Ahsanullah University of Science and Technology
Bangladesh

COURSE OUTLINE

1. Title: AlgorithmsLab

2. Code: CSE2208

3. Credit hours: 1.5

4. Level: Year – 2, Semester – 2

5. Faculty: Engineering

6. Department: **Computer Science and Engineering (CSE)**

7. Programme: **Bachelor of Science in Computer Science and Engineering (B.Sc. in CSE)**

8. Synopsis from the Approved Curriculum:

Laboratory works based on CSE2207 that includes:Algorithmic Complexity Analysis; Methods for the design of efficient algorithms: Divide and Conquer, Greedy method, Dynamic programming, Backtracking, Branch and Bound, Polynomial evaluation, Lower bound theory, Intractable problems.

9. Type of course (core/elective): Core

10. Prerequisite(s) (if any): CSE2103: Data Structures and
CSE2103: Data Structures Lab.

11. Name of the instructor(s) with contact details and office hours:

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12. Semester Offered: Fall – 2019

13. Mapping of Course Outcomes with Bloom's Taxonomy and Programme Outcomes

Sl. No.	Cos	POs	Bloom's Taxonomy		
			C	A	P
1	**Execute different algorithms design starting from scratch.**	**2**			**2**
2	**Apply appropriate algorithm concept to solve some well-known problems.**	**3**			**3**
3	**Adapt various algorithm designs for prospective solution.**	**5**			**4**

14. Percentages of Assessment Methods

Method	Percentage
Attendance and Class Performance	**20**
Assignment (Home Assignment/ offline/ Class Assignment/Online)	**40**
Lab Quiz (Mid Term and/or Term Final)	**40**

15. Week wise distribution of contents and assessment methods

Week	Topics	Assessment Method(s)
1	**Review of Sorting Algorithms (Bubble, Insertion and Selection) with complexity analysis. Discussion on Divide and Conquer Approach (Quick sort, Merge sort) with complexity analysis.**	
2	**Discussion on Radix, Bucket Sort and Counting sort.**	**Assessment onSorting Algorithmswith complexity analysis.**
3	**Discussion on Depth First Search and Breadth First Search.**	**Home Assignment, Online task on Radix,**

			Bucket and Counting sort.
4	Topological Sort, Single Source Shortest Paths on Directed Acyclic Graph.		Home Assignment, Online task on Depth First Search and Breadth First Search.
5	Discussion on Single Source Shortest Paths (Dijkstra Algorithm, Bellman-Ford Algorithm).		Home Assignment, Online task on Topological Sort.
6	Discussion on Minimum spanning tree (Prim and Kruskal Algorithms).		Home Assignment, Online task on Single Source Shortest Paths.
7	Discussion on Greedy Algorithms (Fractional Knapsack, Job sequencing with deadlines).		Home Assignment, Mid Term Examination.
8	All Pair Shortest Path Algorithm (Floyd-Warshall algorithm).		Online task on Greedy algorithms.
9	Backtracking (N-Queens, Graph coloring).		Home Assignment, Online task on All Pair Shortest Path Algorithm.
10	Backtracking (Sum of subsets) and Branch-and-bound.		Home Assignment, Online task on Backtracking.
11	Dynamic Programming (Matrix Chain Multiplication, Longest Common Subsequence).		Home Assignment, Online task on Backtracking.
12	Dynamic Programming (0-1 Knapsack, Travelling Salesman Problem).		Home Assignment, Online task on Dynamic Programming.
13	Similarity testing by various algorithms.		Lab Final Examination.
14	String Matching The Knuth-Morris-Pratt Algorithm.		Viva on Home Assignment.

16.References

16.1. Required (if any)
1. **"Introduction to Algorithms" by Thomas H. Cormen, Charles E. Leiserson , Ronald L. Rivest , Clifford Stein.3rd Edition.**
2. **"Classic Data Structures" by Debasis Samanta**
3. **Course Website – https://classroom.google.com**
   CSE 2208 | Algorithms Lab | Spring 2019
   Class Code: pj35366

16.2. Recommended (if any)
1. **https://cp-algorithms.com/**
2. **https://visualgo.net/en**
3. **https://uva.onlinejudge.org/**

Prepared by:	Checked by:	Approved by:
Signature: _____ Name: **Md. Khairul Hasan, JunaedYounus Khan, H M Zabir Haque** Department: **CSE** Date: **07. 07. 2019**	Signature: _____ Name: **Dr. Mohammad ShafiulAlam** **OBE Program Coordinator, CSE** Date:	Signature: _____ Name: **Prof. Dr. Kazi A. Kalpoma** **HOD, CSE** Date:

Annex-1: PEO of CSE

PEO1 - Professionalism
Graduates will demonstrate sound professionalism in computer science and engineering or related fields.

PEO2 – Continuous Personal Development
Graduates will engage in life-long learning in multi-disciplinary fields for industrial and academic careers.

PEO3 – Sustainable Development
Graduates will promote sustainable development at local and international levels.

Annex-2: Mapping of PEO-PO

	PEO1	PEO2	PEO3
PO1 - Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.	√		
PO2 - Problem analysis: Identify, formulate, research and analyze complex engineering problems and reach substantiated conclusions using the principles of mathematics, the natural sciences and the engineering sciences.	√		
PO3 - Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety as well as cultural, societal and environmental concerns.	√		
PO4 – Investigation: Conduct investigations of complex problems, considering design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.	√		
PO5 - Modern tool usage: Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	√		
PO6 - The engineer and society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.	√		√
PO7 - Environment and sustainability: Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.	√		√
PO8 – Ethics: Apply ethical principles and commit to professional ethics, responsibilities and the norms of engineering practice.	√		

PO9 - Individual work and teamwork: Function effectively as an individual and as a member or leader of diverse teams as well as in multidisciplinary settings.	√	√	
PO10 – Communication: Communicate effectively about complex engineering activities with the engineering community and with society at large. Be able to comprehend and write effective reports, design documentation, make effective presentations and give and receive clear instructions.	√		
PO11 - Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member or a leader of a team to manage projects in multidisciplinary environments.	√		
PO12 - Life-long learning: Recognize the need for and have the preparation and ability to engage in independent, life-long learning in the broadest context of technological change.		√	

Annex-3: Blooms Taxonomy – Revised Version*

Level	Cognitive Domain (C)	Affective Domain (A)	Psychomotor Domain (P)
1	Remember	Receive	Imitate
2	Comprehend	Respond	Execute
3	Apply	Value	Perform
4	Analyze	Conceptualize Values	Adaption
5	Evaluate	Internalize Values	Naturalize
6	Create		

* References: Dyjur, P. (2018). Writing Course Outcomes