Course Outline for CSE-200

Part A

1. Course Code: CSE-200

2. Course Title: Competitive Programming (Sessional)

3. Course Type: Core Course

4.Level/ Term: Level: 2 Term: I

5. Academic Session: 2020-21

6. Course Teacher: Omar Sharif, Lecturer, Dept. of CSE, CUET
Md. Billal Hossain, Lecturer, Dept. of CSE, CUET

7. Prerequisite(s): None

8. Credits: 0.75

9. Contact Hours: 3 hours of lab work in two weeks

10. Total Marks: 75

11. Rational of the Course:

Coding is a universally valuable skill, whether you're a scientist, artist, or a humanist. Algorithms are everywhere, and we all have to understand how they work. This course will cover the basic programming constructs, techniques and fundamental control structures. Coverage includes searching, sorting, number theory, graph theory, string matching and geometry. The main goal of this course is to provide a solid background in the design and analysis of the major classes of algorithms. Different algorithms for a given computational task are presented and their relative merits are evaluated based on performance measures. At the end of the course students will be able to develop their own versions for a given computational task and to compare and contrast their performance. This is a required course for all the students enrolling B. Sc. Engg. in CSE program. The catalog description of the course is

Course Content:

Sessional based on the following topics:

Introduction to different online judges: LightOJ, UVa, Codeforces, Topcoder, Codechef; Understanding complexity; Coding skill improvement; Ensure participations in online contest; Take appropriate steps to improve problem solving skills of students; Solve 100+ problems (on different categories). Number Theory: Prime generation, Sieve of Eratosthenes, Modular arithmetic's, Modular inverse, Big-mod; STL; Searching; Sorting; Graph theory; Tail-call recursion; Pattern matching: KMP, Z-algorithm; Basic Geometry; Advanced Geometry: Convex Hull.

12. Course Objectives:

(a) Getting in-depth knowledge about the analysis and design procedure of Algorithms.

(b) To be able to design efficient algorithms to solve a particular problem.

13. Course Learning Outcomes (CLOs) and Mapping of CLOs with Program Learning Outcomes (PLOs)

a) CLOs

No.	Course Learning Outcomes (CLOs)	Bloom's Level (Optional)
CLO1	Find an efficient solution to solve a particular programming problem	C1, C2, C4
CLO2	Apply acquired knowledge to solve real-world problems	C3
CLO3	Design a new algorithm or improve the existing algorithm for a specific problem	C5, P7

b) Mapping of CLOs with PLOs

No.	CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
1	CLO1		X										
2	CLO2			X									
3	CLO3			X									

Part B

14. Course plan specifying content, CLOs, co-curricular activities (if any), teaching learning and assessment strategy mapped with CLOs

Course Plan

	Topic	Teaching-Learning Methodology	Assessment Method	Corresponding CLOs
Week-01	Introduction to Competitive Programming	● Lecture on theoretical background and design principle ● Hands on demonstration on the implementation	Lab Performance Report	● CLO-1
Week -02	Prime Generation, Sieve of Eratosthenes	● Lecture on theoretical background and design principle ● Hands on demonstration on the implementation	Lab Performance Report	● CLO-2
Week -03	Tail call Recursion and Modular Arithmetic's	● Lecture on theoretical background and design principle ● Hands on demonstration on the implementation	Lab Performance Report	● CLO-1
Week -04	Graph Theory	● Lecture on theoretical background and design principle ● Hands on demonstration on the implementation	Lab Performance Report	● CLO-3
Week -05	Pattern Matching	● Lecture on theoretical background and design principle ● Hands on demonstration on the implementation	Lab Performance Report	● CLO-1
Week -06	Geometry	● Lecture on theoretical background and design principle ● Hands on demonstration on the implementation	Lab Performance Report	● CLO-2

Week -07	Quiz, Viva-voce			

Part C

15. Assessment and Evaluation

l) Assessment Strategy

Quizzes	15%
Viva-voce	15%
Class performance including reports	60%
Attendance	10%
Total	100%

2) Marks distribution:

a) Continuous Assessment: 70%

b) Summative: 30%

3) Make-up Procedures:

- Course teacher may arrange for makeup lab schedule if necessary.

Part D

16. Learning Materials

1) Recommended Readings

- Book-1: ***Competitive Programming 3*** by Steven Halim

2) Others

* Various online resources