Daffodil Institute of IT (DIIT)

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Lecturer, Dept. of CSE

Course Information

Course title: Discrete Mathematics	**Course Code:** CSE - **510223**
Course Credit: 3	**Credit hours:** 3
Year: 1st Year	**Semester:** 2nd

Course Objectives

The purpose of this course is to understand and use (abstract) discrete structures that are backbones of computer science. This course covers widely applicable mathematical tools for computer science, including topics from logic, set theory, combinatory, number theory, probability theory, and graph theory. It includes practice in reasoning formally and proving theorems. The Goals of this course are below:-

- Construct mathematical arguments using propositions, logical connectives, predicates, quantifiers, and rules of inference as well as verify them.
- Select appropriate proof methods (for example direct proof, proof by contradiction, proof by contra-position, existence proof, etc.) to build simple mathematical proofs.
- Identify the types and properties of sets, relations, functions, graphs, and trees and prove simple mathematical properties of them.
- Describe recursive function, sequence, or the sum of a series using recurrence relation.
- Apply mathematical induction to prove properties of mathematical objects, series and so on.

- Apply the knowledge of summation notation and basic counting techniques to solve simple mathematical problems.
- Describe basic operations and properties of Boolean algebra.

	Course Outline
Class Materials	Topics and Chapters are designed with PowerPoint Presentation; all slides and course materials uploaded in Google Classroom and Google Site.
Reference Book	Discrete Mathematics and Its Applications by K. H Rosen
Class Order	
Class No.	Topic
Lecture 1	Introducing discrete structure, goals of DM, Propositional logic
Lecture 2	Propositional logic, Translating English sentence, system specifications
Lecture 3	Logical equivalences, logic law with logical equivalence
Lecture 4	Predicates and quantifiers, fallacy
Lecture 5	Rules of inference, mathematical proofs
Lecture 6	Types of graph, graph models, precedence graph
Lecture 7	Quiz – 1 and Board Questions Solution
Lecture 8	Graph terminology, Bipartite graphs
Lecture 9	Special graphs, graph isomorphism, Euler and Hamilton path shortest path
Lecture 10	Planar graph, graph coloring, applications of graph
Lecture 11	Introduction to trees, trees model
Lecture 12	Applications of trees, tree traversal
Lecture 13	Quiz – 2 and Board Questions solution
Lecture 14	Tree traversal, Traversal notation
Lecture 15	Minimum spanning trees
Lecture 16	Different types of sets, set operations
	Mid – Term Examination
Lecture 17	Set identities, functions, different types of function
Lecture 18	Sequence and summations relations and their properties
Lecture 19	Closure relations, partial orderings

Lecture 20	Assignment
Lecture 21	Boolean functions, representing Boolean functions
Lecture 22	Logic gates
Lecture 23	Minimum of circuits, K – map
Lecture 24	Mathematical induction, recursion
Lecture 25	Quiz – 3 and Board Questions solution
Lecture 26	Basics of counting, pigeonhole principal
Lecture 27	Probability theory, Bayes' theorem
Lecture 28	Advanced counting techniques
Lecture 29	Solve class
Lecture 30	Solve class
	Internal Final Examination

Learning Outcomes:

On successful completion of this course students should be able to:

A discrete mathematics course has more than one purpose. Students should learn a particular set of mathematical facts and how to apply them, more importantly; such a course should teach students how to think logically and mathematically. To achieve these goals, this text stresses mathematical reasoning and the different ways problems are solved. There are five important terms:

- Mathematical reasoning
- Combinational analysis
- Discrete structures
- Algorithm thinking
- Applications and models