



**AMERICAN INTERNATIONAL UNIVERSITY-
BANGLADESH (AIUB)**
Faculty of Science and Technology (FST)
Department of Computer Science (CS)
Undergraduate Program

COURSE PLAN

SEMESTER: Spring 2022-20223

<p>I. Course Code and Title: CSC 3113: Theory of Computation</p> <p>II. Credit: 3 Hour Theory per week</p> <p>III. Nature Core Course for CSE</p> <p>IV. Prerequisite CSC 2211: Algorithms</p>	<p>V. Vision: Our vision is to be the preeminent Department of Computer Science through creating recognized professionals who will provide innovative solutions by leveraging contemporary research methods and development techniques of computing that is in line with the national and global context.</p> <p>VI. Mission: The mission of the Department of Computer Science of AIUB is to educate students in a student-centric dynamic learning environment; to provide advanced facilities for conducting innovative research and development to meet the challenges of the modern era of computing, and to motivate them towards a life-long learning process.</p>
--	---

VII - Course Description:

- 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

VIII - Course outcomes (CO) Matrix:

By the end of this course, students should be able to:

COs*	CO Description	Level of Domain***			PO Assessed****
		C	P	A	
CO1	Describe different computational model and mathematical notations	3			PO-a-2
CO2	Give original example of different computational model and mathematical notations	3			PO-a-2
CO3**	Design a solution for a complex problem using the principles of existing computational models	4			PO-c-3
CO4**	Modify a solution using the principles of existing computational model.	4			PO-c-3

C: Cognitive; P: Psychomotor; A: Affective Domain

* CO assessment method and rubric of COs assessment is provided in later section

** COs will be mapped with the Program Outcomes (POs) for PO attainment

*** The numbers under the 'Level of Domain' columns represent the level of Bloom's Taxonomy each CO corresponds to.

**** The numbers under 'PO Assessed' column represent the POs each CO corresponds to.

IX - Topics to be covered in the class and/or lab: *

Time Frame	CO Mapped	Topics	Teaching Activities	Assessment Strategy(s)
Week 1		Mission & Vision of AIUB, Basic Mathematical Concepts Finite Automaton, Deterministic Finite Automaton (DFA)	Discussion on Mission & Vision of AIUB, Introduction to Theory of Computation Review of Pre-requisite study materials, perform of exercises	
Week 2	CO1	DFA, Non-determinism and Non-regular languages	Discussion, Group study and perform of exercises, PPT slides, board work	Group study, Homework, Quiz
Week 3	CO1, CO2	Closure, Regular Expression	Discussion, Group study and perform of exercises, PPT slides, board work	Pop Quiz, Class discussion, question answer session
Week 4	CO1, CO2	Regular Expression, Context free Languages	Discussion, Group study and perform of exercises	Pop Quiz, Class discussion, question answer session, Home work
Week 5	CO3, CO4	Context Free Grammar (CFG), Ambiguous Grammar, Chomsky Normal Form	Discussion, Group study and perform of exercises, PPT slides, board work	Class discussion, question answer session
Week 6	CO3, CO4	Context Free Grammar (CFG), Ambiguous Grammar, Chomsky Normal Form	Discussion, Group study and perform of exercises, PPT slides, board work	Quiz, Class discussion, question answer session
Week 7		Viva, Review	Discussion, Group study and perform of exercises, PPT slides, board work	
Midterm (Week 8)				
Week 9	CO3	Push Down Automata	Discussion, Group study and perform of exercises, PPT slides, board work	Quiz, Class discussion, question answer session
Week 10		Turing Machine	Discussion, Group study and perform of exercises, PPT slides, board work	Pop Quiz, Class discussion, question answer session
Week 11	CO3	Turing Machine	Discussion, Group study and perform of exercises, PPT slides, board work	Pop Quiz, Class discussion, question answer session
Week 12		Turing Machine	Discussion, Group study and perform of exercises, PPT slides, board work	Quiz, Class discussion, question answer session

Week 13		Turing Machine	Discussion, Group study and perform of exercises, PPT slides, board work	Quiz, Class discussion, question answer session
Week 14		Decidability and Undecidability	Discussion, Group study and perform of exercises, PPT slides, board work	Quiz, Class discussion, question answer session
Week 15		Decidability and Undecidability	Discussion, Group study and perform of exercises, PPT slides, board work	Quiz, Class discussion, question answer session
Week 16		Viva, Review	Discussion, Group study and perform of exercises, PPT slides, board work	
Final term (Week 17)				

* The faculty reserves the right to change, amend, add, or delete any of the contents.

XIV- Course Requirements

- Students are expected to attend at least 80% class.
- Students are expected to participate actively in the class.
- For both terms, there will be at least 2 quizzes based on the theoretical knowledge and conceptual understanding of the topic covered discussed in the classes.
- Submit report based on the given course related problems.
- Submission of assignment and projects should be in due time.

XV – Evaluation & Grading System*

The following grading system will be strictly followed in this class

MID TERM		FINAL TERM	
Attendance	10%	Attendance	10%
Quiz	10%	Quiz	40%
Midterm written exam	50%	Final term written exam	50%
Total	100%	Total	100%
Grand Total 100% = 40% of Midterm + 60% of Final Term			

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
I		Incomplete
W		Withdrawal
UW		Unofficially Withdrawal

** The evaluation system will be strictly followed as par the AIUB grading policy.*

XVI – Textbook/ References

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