

COURSE SYLLABUS
(Training level: Undergraduate)

Course Title:

Vietnamese Course Title: Toán rời rạc

English Course Title: Discrete Mathematics

Course Code: DEM231

Major: Information technology; Electrical, electronic and telecommunication technology; Multimedia communications; Economic informatics; Software Engineering.

Version: 2017

1. General Information

- Number of credits: 3 (Theory: 3; Practice: 0)

- Types of Knowledge:

General Education		Basic core courses		Major core courses		Concentration courses		Others
Required <input type="checkbox"/>	Optional <input type="checkbox"/>			Information technology; Electrical, electronic and telecommunication technology; Multimedia communications; Economic informatics; Software Engineering				
		Required <input type="checkbox"/>	Optional <input type="checkbox"/>	Required <input checked="" type="checkbox"/>	Optional <input type="checkbox"/>	Required <input type="checkbox"/>	Optional <input type="checkbox"/>	Alternative subject of Graduation Thesis <input type="checkbox"/>

- Required courses: None

- Pre-requisite: Advanced Math (MAT140), Programming Techniques (KTL122)

- Co-requisite: None

- Facility Requirements: Having a projector in the classroom.

- Departments in Charge: Faculty Information Technology

2. Time Allocated

Total: 54 Periods	Theory: 36 Periods
	Discussion/ Group Presentation: 18 Periods
	Assignment/ Essay/ Practice: 0
	Tests: 3 + Theory: Number of Tests: 3 Periods: 0 + Practice: Number of Tests: 0 Periods: 0
Self-Study: 90 Periods Other Activities: 0	

3. Lecturer's Information

No.	Lecturer name	Phone number	Email	Note
1	MSc. Nguyen Hien Trinh	0987562055	nhtrinh@ictu.edu.vn	Member
2	MSc. Nguyen Thi Tuyen	0988808459	nttuyen@ictu.edu.vn	Leader
3	MSc. Nguyen Thi Oanh	0981368808	ntoanh@ictu.edu.vn	Member
4	Dr. Dam Thanh Phuong	0912998749	dtphuong@ictu.edu.vn	Member
5	MSc. Doan T. Bich Ngoc	0987944381	dtbngoc@ictu.edu.vn	Member

4. Objectives

- Knowledge: Equip students with methods of thinking, logical reasoning, principles and advanced counting techniques. Basic concepts and algorithms on discrete structures and techniques to solve practical problems with these structures on computers.
- Skills: This course helps students form and improve logical thinking ability, reasoning methods, and scientific proofs. Promote the ability to form and develop the idea of solving practical problems with discrete structures on computers and subjects should be arranged in the second year.
- Position of the course: The course contributes to meet the outcomes L4, L8.

5. Description of content and output standards:

- **Knowledge Standards:** (1) Remember \Rightarrow (2) Understand \Rightarrow (3) Apply \Rightarrow (4) Analyze \Rightarrow (5) Create.
- **Skills Standards:** (1) Copy \Rightarrow (2) Self-manipulation \Rightarrow (3) Masterfully repeating to the norm \Rightarrow (4) Combining multiple activities \Rightarrow (5) Completely proactive.

Notation CLOs	Contents	Level	
		Knowledge	Skills
C1	Understand the basic concepts of collection, mathematics on the collection, basic concepts of logic clauses, mathematics on logical clauses, the main types of rules of the logical logic, concept of new words with all, existence At, the rules of reasoning.	2	
C2	Apply the transformation skills, shorten the logical expression to prove the two equivalent expressions.		3
C3	Apply the skills to find the main rules, the main clarification of a logical expression, the knowledge proven and the methods of proof to find the main forms of rules and mathematical proof.		3
C4	Understand the basic concepts of counting, unable to count, combined, adjusted and swapping.	2	
C5	Apply basic and advanced counting principles, combinations and permutation methods to apply computing and simulation programming.	2	3
C6	Understand the basic concepts in graphs, graph shows, concepts of steps, cycles and connections of graphs, Euler graphs and Hamilton graphs, concepts of trees and frames .	2	

Notation CLOs	Contents	Level	
		Knowledge	Skills
C7	Apply the skills to implement the Euler cycle, Hamilton cycle, the shortest way to find the path and the smallest frame to find the shortest path and the smallest frame tree in the graph.	2	3
C8	Apply plants to apply the problem of graph approval	2	3

6. Reading List

- Main Syllabus:

[1] K.H. Rosen, *Discrete math and applications in informatics*, KHKT, 1999.

[2] Do Duc Giao, *Discrete mathematics*, Hanoi National University, 1999.

- References:

[3] Dinh Manh Tuong, *Data structure and algorithm*, Education Publishing House, 2002.

[4] Do Duc Giao, *Discrete mathematical exercises*, Hanoi National University, 2002.

[5] Nguyen To Thanh, Nguyen Duc Nghia, *Discrete math*, Hanoi University of Technology, 1997.

7. Score Assessment

- Score Scale: 10.

- Components Assessment:

Evaluation time	Components Assessment	Learning Outcomes	Factor	Score	Weight
During the duration of the course	Attendance: (b_0)		1	$d = (b_0 + b_1 + b_2 + b_3) / 4$	30%
According to the teaching plan in section 9	Test No.1: (b_1)	C1; C2; C3	1		
	Test No.2: (b_2)	C4; C5	1		
	Test No.3: (b_3)	C6; C7; C8	1		
The end of the term.	Final exam	C1; C2; C3; C4; C5; C6; C7; C8;		e	70%
Final Score: (f)				$f = d \times 30\% + e \times 70\%$	

- Final exam: *Oral test*

8. Regulations for students

8.1. Student's Duties

- Read documents and prepare for each lesson before attending class.

- Complete the assigned exercises.

- Prepare the discussion content of the module.

8.2. Regulations on Exams and Academic Studies

- Students must attend the full class, ensuring at least 80% of classes in class.

- Complete the assigned tasks for the module.

9. Teaching Plan

No.	Period	Contents	Teaching Methodology	CLOs	References
1	3	Chapter 1: Gathering, logical clauses 1.1. Gather and operations on the set 1.2. The above laws 1.3. Relationship and properties on the collection	- Teaching: lecturing, discussing, asking questions and assigning homework to students. - Study in class: Apply the knowledge of gathering, relationships to answer questions, participate in building lessons and solving exercises.	C1	[1]. (53-92); [1]. (423-493)
2	3	Chapter 1: Gathering, logical clauses 1.4. Logic clause and mathematics on propositions 1.5. The main forms of the proposition formula	- Teaching: lecturing, discussing, asking questions and assigning homework to students. - Study in class: Apply the knowledge of logical clauses, the standard forms of the clause formula to answer questions, participate in building lessons and solving exercises.	C1 C2	[1]. (6-28) [1]. (32-45) [2]. (332-400)
3	3	Discussion 1: Collection structure, propositional algebra. 1.1 Summary of knowledge about the collection structure, propositional algebra 1.2 Exercise about getting, on the getting, relationship 1.3 Exercises on logic clauses and standard types, new words and words	- Teaching: Summary of the main contents of collection, logical clauses. Guide, answer exercises for students. - Study in class: Students ask questions, complete exercises.	C1 C2 C3	[1]. (6-28) [1]. (32-45) [1]. (53-92) [1]. (209-242) [1]. (423-493) [2]. (332-400)
4	3	Chapter 1: Gathering, logical clauses 1.6. New words "with everything" and "exist" 1.7. Rules of argument, deduction	- Teaching: lecturing, discussing, asking questions and assigning homework to students. - Study in class: Apply the knowledge of the rules of argument, deduction to answer questions, participate in building lessons and solving exercises.	C1	[1]. (209-242)
5	2	Chapter 1: Gathering, logical clauses 1.8. Prove and proof methods	- Teaching: lecturing, discussing, asking questions and assigning homework to students. - Study in class: Apply knowledge about proofs and methods of proof to answer questions, participate in building lessons and solving exercises.	C3	[1]. (712-763)
	1	Test No1	Written	C1, C2, C3	
6	3	Discussion 2: Inferred, proof methods 2.1 Summary of knowledge about the rules of argument, methods to prove mathematics 2.2. Exercise on the rules of deduction, prove mathematics	- Teaching: Summary of the main contents of reasoning and proof methods. Guide, answer exercises for students. - Students: Students ask questions, complete exercises. - Teacher: Assess students through the results of the test.	C1 C3	[1]. (209-242) [1]. (712-763)

No.	Period	Contents	Teaching Methodology	CLOs	References
7	3	Chapter 2: Counting methods 2.1. Practice counting and not counting. 2.2. Basic and advanced counting principles	- Teaching: lecturing, discussing, asking questions and assigning homework to students. - Study in class: Apply the knowledge of basic and advanced counting principles to answer questions, participate in building lessons and solving exercises.	C4 C5	[1]. (131-147) [1]. (249-267) [2]. (5-38)
8	3	2.3 Methods of combining and permutation	- Teaching: lecturing, discussing, asking questions and assigning homework to students. - Study in class: Apply knowledge about combinations and permutation methods to answer questions, participate in lesson construction and solve exercises.	C4 C5	[1]. (291-322)
9	2	2.4. The algorithm of calculating combination and permutation	- Teaching: lecturing, discussing, asking questions and assigning homework to students. - Study in class: Apply the knowledge of combining and permutation algorithms to answer questions, participate in building lessons and solving exercises.	C5	[1]. (314-322) [1]. (338-355)
	1	Test No2	Written	C4, C5	
10	3	Chapter 2: Counting methods Discussion 3. Counting method 2.1 Summary of knowledge about counting methods 2.2. Exercise on counting principles 2.3 Exercises about products and pair	- Teaching: Summary of the main contents of combinations and permutation of combinations and permutation algorithms. Guide, answer exercises for students. - Study in class: Students ask questions, complete exercises.	C4 C5	[1]. (131-147) [1]. (249-267) [1]. (291-322) [2]. (5-38)
11	3	Chapter 3: Graph theory and tree 3.1. Graphs and basic concepts in graphs 3.2. Graph show 3.3. Steps, paths, cycles and connections of the graph 3.4. Methods of graph browsing	- Teaching: lecturing, discussing, asking questions and assigning homework to students. - Study in class: Apply knowledge about graphs and approval methods to answer questions, participate in building lessons and solving exercises.	C6 C7	[1]. (494-544) [2]. (71-110)
12	3	3.5. The common and special forms of graphs 3.6. Euler graph and Hamilton graph	- Teaching: lecturing, discussing, asking questions and assigning homework to students. - Study in class: Apply the knowledge of Euler graph and Hamilton graph to answer questions, participate in building lessons and solving exercises.	C6 C7	[1]. (549-560) [1]. (581-589)

No.	Period	Contents	Teaching Methodology	CLOs	References
13	3	Discussion 4: Graph structure, basic issues 5.1 Summary of knowledge about graph structure, graph approval methods. 5.2 Exercise on graph shows, steps, methods of approval of graphs	- Teaching: Summary of the main contents of graphs and methods of approval of tests. Guide, answer exercises for students. - Study in class: Students ask questions, complete exercises.	C6 C7	[1]. (494-544) [2]. (71-110)
14	3	Chapter 3: Graph theory and tree 3.7. The shortest way to find the way	- Teaching: lecturing, discussing, asking questions and assigning homework to students. - Study in class: Apply the knowledge about the shortest way of finding the way to answer questions, participate in building lessons and solving exercises.	C6 C7	[1]. (549-560) [1]. (581-589) [2]. (71-110)
15	3	Discussion 5: Math problems and algorithms find the shortest way 6.1 Summary of knowledge about the shortest path, trees, 6.2. Exercise on Dijkstra algorithms, Floyd	- Teaching: Summary of the main contents of graphs and algorithms find the shortest way on the graph. Guide, answer exercises for students. - Study in class: Students ask questions, complete exercises.	C6 C7	[1]. (549-560) [1]. (581-589) [2]. (71-110)
16	3	Chapter 3: Graph theory and tree 3.8. The concept of trees, frames, algorithms build the shortest frame tree.	- Teaching: lecturing, discussing, asking questions and assigning homework to students. - Study in class: Apply the knowledge of trees and frames, the algorithms find the shortest frame on the graph to answer questions, participate in building lessons and solving exercises.	C6 C7	[1]. (568-576) [1]. (646-661) [1]. (677-692) [2]. (104-110) [2]. (128-189)
17	2	Chapter 3: Graph theory and tree The methods of browsing on trees	- Teaching: lecturing, discussing, asking questions and assigning homework to students. - Study in class: Applying knowledge about trees and frames, methods of approval of plants to answer questions, participate in building lessons and solving exercises.	C8	[1]. (568-576) [1]. (646-661) [1]. (677-692) [2]. (104-110) [2]. (128-189)
	1	Test No3	Written	C6; C7; C8	
18	3	Discussion 6: The problem and algorithm to find the shortest frame on the graph 6.1. Summary of knowledge about the frame, the smallest frame construction algorithm, the methods of approval on the tree 6.2. Exercise on the smallest frame construction algorithms, the methods of approval on the tree	- Teaching: Summary of the main contents of the frame tree and the smallest frame tree algorithm on the graph. Guide, answer exercises for students. - Study in class: Students ask questions, complete exercises.	C6; C7; C8	[1]. (549-560) [1]. (581-589) [2]. (71-110)

10. Competent Authority Approval: Thai Nguyen University of Information and Communication Technology

5th October, 2017

Vice Rector



Ph.D Do Dinh Cuong

Dean



Ph.D Nguyen Hai Minh

Head of Department



Ph.D Dam Thanh Phuong


Composer Team

Dam Thanh Phuong 

Doan Thi Bich Ngoc 

Nguyen Hien Trinh 

Nguyen Thi Tuyen 

Nguyen Thi Oanh 

11. Updated Procedure

1st update:
19/08/2019.

Updater



Doan Thi Bich Ngoc