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):

Name:	Office/Room:	E-mail
Dr. Muhammad Masroor Ali	ECE 219	mmasroorali@cse.buet.ac.bd
Dr. Md. Abul Kashem Mia	ECE 315	kashem@cse.buet.ac.bd
Dr. Md. Shamsuzzoha Bayzid	ECE 522	shams_bayzid@cse.buet.ac.bd
Dr. Atif Hasan Rahman	ECE 520	atif@cse.buet.ac.bd
Shadman Saqib Eusuf	ECE 415	ssaqib@cse.buet.ac.bd
Preetom Saha Arko	ECE 508	arko@cse.buet.ac.bd
Md. Masum Mushfiq	ECE 418	mushfiq@teacher.cse.buet.ac.bd
Syed Md. Mukit Rashid	ECE 214	mukit@teacher.cse.buet.ac.bd
Tahmid Hasan	ECE 409	tahmid@teacher.cse.buet.ac.bd

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:	40%
Viva + Practice:	30%
Quiz:	30%

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
BREAK		
Week 9 Online Week 5 19 Sep - 25 Sep	Trial Sessional Class	All
Week 10	All-Pair Shortest Path Problem (Offline, Viva, Practice)	All
Week 11	Minimum Spanning Tree (Offline, Viva, Practice)	All
Week 12	Maximum Flow and Maximum Bipartite Matching (Offline, Viva, Practice)	All
Week 13	Advanced Data Structure-I (Offline, Viva, Practice)	All
Week 14 Online Week 10 31 Oct - 6 Nov	Reserved	All
Week 15	Advanced Data Structure-II (Offline, Viva, Practice)	All
Week 16	Hashing (Offline, Viva, Practice)	All
Week 17	Reserved	All
Week 18	NP & NP-Completeness (Practice)	All
Week 19	Approximation Algorithms, Branch and Bound (Offline, Viva, Practice)	All
Week 20	Quiz	All
Week 21		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:	