

DEERWALK INSTITUTE OF TECHNOLOGY

B. Sc. CSIT

Course Plan

Course Title: Discrete Structure

Course Code: CSC 152

Term: Fall 2013

Start Date: 10 June 2013

Time: 3:15 pm to 5:25 pm

Total Class Hours: 36

Instructor: Bikash Balami

Email: bikash@cdcsit.edu.np

COURSE DESCRIPTION:

After completing this course, the target student will gain knowledge in discrete mathematics and finite state automata in an algorithmic approach. It helps the target student in gaining fundamental and conceptual clarity in the area of logic, reasoning, algorithms, recurrence relation, and graph theory.

COURSE OBJECTIVE:

This module aims to provide the students with the basic foundation on logic and reasoning the proof techniques. Also they will be benefited with some theory of computation and graph theory.

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TEXT BOOKS:

Kenneth H. Rosen, *Discrete Mathematical Structures with Application to Computer Science*, WCB/McGraw Hill.

Joe L. Mott, Abraham Kandel and Theodore P. Baker, *Discrete Mathematics for Computer Scientists and Mathematicians*, Prentice-Hall of India

COURSE SCHEDULE

Week 1: **Tentative Dates: 10-14th June**

Propositions, truth value, propositional logic, compound propositions, logical connectives, translation of English statements into logical expressions.

Contradiction, tautology, contingency, logical equivalences, laws of logical equivalences, proving logical equivalence by using truth tables and laws of logical equivalences, dual of compound proposition.

Week 2: **Tentative Dates: 17-21th June**

Predicate logic, quantifiers and quantification, universal and existential quantification, translation of quantified expressions into English sentences and vice versa, bounded and free variables, negations of quantified expression.

Assignment 1

Week 3: **Tentative Dates: 24th – 28th June**

Rules of inferences ,proving the validity of arguments, resolution, fallacies, quantified statements, rules of inference for quantified statements, Methods of proving theorems.

Unit Test 1 (1 Hr)

Unit 1 Finished

Week 4: **Tentative Dates: 1th – 5th July**

Introduction to recurrence relations, definition of recurrence relations, Fibonacci numbers, recursively defined sets and structures, basic concepts of combinatory, initial condition, modeling problems with recurrence relation.

Week 5: **Tentative Dates 15th - 19th July**

Theorem 1 \rightarrow Theorem 6

Assignment 2

Unit Test 2(1 Hr)

Unit 3 Finished

Week 6: **Tentative Dates 22th – 26nd July**

Definition of directed and undirected graphs, simple and multigraphs, pseudographs, edges, vertices, isolated and pendant vertices, adjacent vertices, incident edge, adjacent and incident matrices representations of graphs, adjacency lists, in-degree, out-degree of a vertex, regular graph, Graph isomorphism and other related definitions and theorems. Definitions and examples of walk and path

and circuits, cut vertices/Edges, cut sets, connectedness in undirected and directed graphs, weakly and strongly connected graphs, underlying graphs, connected components.

Week 7: **Tentative Dates: 29 July – 2 August**

Theorem related to Hamilton path and Euler path, Definitions of Hamiltonian paths and circuits, examples illustrating existence and nonexistence of Hamiltonian circuit, K_n has Hamiltonian circuit whenever $n > 2$, application of Dirac's Theorem and Ore's Theorem.

Week 8: **Dates: 5th – 9th August**

Mid Term Exams

Week 9: **Tentative dates: 12th – 16th August**

Definition of weighted graph, the Shortest Path Algorithm of Dijkstra, examples to illustrate the algorithm, idea of traveling salesman problem in connection to the shortest path algorithm, Graph coloring.

Assignment 3

Week 10: **Tentative Dates: 19th – 23th August**

Trees and Spanning Trees, Network flow problems.

Unit Test 3(1 Hr)

Unit 4 Finished

Week 11: **Tentative Dates: 25th – 30th August**

Automata Theory

Unit 2 Finished

Week 12: **Tentative Dates: 2th – 6th September**

Presentation

Week 13: **Dates: 9th – 13th September**

Pre Borad Examination

Criterion for Internal Evaluation (20 Marks)

Assignments → 30%

Unit Test → 30%

Attendance → 20%

Attitude and Discipline → 10%

Presentation → 10%