هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

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Course Specification

Course Title:	**Graph Theory**
Course Code:	**454Math-3**
Program:	**B.Sc. of Mathematics**
Department:	**Mathematics**
College:	**Art and Science**
Institution:	**Najran University**
Version:	1
Last Revision Date:	**07-05-2023**

Table of Contents:

A. General information about the course:

Course Identification					
1. Credit hours:	3				
2. Course type					
a.	University ☐	College ☐	Department☒	Track☐	Others☐
b.	Required ☒	Elective☐			
3. Level/year at which this course is offered:	8/4				
4. Course general Description This course covers fundamental concepts for the theory of graphs for both directed and undirected graphs, etc. Topics include graph isomorphism, Eulerian and Hamiltonian graphs, connectivity; Adjacency matrix for directed graph, complete graph, planar graph and Euler formula, isomorphism between graphs; Eulerian and Hamiltonian graphs, infinite and dual graphs. The course emphasis on algebraic graph theory: chromatic number, chromatic polynomial.					
5. Pre-requirements for this course (if any): None					
6. Co- requirements for this course (if any): None					
7. Course Main Objective(s) To learn the basic terminology and some of the theory associated with trees and graphs and to explore applications of them in coding.					

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	3	100%
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	45
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			
1.1	Define concepts related to graphs and trees.	K1	- Lecture - Discussions	- Quiz - Written Exam
1.2	Identify whether graphs are directed, undirected, Hamiltonian and/or Eulerian. etc.			
2.0	Skills			
2.1	Demonstrate induced sub-graphs, and proper sub-graphs	S2	- Lecture - Discussions	• Assignments • Quiz • Midterm • Final Exam
2.2	Solve problems involving vertex and edge connectivity and planarity.	S1		
3.0	Values, autonomy, and responsibility			
3.1	Work as part of a team and independently.	V1	Assignments	- Oral Exam - Observation Card

C. Course Content

No	List of Topics	Contact Hours
1.	Fundamental concepts: Trees; Characterization of trees	6
2.	Types of graphs: Undirected graphs, Directed graphs and weighted graphs and related notions such as paths and cycles, degree of graph …etc.	9
3	Connectivity: Adjacency matrix for directed graph, complete graph, planar graph and Euler formula.	9
4	Isomorphism between graphs; Eulerian and Hamiltonian graphs, infinite and dual graphs	12
5	Algebraic graph theory: chromatic number, chromatic polynomial.	9
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Semester Exam1	6-8	20
2.	Assignments	During classes	10
3.	Semester Exam2	11-13	20
4.	Final Exam	16-18	50

*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	علي، علي عزيز، "مقدمة في نظرية البيانات"، جامعة الموصل، 1983م
Supportive References	J. A. Bondy and U. S. R. Murty (2011), Graph Theory, London, New York.
Electronic Materials	B. West (2000), Introduction to Graph theory, Prentice Hall.
Other Learning Materials	http://en.wikipedia.org/wiki/Graph theory

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	• Lecture Hall by the number of seats = 25 seat approximately.
Technology equipment (projector, smart board, software)	• Data show • Smart Board • Wi Fi
Other equipment (depending on the nature of the specialty)	• None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student	Student Questionnaire (Indirect)
Effectiveness of students assessment	Peer Reviewer	Rubrics (Indirect)
Quality of learning resources		
The extent to which CLOs have been achieved	Faculty	Direct
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Council of Mathematics Department
REFERENCE NO.	14441017-0208-00014
DATE	17-10-1444H