COURSE OUTLINE

Course Code: CSE 208

Course Title: Data Structures and Algorithms II Sessional

Level/Term: L2T2 Section: A, B

Academic Session: January 2020

Course Teacher(s):

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Course Outline:

Graph algorithms; MST algorithms, Shortest path algorithms, Maximum flow and maximum bipartite matching; Lower bound theory; Advanced data structures: Balanced binary search trees (AVL trees, red-black trees, splay trees etc.), Advanced heaps (Fibonacci heaps, binomial heaps); Hashing; NP-completeness; NP-hard and NP-complete problems; Coping with hardness: Backtracking, branch and bound, Approximation algorithms; String matching algorithms; FFT and its applications.

Learning Outcomes/Objectives:

After undergoing this course, students should be able to:

i. understand and analyze performance of algorithms in terms of time and space, and prove the correctness of algorithms,
ii. formulate various algorithmic problems and design efficient algorithms to solve those problems,
iii. solve real world problems using algorithms,
iv. utilize advanced data structures for efficient implementations of algorithms,
v. understand various complexity classes of algorithmic problems , and
vi. design backtracking, branch and bound and efficient approximation algorithms to cope with hard combinatorial problems.

Assessment (tentative):

Offline:	30-40%
Online:	30-40%
Quiz:	30-40%

Text and Reference Books:

a. Algorithm Design, by Michael T. Goodrich and Roberto Tamassia, John Wiley & Sons, Inc.
b. Algorithms, by Sanjoy Dasgupta, Christos Papadimitriou and Umesh Vazirani.
c. Introduction to Algorithms, by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, MIT Press.
d. Algorithm Design, by Jon Kleinberg and Eva Tardos, Pearsons Publishers.
e. Introduction to the Design & Analysis of Algorithms, by Anany Levitin.
f. Algorithm Design Manual, by Steven S. Skiena.

Weekly schedule:

Week	Topics	Teacher's Initial
Week 1	Introduction	All
Week 2	Basic Graph Algorithms (Offline and Online)	All
Week 3	Single Source Shortest Path Problem (Offline and Online)	All
Week 4	All-Pair Shortest Path Problem (Offline and Online)	All
Week 5	Minimum Spanning Tree (Offline and Online)	All
Week 6	Maximum Flow and Maximum Bipartite Matching (Offline and Online)	All
Week 7	Reserved	All
Week 8	Advanced Data Structure-I (Offline and Online)	All
Week 9	Advanced Data Structure-II (Offline and Online)	All
Week 10	Hashing (Offline and Online)	All
Week 11	NP & NP-Completeness (Practice)	All
Week 12	Approximation Algorithms, Branch and Bound (Offline and Online)	All
Week 13	Reserved	All
Week 14	Quiz	All

*** Please DO NOT COPY solutions from anywhere (your friends, seniors, internet etc.). Any form of plagiarism (irrespective of source or destination), will result in getting -100% marks in the online/offline.**

Prepared by:	
Signature: Date:	