PART-A

Course Outline		
I.	**Course No./ Course Code**	CSC 3113
II.	**Course Title**	Theory of Computation
III.	**Course Type (General Education / Core Course / Electives)**	Core Course
IV.	**Semester**	**8th Semester**
V.	**Academic Session**	**Fall 2022-2023**
VI.	**Course Teacher/Instructor**	SHARFUDDIN MAHMOOD SAJIB HASAN
VII.	**Pre-requisite (If any)**	**CSC 2211: Algorithms**
VIII.	**Credit Value:**	**3**
IX.	**Contact Hours:**	**3 hours of theory per week**
X.	**Total Marks:**	100
XI.	**Rationale of the Course:**	
XII.	**Course Objectives:**	• Understanding the notations used in computer science literature • Understanding the mathematical model of Computation. • Use of Computational models to solve problems • Understanding Computability • Determining Complexity of problems

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

CLOs	CLO Descriptions	PLO Assessed
CLO1	Apply the principles of existing computational models to find out an appropriate solution for a complex problem.	PLO-a-3
CLO2	Compute the decidability and the solvability of a complex problem based on the stablished methods using computational model.	PLO-a-3

PART-B

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

Week	Topic	Teaching-Learning Strategy	Assessment strategy	Corresponding CLOs
Week 1	Mission & Vision of AIUB, Basic Mathematical Concepts	Discussion on Mission & Vision of AIUB, Introduction to Theory of Computation Review of Pre-requisite study materials.	Lecture, Group Discussion	
Week 1	Finite Automaton, Deterministic Finite Automaton (DFA)	Discussion, Group study and perform of exercises.	Lecture, Group study Homework Quiz	
Week 2	DFA	Discussion, Group study and perform of exercises.	Lecture, Group study Homework	
Week 2	Non-determinism and Non-regular languages	Discussion, Group study and perform of exercises	Quiz	CLO1
Week 3	Closure	Discussion, Group study and perform of exercises	Lecture, Group study Homework	
Week 3	Regular Expression	Discussion, Group study and perform of exercises	Quiz	CLO1

Week 4	Regular Expression	Discussion, Group study and perform of exercises	Quiz	CLO2
Week 4	Context free Languages	Discussion, Group study and perform of exercises	Lecture PPT Slides Board Work Homework Quiz	
Week 5	Context Free Grammar (CFG)	Discussion, Group study and perform of exercises	Quiz	CLO1
Week 5	Ambiguous Grammar, Chomsky Normal Form	Discussion, Group study and perform of exercises	Quiz	CLO2
Week 6	Push Down Automata	Discussion, Group study and perform of exercises	Lecture PPT Slides Board Work Homework	
Week 6	REVIEW Assignment Submission + Viva	Submission, Discussion	Viva	
Midterm Week Week 7				
Week 8	Turing Machine	Discussion, Group study and perform of exercises	Lecture PPT Slides Board Work Homework	
Week 8	Turing Machine	Discussion, Group study and perform of exercises	Quiz	CLO1
Week 9	Turing Machine	Discussion, Group study and perform of exercises	Lecture PPT Slides Board Work Homework	
Week 9	Turing Machine	Discussion, Group study and perform of exercises	Lecture PPT Slides Board Work Homework Quiz	
Week 10	Turing Machine	Discussion, Group study and perform of exercises	Quiz	CLO2

Week 10	Decidability and Undecidability	Discussion, Group study and perform of exercises	Quiz	CLO2
Week 11	Decidability and Undecidability	Discussion, Group study and perform of exercises	Lecture PPT Slides Board Work Homework	
Week 11	Theory of NP completeness	Discussion, Group study and perform of exercises	Lecture PPT Slides Board Work Homework Quiz	
Week 12	NP Completeness	Discussion, Group study and perform of exercises	Lecture PPT Slides Board Work Homework	
Week 12	Time/Space complexity	Discussion, Group study and perform of exercises	Lecture PPT Slides Board Work Homework Quiz	
Week 13	Time/Space complexity	Discussion, Group study and perform of exercises	Lecture PPT Slides Board Work Homework	
Week 13	Review Assignment Submission + Viva	Submission, Discussion	Viva	
Final term Week **Week 7**				

Part-C

XV. Assessments and Evaluation

1) Assessment strategy:

Quiz	Term Exam
Viva	Group Discussion

2) Marks distribution:

Midterm term	
Quiz/ Viva	30%
Mid Term Exam	40%
Assignment	20%
Attendance	10%
Total	100%
Final Grade/ Grand Total	
Midterm:	40%
Final Term:	60%

Letter	**Grade Point**	**Numerical %**
A+	4.00	90-100
A	3.75	85<90
B+	3.50	80<85
B	3.25	75<80
C+	3.00	70<75
C	2.75	65<70
D+	2.50	60<65
D	2.25	50<60
F	0.00	<50(Failed)

Final term	
Quiz/ Viva	30%
Mid Term Exam	40%
Assignment	20%
Attendance	10%
Total	100%
Final Grade/ Grand Total	
Midterm:	40%
Final Term:	60%

3) Make-up Procedures: Make-up quizzes are taken if students are unable to attend due to sickness/valid reasons

PART- D

XVI. Learning materials

1) Recommended Readings:

- Introduction to the Theory of Computation (Latest Edition) by Michael Sipser
- Introduction to Automata Theory, Languages, and Computation (Latest Edition) by John E. Hopcroft, et al
- Elements of the Theory of Computation (Latest Edition) by Harry R. Lewis, Christos H. Papadimitriou