Academic Quality Assurance Department

Course Syllabus Form

College	Applied science		
Department	Computer and Technological Education		
Program	Applied Computing		
Course Title	Discrete Structures	**Course Number:**	15041221
Year	2021/2022	**Semester:**	First
Prerequisite(s)	Calculus		
Instructor	Kamal Darwish		
Instructor's e-mail	kdarwish@ptuk.edu.ps		
Office Hours	[12:00 – 13] Sun, Tue [10:00 – 11] Thu		
Class Time	[9:00 – 10:00] Sun, Tue , Thu	**Class Room:**	D404
Course description	The purpose of this course is to understand and use (abstract) discrete structures that are backbones of computer science. In particular, this class is meant to introduce logic, proofs, sets, relations, functions, counting, and probability, with an emphasis on applications in computer science.		
Course Intended Learning Outcomes (CILOs)	1- Explain at high levels concepts and implement basic operations in discrete mathematics. 2- Perform combinatorial analysis to solve counting problems. 3- Develop mathematical models through relations, combinatorics, graphs, and trees. 4- Use mathematical reasoning to comprehend and construct mathematical arguments. 5- Apply graph theory and other mathematical methods to both data structures and analysis of algorithms, and some other problems in computer sciences.		
Textbook(s)	**Textbook**: Kenneth H. Rosen. *Discrete Mathematics and Its Applications*, 7th Edition, McGraw Hill, 2012.		
Other required material (References):	-Discrete Mathematics, second edition, Norman L. Biggs. - Discrete Mathematics with Applications by Susanna S. Epp, 3rd Edition.		
Other Resources used (e.g. e-learning, field visits, periodicals, software, etc.)			

Course Teaching Methods	
Teaching Method	**CILOs**

Assessment Type	Details/Explanation of assessment in relation to CILOs	Weight	Date(s)
First Exam	25%		
Second Exam	25%		
Quizzes			
Laboratory/Practical			
Assignments	10%		
Project			
Final Exam	40%		
Total	100%	100%	

Course Intended Learning Outcomes (CILOs)										
CILOs	**Mapping to Program ILOs**									
On successful completion of the course, students will be able to:	**a**	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**I**	**j**

Course Weekly Breakdown					
Week	**Date**	**Topics Covered**	**CILOs**	**Lab Activities**	**Assessment**
1		**Ch.01:The Foundations: Logic and Proofs** 1.1 Propositional logic.			
2		1.2 Applications of Propositional Logic. 1.3 Propositional Equivalences. 1.4 Predicates and Quantifiers.			
3		1.5 Nested Quantifiers. 1.6 Rules of Inference.			
4		**Ch.02: Basic Structures: Sets, Functions, Sequences and Sums.** 2.1 Sets 2.2 Set Operations 2.3 Functions			
5		2.4 Sequences and Summations 2.5 Cardinality of Sets			
6		**Ch.04 Number Theory** 4.1 Divisibility and Modular Arithmetic 4.2 Integer Representations and Algorithms 4.3 Primes and Greatest Common Divisors			
7		4.4 Solving Congruences 4.5 Applications of Congruences			
8		**Ch.05 Induction and Recursion**			

		5.1 Mathematical Induction 5.2 Strong Induction 5.3 Recursive Definitions			
9		**Ch.06 Counting** 6.1 The Basics of Counting 6.2 The Pigeonhole Principle			
10		6.3 Permutations and Combinations 6.4 Binomial Coefficients 6.5 Generalized Permutations and Combinations			
11		**Ch.09: Relations** 9.1 Relations and Their Properties 9.3 Representing Relations			
12		9.4 Closures of Relations 9.5 Equivalence Relations 9.6 Partial Orderings			
13		**Ch.10 Graphs** 10.1 Graphs and Graph Models 10.2 Graph Terminology and Special Types of Graphs 10.3 Representing Graphs and Graph Isomorphism 10.4 Connectivity			
14		**Ch.11 Trees** 11.1 Introduction to Trees 11.2 Applications of Trees 11.3 Tree Traversal 11.4 Spanning Trees			

Prepared by:		**Signature**	
Head of Department		**Signature**	
Date			