جامعة الزيتونة الأردنية

Al-Zaytoonah University of Jordan

كلية العلوم وتكنولوجيا المعلومات

Faculty Of Science & IT

" حيث تصبح الرؤية واقعاً"
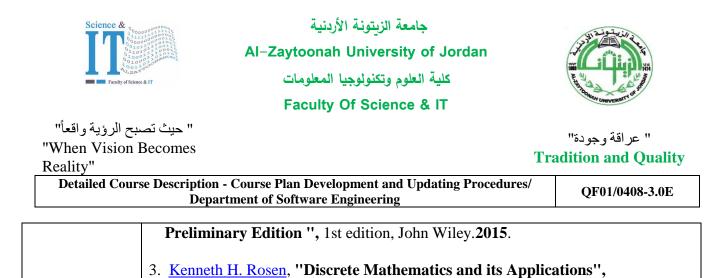
"When Vision Becomes
Reality"

" عراقة وجودة"
Tradition and Quality

Detailed Course Description - Course Plan Development and Updating Procedures/ Department of Software Engineering	QF01/0408-3.0E

Faculty	Science and Information Technology	Department	Software Engineering
Course number	0114211	Course title	Discrete Mathematics
Number of credit hours	3	Pre-requisite/co-requisite	0120117

Brief course description

This course will cover the following topics and specific applications in computer science.
Numbers and Exponents , Errors (absolute and relative) , Propositions , Predicates and Quantifiers , Quantifiers and logical operators, Logical Inference , Methods of Proof , Sets , Relations and Functions

	Course goals and learning outcomes
Goal 1	Learning about errors when representing real numbers in computers.
Learning outcomes	1.1 Distinguish between numbers in mathematics and computer. 1.2 Find the absolute and relative errors for real numbers in computer. Simplify the propositions
Goal 2	Understanding propositional logic and predicate logic.
Learning outcomes	2.1. Convert predicates into propositions using quantification methods
Goal 3	Recognizing distribution of quantifiers over logical operators.
Learning outcomes	3.1. Understand the distribution of quantifiers over logical operators
Goal 4	Knowing rules of logical inference
Learning outcomes	4.1 Use logical inference to prove the validity of arguments.
Goal 5	Recognizing methods of proof.
Learning outcomes	5.1 Understand and use different methods of proof.
Goal 6	Providing knowledge of sets, relations, and functions
Learning outcomes	6.1 Understand set theory and Cartesian product. 6.2 Represent set operations in computer.
Textbook	1. James L. Hein, "Discrete Structures, Logic, and Computability", **Fourth edition, Jones and Bartlett learning**, 2017
Supplementary references	1. Oscar Levine, "**Discrete Mathematics: an open introduction**," 2nd edition, Oscar Levine, **2016.** 2. Liben-Nowell, D. "**Discrete Mathematics for Computer Science**

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	Preliminary Edition ", 1st edition, John Wiley.**2015**. 3. Kenneth H. Rosen, **"Discrete Mathematics and its Applications",** Seventh edition, McGraw-Hill , **2012**.

Course timeline				
Week	**Number of hours**	**Course topics**	**Pages (textbook)**	**Notes**
01	1 1 1	**Numbers and Exponents:** integer numbers in mathematics and in computer, real numbers in mathematics and in computer, exponents, properties of exponents, and metric system.	1-5	
02	1 1 1	**Error:** normalized exponential notation of numbers, (mantissa and exponent parts), precision, magnitude, absolute error (with rounding and truncating), and relative error (with rounding and truncating).	5-10	
03	1 1 1	**Propositions:** definition of proposition and assertion, proposition variables, truth tables for logical operators (NOT, AND, OR, Exclusive-OR, implies, equivalence, NAND, NOR). Types of propositions (Tautology, contingency and contradiction)	10-35	
04	1 1 1	Logical identities, simplifying propositions using logical identities. Translating from English into Logical Expression. Translating from Logical Expression into English	10-35	
05	1 1 1	**Predicates:** universe of discourse, the quantifiers (universal, existential, and unique).	36-69	
06	1 1	More than one quantifier applied to predicates		

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		1	(Nested Quantifiers). Review of previous chapters. **First Exam 20%**	**36-69**	
07		1 1 1	**Quantifiers and Logical Operators:** Translating from English into Logical notation. Translating from Logical notation into English. The negation of quantifiers.	**36-69**	
08		1 1 1	Distribution of quantifiers over logical operators and proofs.	**36-69**	
09		1 1 1	**Logical Inference:** rules of inference, fallacious arguments, additional rules of inference.	**69-79**	
10		1 1 1	**Methods of Proof:** techniques of proof for implication (vacuous, trivial, direct, and indirect proofs), proof by contradiction, proof by Counter Example.	**80-108**	
11		1 1 1	Proof by Cases, proof by Equivalence, Constructive Existence, constructive and non-constructive proof.	**80-108**	
12		1 1 1	**Sets:** Set Builder Notation, No. of Elements, Subsets, Proper Subsets, power set, Cartesian products, set with quantifiers.	**115-126**	
13		1 1 1	**Set Operations:** set identities, generalization, and computer representation of sets. Review of previous chapters. **Second Exam 20%**	**127-137**	
14		1 1 1	**Relations:** Definition and their properties (types of relations).	**573-583**	
15		1 1 1	**Functions:** Definition and types of function (one to one, onto and inverse function).	**138-156**	
16			Final Exam		

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Theoretical course evaluation methods and weight	Participation = 10% First exam 20% Second exam 20% Final exam 50%	**Practical (clinical) course evaluation methods**	Semester students' work = 50% (Reports, research, quizzes, etc.) Final exam = 50%

Approved by head of department		Date of approval	

Extra information (to be updated every semester by corresponding faculty member)

Name of teacher	Khalil Awad	Office Number	
Phone number (extension)		Email	Khalil.Awad@ Zuj.edu.jo
Office hours	9:30 – 11 (Sat , Tue , Ther) 11-12:30 (Mon , Wed)		