee	**Approval by the Department Council**
Reference No.	DEPARTMENT COUNCIL NO (26)
Date	**11/9/1444 H**