Lesson Plan

Subject Name: Theory of Computation **Class:** B.Tech (IT) **Subject Code:** CIC-206

Department: IT **Teaching Scheme**: 4L **Total Lecture:** 48

S.NO.	Topics Details	No. Of Lecture Alloted	Tentative Date
	UNIT I		
1.	Introduction to Theory of Computation and terms like symbols, alphabets, strings. Uses and applications of Automata.	1	16/01/25
2.	Introduction to languages & Chomsky Classification of Language.	2	17/01/25, 21/02/25
3.	Finite State Systems- Basic Definitions and finite automata DFA	2	22/01/25, 23/01/25
4.	Introduction to NFA, Difference between NFA and DFA.	1	24/01/25
5.	Conversion of NFA to DFA, Equivalent states, Minimization of DFA.	1	28/01/25
6.	Introduction to Regular Expressions, Algebraic Laws & Simplification of Regular Expressions	2	29/01/25, 30/01/25
7.	Conversion of Regular expression to NFA, and Closure properties of Regular Languages.	2	31/01/25, 04/02/25
8.	Equivalence of DFA, NFA & regular expressions	1	06/02/25
9.	Non regular languages and Pumping lemma for Regular Sets	1	07/02/25
	UNIT II		
10.	Grammar Introduction- Types of Grammars	1	11/02/25
11.	Context Free Grammar and Language, Closure properties of CFL's	1	12/02/25
12.	Introduction to Pushdown Automata PDA, Definitions and moves. Deterministic and Non-Deterministic PDA.	3	13/02/25, 14/02/25, 18/02/25
13.	Construction of PDA & NPDA	2	19/02/25, 20/02/25
14.	Equivalence of CFG's and PDA's	2	21/02/25, 25/02/25
15.	Parsing and Construction of LL(K) Grammar	2	27/02/25, 28/02/25
16.	Pumping Lemma for Context free Languages and Problems on that.	1	04/03/25
	UNIT III		
17.	Introduction to Turing Machines & Turing Machine Model	2	
18.	Variations of Turing Machines & Universal Turing Machine	1	
19.	Design & Techniques of Constructing Turing Machine	1	
20.	Equivalence of different Turing Machines	1	
21.	Halting Problem of Turing Machine	1	
22.	Introduction to Recursive & Recursively Enumerable Language and its Properties.	1	
23.	Decidable & Undecidable languages. Reducible Problems With Examples.	2	
24.	Post Correspondence Problem and Rice's Theorem & Church's Hypothesis	2	
25.	Introduction to Recursive Function Theory	1	

	UNIT IV		
26.	Introduction to Complexity Theory, Tractable and Intractable Problems	1	
27.	Classes of Problems:- Computational, Decision and Optimization Problems.	1	
28.	Class P, NP& co-NP Problem With Examples.	2	
29.	Polynomial Time Reductions, NP Complete & NP Hard Problem With Proves.	2	
30.	Cook-Levin Theorem, Savitch Theorem (With Proves)	2	
31.	PSPACE & NPSPACE Complexity Classes	1	
32.	Probabilistic Computation & BPP Class	1	
33.	Interactive Proof Systems and IP Class	1	
34.	Relativized Computation & Oracles.	1	

Textbook(s):

[T1] J. Hopcroft, R. Motwani, and J. Ullman, Introduction to Automata Theory, Language and Computation,Pearson, 2nd Ed, 2006
[T2] Sipser, Michael. Introduction to the Theory of Computation, Cengage Learning, 2012.

References:

[R1] Peter Linz, An Introduction to Formal Languages and Automata, 5th edition, Viva Books, 2011.
[R2] J. C. Martin, Introduction to Languages and the Theory of Computation, TMH, 2nd Ed. 2004.
[R3] Maxim Mozgovoy, Algorithms, Languages, Automata, and Compilers, Jones and Bartlett, 2010.
[R4] D. Cohen, Introduction to Computer Theory, Wiley, N. York, 2nd Ed, 1996.
[R5] K. L. Mishra and N. Chandrasekharan, Theory of Computer Science: Automata, Languages and Computation,PHI, 2006.
[R6] Anne Benoit, Yves Robert, Frédéric Vivien, A Guide to Algorithm Design: Paradigms, Methods, and Complexity Analysis, CRC Press, 2013.

Signature of Faculty Signature of HoD