

COURSE OUTLINE OF RECORD

Dept., Number	CSC 3331	Course Title	Analysis of Algorithms
Semester Hours	3		
Year	2006	URL (if any):	

Current Catalog Description:

This course covers the analysis and design of various algorithms using divide-and-conquer, greedy, backtracking, branch-and-bound, NP-hard, and NP-complete methods. Prerequisite: CSC 2331.

Textbook:

Introduction to the Design & Analysis of Algorithms by Anany Levitin, 2003, Addison Wesley Publisher

Course Goals:

1. To introduce basic principles and techniques of computational complexity.
2. To design and analyze algorithms for solving real problems in computer applications.
3. To introduce NP-hard and NP-complete problems.

Prerequisites by Topic:

1. Data structures including linked lists, stacks, queues, trees, and graphs.
2. Sorting and Searching.
3. Mathematical background involving properties of logarithms and Calculus I.

Major Topics Covered in the Course (number of weeks):

- Introduction, fundamentals of analysis of algorithms efficiency 1
- Brute Force 1
- Divide and conquer 1
- Decrease and conquer 1
- Transform and conquer 1
- Dynamic Programming 2
- Greedy Technique 2
- Backtracking 1
- Branch and Bound 1
- NP-hard and NP-complete problems 1
- Professional Ethics 1

Laboratory Projects: (Number of Weeks)

- Program to compare the efficiency of various sorting algorithms. 3
- Program to compute the minimal spanning tree. 3
- Program to implement dynamic programming. 3
- Program to implement backtracking algorithm. 3

Estimate Curriculum Category Content (Semester hours)

Area	Core	Advanced	Area	Core	Advanced
Algorithms	2		Data Structures		
Software Design			Prog. Languages		
Comp. Arch.			Theoretical Foundation	1	

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Oral and Written Communication:

Every student is required to submit at least 1 written report (not including exams, tests, quizzes, or commented programs) of typically 8 pages and to make 1 oral presentation of typically 10-15 minutes in duration.

Social and Ethical Issues:

Students are required to read at least two different articles for class review and discussion. Open class discussion is lead by instructor and all students are required to give input.

Theoretical Content:

Analog and digital signaling concepts, data Encoding techniques, circuit multiplexing methods, circuit and packet switching concepts, network systems and data routing, protocols and architectures.

Problem Analysis:

Students are asked to analyze the differences between asynchronous and synchronous communication models, circuit and packet switching systems, data encoding methods, error detection and correction methods, protocols, transmission media, and basic computer network technology.

Open-Ended Design:

None is required for this course.