# الجامعة الأميركية في الشارقة AMerican University of Sharjah

Α	Course Number & Title	Graph Theory – MTH 418							
В	Pre/Co-requisite(s)	Prerequisite: MTH 213							
с	Number of credits	3							
D	Faculty Name	Ayman Badawi							
E	Term/Year	Spring 2024							
F	Sections								
		CRN	Days	Time					
		MTH 418	MW	11:00 - 12:2	15	5 Chem. 227			
G	Instructor Information	Office		Telephone		Email			
	internation	NAB 262				abadawi@aus.edu			
		Office Hours:           •         MTWR: 13:00 – 14:00							
Н	Course Description from Catalog	Covers graphs and sub graphs, connected and disconnected graphs, matrices, trees and girth, planar and nonplanar graphs, graph embedding, connectivity and edge connectivity, Hamiltonian graphs, matching, factorization and coverings, networks and applications to science and engineering.Course Learning Outcomes (CLOs)Assessment Instrument(s)							
Ι	Course Learning Outcomes and Assessment Instruments	Course Learning Outcomes (CLOs)Assessment Instrument(s)Upon completion of this course, students will be able to;CLO1: Identify connected graphs, subgraphs, induced subgraphs, spanning subgraphs, Eulerian, Hamiltonian, planar, chordal graphs, and trees.Exam 1 and/or FinalCLO2: Apply basic concepts and theorems to find degrees of vertices, diameter, girth, and Ramsey numbers for some graphs.Exams 1, 2, and/or FinalCLO3: Demonstrate a thorough knowledge of Dijkstra's algorithm, the structure of complete graphs, bipartite graphs, complete bipartite graphs, regular graphs, line graphs, matching, covering, and partial order graphs.Exams 1, 2, 3 and/or 							

### الجامعة الأميركية في الشارقة AUS | الجامعة الأميركية في الشارقة

1	Manning CLO's to								
,		Course Learning Outcomes		Program Learning Outcome:					
	. 20 3			The	The BSMTH CLOs are listed at the end of this document				
		1. CLO1, CLO2		PLO	1, PLO2, Pl	.03, PLO5, PLO6	, PLO8, PLO	9	
		2. CLO3, CLO4		PLO	1, PLO2, Pl	.03, PLO5 , PLO	5, PLO7, PLC	98, PLO9	
к	Textbook and	Required: Badawi- Class- Notes, materials on I-Learn, essential old guizzes, notes. online							!
	other Instructional	textbook, and exams on the MTH 418 webpage: https://www.ayman-							
	Material and	badawi.com/MTH%20%20418.html							
	Resources								
L	Teaching Methods	Lectures, oral presentat	tions. an	d grou	ip discussio	on. All lecture no	otes and vide	eos will be	
-		available on iLearn.							
	Creding Scolo	Creding Seels (avample	-)						
IVI	Grading Scale,	Grading Scale (example	<u>e)</u>						
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	Distribution, and Due Dates	95 - 100	4.0	A	/5.0	0 - 77.99	2.5		
	Due Dates	89.00 - 92.99	3.7	A-	68.0	JU - 72.99	2.0		
		86.00 - 88.99	3.3	B+	62.0	0 - 67.99	1./	<u>L-</u>	
		81.00 - 85.99	3.0	B	50.0	0 - 61.99	1.0	D	
		78.00 - 80.99	2.7	B-	Less	5 Than 50.00	0	F	
		Grading Distribution							
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		Grading Distribution Assessment Exam 1			Weight 22%	We	Due	v <b>ate (Week #</b> b. 21, In Clas	<u>#)</u> 55
		Grading Distribution Assessment Exam 1 Exam 2			<b>Weight</b> 22% 22%	We Wedn	<b>Due E</b> dnesday, Fe esday, Maro	b <b>ate (Week #</b> b. 21, In Clas ch 27, In Clas	<b>#)</b> \$\$ \$\$
		Grading Distribution Assessment Exam 1 Exam 2 Exam 3			Weight 22% 22% 22%	We Wedn	<b>Due E</b> dnesday, Fe esday, Maro Monday, N	<b>vate (Week #</b> b. 21, In Clas :h 27, In Clas 1ay 6, In Clas	<b>#)</b> 55 55 55
		Grading Distribution Assessment Exam 1 Exam 2 Exam 3 Final Exam			Weight 22% 22% 22% 34%	We Wedn	<b>Due E</b> dnesday, Fe esday, Maro Monday, N	P <b>ate (Week #</b> b. 21, In Clas ch 27, In Clas 1ay 6, In Clas TB/	<b>#)</b> 55 55 75 A
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### Schedule(but not in order; I recommend following class notes)

Week #	CHAPTER	NOTES
1	Graphs and their plane figures	•
2	Subgraphs	•
3	Paths and Connectivity of Graphs + distance, parameter and girth	•
4	Vertex cut	•
5	dominating set and domination number	•
6	clique number (components)	•
		•
7	Bipartite graphs and trees	•
8	Tours and Matching	•
9	Eulerian graphs	•
10	Hamiltonian graphs	
11	Colorings- vertex coloring	•
12	Edge colorings	•
13	Ramsey's Theorem and partial order graphs	•
14	Planar graphs, Line graphs	•
15	<b>Reviews/ comments, discussion</b>	•

## الجامعة الأميركية في الشارقة American University of Sharjah

#### **BSMTH Program Learning Outcomes**

**PLO1**: Demonstrate knowledge and understanding of diverse areas in mathematics, such as analysis, algebra, discrete mathematics, and applied mathematics.

PLO2: Construct and effectively communicate valid mathematical arguments.

PLO3: Demonstrate a solid grounding in the ideas and techniques of mathematics.

PLO4: Apply mathematical analysis and mathematical skills to problems in other disciplines.

**PLO5**: Use discrete mathematical concepts in various contexts such as algorithm development, computer programming, and network development and implementation.

PLO6: Demonstrate the ability to identify and carry out thoughtful approaches to problem-solving.

**PLO7**: Define and execute simple research tasks and assist in more research that is complex tasks as required for professional work.

**PLO8**: Formulate a problem in mathematical terms from descriptions written in language specific to disciplines associated with engineering, finance, and the natural sciences.

**PLO9**: Obtain the research skills necessary to adapt to change, remain current in the field, and continue to learn new information, skills, and concepts.