

COURSE SYLLABUS

GRAPH THEORY

Course code: 220100

1. General information

<i>Course type</i>		<i>Number of credits</i>	<i>Number of learning periods</i>
General	<input checked="" type="checkbox"/>	Theory: 02 Exercise: Practice: 01	Theory: 30 Exercise: Practice: 30
Basic	<input type="checkbox"/>		
Specialized	<input type="checkbox"/>		
Required	<input checked="" type="checkbox"/>		
Elective	<input type="checkbox"/>		

Learners:

Level	Bachelor
Discipline	Information Technology

Course requirements:

Prerequisites	Programming Techniques
Parallels	None
Other requirements	None

2. Learning resources

Books	[1] Nguyễn Đức Nghĩa, Tô Hiến Thành (2009). <i>Toán rời rạc</i> . NXB ĐHQG Hà Nội [2] Đặng Huy Ruận (2000). <i>Lý thuyết đồ thị và ứng dụng</i> . NXB Khoa học và Kỹ thuật Hà Nội. [3] Kenneth H. Rosen (2007). <i>Discrete Mathematics and Its Applications, 6th Edition</i> . McGraw Hill
References	[4] Bollobás, B. (2013). <i>Modern graph theory</i> (Vol. 184). Springer Science & Business Media.

Other learning materials	<p>[5] Websites:</p> <ol style="list-style-type: none"> 1. https://www.tutorialspoint.com/graph_theory/index.htm 2. https://primes.utm.edu/graph/index.html 3. https://www.ics.uci.edu/~eppstein/gina/gdraw.html
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3. Course description

The course provides students basic knowledge of applied mathematics in computer science. The course also aims to provide opportunities to practice skills including programming to solve problems related to graph theory. Additionally, the course develops students' appropriate awareness of active learning and skill groups.

4. Course learning outcomes (CLOs)

After finishing the course, students will be able to:

		Satisfy LOs of the program	Satisfy LOs of the ABET
❖ Topic 1: Disciplinary Knowledge and Reasoning			B.1.1 B.1.5
L1.	Present the concepts of Graphs	1.2.4	
L2.	Solve path problems in Graphs		
L3.	Determine Planar Graphs		
L4.	Solve Graph Coloring problems		
L5.	Solve Minimum Spanning Tree problems		
L6.	Implement basic algorithms related to Graphs and algorithms related to cycles, paths, coloring, minimum spanning trees		
❖ Topic 2: Personal and Professional Skills and Attributes			
L7.	Problem Identification and Formulation	2.1.1	
L8.	Modeling	2.1.2	
L9.	Estimation and Qualitative Analysis	2.1.3	
❖ Topic 3: Interpersonal Skills: Teamwork and Communication			
L10.	Team Operation	3.1.5	

❖ Topic 4: Conceiving, Designing, Implementing and Operating Systems in The Enterprise, Societal and Environmental Context – The Innovation Process			

5. Course content

<i>Course content</i>	<i>CLOs</i>	<i>Number of learning periods</i>		
		<i>Theory</i>	<i>Practice</i>	<i>Others</i>
Chapter 1. Graphs	<i>L1, L6</i>	10	5	
1.1. Graphs and Representing Graphs				
1.2. Paths, Cycles, Interconnection Networks				
1.3. Special Types of Graphs, Graph Isomorphism				
<input checked="" type="checkbox"/> <i>Personal and Professional Skills and Attributes</i>	L7(I); L8(I); L9(I)			
<input checked="" type="checkbox"/> <i>Interpersonal Skills: Teamwork and Communication</i>	L10(U)			
<input checked="" type="checkbox"/> <i>CDIO in the enterprise, societal and environmental context</i>				
Chapter 2. Path Problems	<i>L2, L6</i>	10	15	
2.1. Graph Search Algorithms				
2.2. Euler Graph				
2.3. Hamiltonian graph				
2.4. Shortest path problem				
<input checked="" type="checkbox"/> <i>Personal and Professional Skills and Attributes</i>	L7(I); L8(I); L9(I)			
<input checked="" type="checkbox"/> <i>Interpersonal Skills: Teamwork and Communication</i>	L10(U)			
<input checked="" type="checkbox"/> <i>CDIO in the enterprise, societal and environmental context</i>				
Chapter 3. Planar Graph and Graph Coloring	<i>L3, L4, L6</i>	5	5	

3.1. Planar Graph				
3.2. Graph Coloring				
<input checked="" type="checkbox"/> <i>Personal and Professional Skills and Attributes</i>	L7(I); L8(I); L9(I)			
<input checked="" type="checkbox"/> <i>Interpersonal Skills: Teamwork and Communication</i>	L10(U)			
<input checked="" type="checkbox"/> <i>CDIO in the enterprise, societal and environmental context</i>				
Chapter 4. Trees	<i>L5, L6</i>	5	5	
4.1. Basic Concepts				
4.2. Binary Trees and Tree Traversal				
4.3. Minimum Spanning Trees				
<input checked="" type="checkbox"/> <i>Personal and Professional Skills and Attributes</i>	L7(I); L8(I); L9(I)			
<input checked="" type="checkbox"/> <i>Interpersonal Skills: Teamwork and Communication</i>	L10(U)			
<input checked="" type="checkbox"/> <i>CDIO in the enterprise, societal and environmental context</i>				
Summary of skills in course level				
<input checked="" type="checkbox"/> <i>Personal and Professional Skills and Attributes</i>	L7(I); L8(I); L9(I)			
<input checked="" type="checkbox"/> <i>Interpersonal Skills: Teamwork and Communication</i>	L10(U)			
<input checked="" type="checkbox"/> <i>CDIO in the enterprise, societal and environmental context</i>				

6. Teaching and learning methods

ID	Teaching method/technique		Description
M1.	Lecturing	<input checked="" type="checkbox"/>	
M2.	Questions – Answers	<input type="checkbox"/>	
M3.	Group-based Learning	<input checked="" type="checkbox"/>	
M4.	Problem-based Learning	<input checked="" type="checkbox"/>	

ID	Teaching method/technique		Description
M5.	Project-based Learning	<input type="checkbox"/>	
M6.	Case studies	<input type="checkbox"/>	
M7.	Roleplay	<input type="checkbox"/>	
M8.	Demo	<input checked="" type="checkbox"/>	
M9.	Simulations	<input type="checkbox"/>	
M10.	Debate	<input type="checkbox"/>	
M11.	Game	<input type="checkbox"/>	
M12.	Brainstorming	<input type="checkbox"/>	
M13.	Think-Pair-Share	<input type="checkbox"/>	

7. Course assessment

ID	Assessment activity		Quantity	Weight	LOs assessed
T1.	Text-based midterm exam	<input checked="" type="checkbox"/>	01	25%	L1, L2
T2.	Text-based final exam	<input type="checkbox"/>			
T3.	Practice midterm exam	<input checked="" type="checkbox"/>	01	25%	L6
T4.	Practice final exam	<input type="checkbox"/>			
T5.	Report	<input type="checkbox"/>			
T6.	In-class exercises	<input type="checkbox"/>			
T7.	Homework assignments	<input type="checkbox"/>			
T8.	Question – Answer	<input type="checkbox"/>			
T9.	Term Project	<input type="checkbox"/>			
T10.	Final Exam	<input checked="" type="checkbox"/>	01	50%	L1, L2, L3, L4, L5
Formula for Overall score		$T1*0.25+T3*0.25+T10*0.5$			

8. Course requirements and expectations

8.1. Requirements on attendance

- Students are responsible for attending in all classes. In case of absence due to force majeure circumstances, there must be sufficient and reasonable evidence.
- Students who do not attend more than 20% of the class sections, whether for reason or not, are deemed not to have completed the course and must re-enroll in the following semester.

8.2. Requirements and expectations on student behaviors

- Students must show their respects for teachers and other learners.
- Students must be on time. Students who are late more than five minutes will not be allowed to attend the class.
- Students should not make noise and interfere with others in the learning process.
- Students should not eat, chew gum, and use devices such as cell phones, music players during class hours.
- Laptops and tablets can only be used in class for the purpose of learning.
- Students who violate the above principles will be asked to leave the class and considered absent from the class.

8.3. Requirements on learning issues

Issues related to applying for score reservation, scoring complaints, scoring, exam disciplines are done according to the Learning Regulation of Tra Vinh University.

9. Tentative course instructor

Tram Hoang Nam

DEAN

DEPARTMENT HEAD

LECTURER

Tram Hoang Nam