Course Title:	***Discrete Mathematics / Discrete Structures I***
Course Code:	**SEN-120**
Credit Hours Theory:	**3**
Credit Hours Lab (If Applicable):	**0**
Instructor Name with Qualification:	Engr. Sadaf Khalid. MS Computer Software Engineering. (Double Gold Medalist)
Course Objectives:	This course aims to develop the students' ability of logical thinking and its application to computer science. Via teaching variety of important concepts, this course aims to develop students understanding of breadth of mathematics and familiarity with the concepts, structures and algorithms that are essential to the field of computer science and engineering.
Course Learning Outcomes:	After the successful completion of course, the students will be able to: 1. Demonstrate the understanding of fundamental concepts of logic, reasoning, algorithms, graphs and counting to model simple applications. 2. Confidently apply the knowledge learnt to solve mathematical problems in computer science and engineering disciplines.
Contents (Catalog Description):	Logical reasoning and proofs, Mathematical induction and recursion, Sets, Relations and functions, Algorithms, Graph theory, Trees, Boolean algebra, Languages and grammar, Finite state machines, Number theory.
Recommended Text Books:	1. Kenneth H.Rosen, "Discrete Mathematics and Its Applications", 7th Edition, McGraw Hill Books Co. 2. Richard Johnsonbaugh, "Discrete Mathematics", 5th Edition, Pearson Education Asia.
Reference Books:	-
Helping Web Sites:	-
General Instructions for students:	Attendance is mandatory. Every class is important. All deadlines are hard. Under normal circumstances late work will not be accepted. Students are required to take all the quizzes. No make-up quizzes will be taken under normal circumstances. Any form of cheating on exams/assignments/quizzes is subject to serious

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<td>penalty.

Attendance:
75% attendance is mandatory. Latecomers will be marked as absent.

Evaluation Criteria:
Assignments/projects 20%
Quizzes 10%
Mid-Term 20%
Final 50%

Quizzes Schedule:
<table><tr><td>Quiz # 1</td><td>Week # 3</td></tr><tr><td>Quiz # 2</td><td>Week # 7</td></tr><tr><td>Quiz # 3</td><td>Week # 12</td></tr><tr><td>Quiz # 4</td><td>Week # 15</td></tr></table>
All quizzes are mandatory and will contribute to final evaluation.

Assignments:
Six assignments will be given relevant to the topics taught in class. All assignments are mandatory and will contribute to final evaluation.</td>
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<td>Sixteen Week Lesson Plan</td>
<td>Week # 1 Number Theory.
Introduction to Sets.
Set operations and properties.
Week # 2 Venn diagrams.
Sequences and Strings.
Week # 3 Relations.
Week # 4 Functions.
Week # 5 Propositional logic.
Conditional propositions and logical equivalence.
Week # 6 Proofs.
Rules of inference.
Mathematical induction and recursion.
Week # 7 Matrices.
Week # 8 Counting techniques.
Week # 9 <u>MIDTERM EXAMINATIONS</u>
Week # 10 Algorithms and integers.
Week # 11 Introduction to graph theory.
Graph terminologies and types.</td>
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	Graph connectivity. Week # 12 Hamiltonian cycle and Travelling Salesperson problem. Euler cycle. Dijkstra's shortest path algorithm. Week # 13 Representing graphs using matrices. Introducing trees. Application of trees (Binary trees, Prefix codes, Huffman coding). Week # 14 Tree traversal. Universal address system. Infix, prefix and postfix notations. Spanning trees. Minimum spanning trees. Week # 15 Introducing Boolean functions and combinatorial logic. Logic gates and Boolean algebra and applications. Week # 16 Languages and grammars. Finite state machines. Week # 17 Revision. Week # 18 **FINAL EXAMINATIONS**

Course Learning Outcomes mapping to Program Learning Objectives:

CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME LEARNING OUTCOMES						
SOFTWARE ENGINEERING		DISCRETE MATHEMATICS/ DISCRETE STRUCTURES I				
No.	Program Outcomes	Course Learning Outcomes				
		1	2	3	4	
1	Engineering Knowledge	√	√			
2	Problem analysis					
3	Design/Development of solutions					
4	Investigation					
5	Modern tool usage					
6	Engineer and society					
7	Environment and sustainability					
8	Ethics					

	9	Individual and Team work						
	10	Communication						
	11	Project Management						
	12	Lifelong learning						