



Course Syllabus
According to JORDAN National Qualification
Framework (JNQF)

Course Name: Discrete Mathematics

Course Number: 06051200

General Course Information:

Course title	Discrete Mathematics
Course number	06051200
Credit hours	3
Education type	[Face-to-Face]
Prerequisites/corequisites	---
Academic Program	Department of Computer Science
Program code	605
Faculty	Faculty of Information Technology
Department	Department of Computer Science
Level of course	1
Academic year /semester	1, 1
Awarded qualification	Bachelor (B.Sc.)
Other department(s) involved in teaching the course	(CIS, CS, CSY,CMS, ..)
Language of instruction	English
Date of production/revision	June, 2022

Course Coordinator:

Coordinator's name	Dr. Dimah Fraihat
Office No	4109
Office Phone extension number	2461
Office Hours	Sun., Tue. and Thu. (12:00 – 01:00), Mon. and Wed. (11:00 – 12:30)
Email	d.fraihat@iu.edu.jo

Other Instructors:

Instructor name	
Office No	
Office Phone extension number	
Office Hours	
Email	

Course Description (English/Arabic):

English	The course provides a comprehensive study of important aspects of discrete structures used in computer science starting with propositions, logical operations, quantifiers, set theory, sequences, Matrices, Methods of proofs, relations, properties of relations, functions, types of functions, Ordered relations (partially ordered relations, linearly ordered relations, diagrams), Trees (rooted tree, sub-tree and ending with Graph theory).
Arabic	يقدم هذا المساق دراسة شاملة لجوانب مهمة من الهياكل المنفصلة المستخدمة في علوم الكمبيوتر بدءًا من المقترحات والعمليات المنطقية والمحددات الكمية ونظرية المجموعات والتسلسلات والمصفوفات وطرق الإثبات والعلاقات وتطور العلاقات والوظائف وأنواع الوظائف المطلوبة العلاقات (العلاقات المرتبة جزئيًا، العلاقات المرتبة خطيًا، المخططات)، الأشجار، (الشجرة الجذور، الشجرة الفرعية وتنتهي بنظرية الرسم البياني).

Textbook: Author(s), Title, Publisher, Edition, Year, Book website.

1. Kenth H. Rosen, Discrete Mathematics and its Applications, 6th Edition, 2016, ISBN: 007 124474-3.

References: Author(s), Title, Publisher, Edition, Year, Book website.

Required book (s), assigned reading and audio-visuals:
1. Andrews Tanenbaum, “Modern Operating Systems”, 4 th Edition, Pearson, 2014)
2. William Stallings “Operating systems, internals and design principles”, 8 th Edition, Pearson, 2014.
Discrete Mathematics: An Open Introduction Open Textbook Library, Oscar Levin , 2 nd Edition, 2016, ISBN:1534970746, 9781534970748, Create Space Independent Publishing Platform, http://discrete.openmathbooks.org/home.php .

Course Educational Objectives (CEOs):

1.	Outlines the main concepts of discrete structures concepts (Logic, Quantifiers).
2.	Explain Set Theory and Sets Operations.
3.	Demonstrate Functions, and Methods of Proofs.
4.	Explain Binary Matrices, Operations, Summations, and Sequences.
5.	Explain the concepts of Relations and Ordered Relations.
6.	Explain Lattices, Hasse Diagrams, Trees, Graphs

Intended Learning Outcomes (ILO's):

	Subject Intended learning outcomes (ILOs) describe what students are expected to know and be able to do at the end of the course. These outcomes are related to the knowledge, skill and competence that students acquire:	Relationship to CEOs	Contribution to PLOs	Bloom Taxonomy Levels*	Descriptors**
A	Knowledge and Understanding:				
A1	Understand Propositions, Logical operations, truth Tables, Quantifiers, conditional statements, examples).	1, 2	3	1, 2	K
A2	Understand sets, sub-sets, set operations.	1, 3	3,5		
B	Intellectual skills:				
B1	Understand Functions, types of functions, one-to-one, onto, bijection, computer science functions, invertible functions, compositions.	3	3	3, 4	S
B2	Understand Sequences, Summations, and Methods of proofs direct, indirect. Matrices Binary Matrices.	3, 4	3,5		
C	Subject specific skills:				
C1	Understand Relations, Cartesian product, Types of relations, Matrix of relations, equivalence relations, compositions of relations.	4	3	3, 4	S
C2	Understand ordered relations, partially ordered Sets, Lattices, Properties of Sets.	4, 5	3,5,6	5, 6	C
D	Transferable skills:				
D1	Understand Trees, Rooted trees, Labeled trees, Graphs, Connected Graphs, and examples.	5, 6	3,5,6	5, 6	C

***Bloom Taxonomy Levels**

Level #	1	2	3	4	5	6
Level Name	Knowledge	Comprehension	Application	Analysis	Evaluation	Synthesis

**** Descriptor (National Qualification Framework Descriptors): K : Knowledge, S: Skill, C: Competency.**

Program Learning Outcome (PLOs):

Program Learning Outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviours that students acquire as they progress through the program. A graduate of the () program will demonstrate:		Descriptors**		
		K	S	C
1.	Analyse a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.	✓		
2.	Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.	✓		
3.	Communicate effectively in a variety of professional contexts.		✓	
4.	Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.		✓	
5.	Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.			✓
6.	Apply computer science theory and software development fundamentals to produce computing-based solutions. [CS]			✓

**** Descriptors according to the national qualifications framework (K: knowledge, S: skill, C: Competency)**

Weekly Schedule *(please choose the type of teaching)*

- ☐ **✓ Face to Face**
- ☐ **Hybrid (2 Lectures Face – To - Face +1 Lecture Asynchronous)**
- ☐ **Hybrid (1 Lectures Face – To - Face +1 Lecture Asynchronous)**
- ☐ **Online (2 Lectures Synchronous +1 lecture Asynchronous)**

Week	First Lecture (.....)	Second Lecture (.....)	Third Lecture (.....)	Ach. ILOs	Ach. PLOs	Descriptors**
1	Propositions, statement and truth tables	Propositions, statement and truth tables	Propositions, statement and truth tables	A1	3	K
2	Tautology	Contradiction	Logical equivalencies	A1	3	K
3	Quantified statement	Negations	Universal statements	A1	3	K
4	Mathematical Inductions	Mathematical Inductions	Mathematical Inductions	A1	3	K
5	Universal Statements and	Subsets	Proper subsets	A1	3	K
6	Operations on sets	Operations on sets	Venn's diagram	A2	3,5	S
7	Cartesian products	Sets identities	Sets identities	A2	3,5	S
8	Arrows diagrams	Arrows diagrams	Functions	B1	3	S
9	Sequences	Sequences	Sequences	B2	3,5	C
10	Binary Operations	Binary Operations	Hamming functions	C1	3	C
11	One-to-one functions	Onto functions	One-to-one correspondence	C2	3,5,6	C
12	Relations	Relations and functions	Properties of relations 1	C2	3,5,6	C
13	Properties of relations 1	Operations on relations	Combining relations	D1	3,5,6	C
14	Graphs, basics, examples of Graphs	Same Graph, Simple Graph, BiGraph, Complete Graphs	Subgraphs, the concept of degree	D1	3,5,6	C
15	Revision					
16	Final Exams					

* K: Knowledge, S: Skills, C: Competency

Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

- Interactive videos
- Practice Labs
- Discussion Forums
- ✓ Quizzes
- Other Interactive online activities
- Reports

Course Policies:

A- Attendance policies:

The maximum allowed absences is 15% of the lectures.

B- Absences from exams and handing in assignments on time:

Midterm exam can be retaken based on approval of excuse by the instructor's discretion.

Not handing assignment on time will incur penalties.

C- Academic Health and safety procedures

D- Honesty policy regarding cheating, plagiarism, and misbehaviour:

Cheating, plagiarism, misbehaviour will result in zero grade and further disciplinary actions may be taken.

E- Grading policy:

- All homework is to be posted online through the e-learning system.
- Exams will be marked within 72 hours and the marked exam papers will be handed to the students.
- Online Activities (Course Videos, Practice labs, Discussion Forums, Quizzes) **20%**
- Midterm **_30_%**
- Final Exam **_50_%**

F- Available university services that support achievement in the course: **E-Learning Platform, Labs, Library.**

Required equipment:

- PC / Laptop with webcam and mic
- Internet Connection
- Access to the IU E-Learning Platform at: <https://elearn.iu.edu.jo/>
- E-learning plan
- Satisfaction questionnaires for online and face-to-face learning
- Software for e-learning
- Training

Assessment Tools implemented in the course:

- ✓ Final Exam
- ✓ Midterm Exam
- ✓ Quizzes
- ✓ Homework
- Practice Labs
- Discussion Forums
- Periodic reports for learning assessment
- Improvement plans for online or face-to-face teaching
- Others:.....

Responsible Persons and their Signatures:

Course Coordinator	Dr. Dimah Frihat	Completed Date	29/6/2022
		Signature	
Received by (Department Head)	Dr. Faisal Alzyoud	Received Date	
		Signature	