جامعة الزيتونة الأردنية
Al-Zaytoonah University of Jordan
كلية العلوم وتكنولوجيا المعلومات
Faculty of Science and Information Technology

" عراقة وجودة"
"Tradition and Quality"

Detailed Course Description - Course Plan Development and Updating Procedures/ Computer Information Systems Department	**QF01/0408-3.0E**

Faculty	Faculty of Science and Information Technology	Department	Computer Information Systems
Course Number	**0113111**	**Course Title**	**Discrete Mathematics**
Number of Credit Hours	3	Pre-Requisite/Co-Requisite	Introduction to Information Technology

Brief Course Description:
This course provides The following topics:
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	**1.2** Distinguish between numbers in mathematics and computer. **1.2** Find the absolute and relative errors for real numbers in computer.
Goal 2	**Understanding propositional logic and predicate logic.**
Learning Outcomes	**2.1** Simplify the propositions. **2.2** 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 different types of functions. **6.2** Understand set theory and Cartesian product. **6.3** Represent set operations in computer.
Textbook	**1. James L. Hein**, "Discrete Structures, Logic, and Computability", **4th 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 Preliminary Edition ",** 1st edition, John Wiley.**2015**. **3.** Kenneth H. Rosen, **"Discrete Mathematics and its Applications",** Seventh edition, McGraw-Hill , **2012**.

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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 1	More than one quantifier applied to predicates (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	

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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	1	**Final Exam 50%**		

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		Office Number	
Phone Number (Extension)		Email	_____@zuj.edu.jo
Office Hours			