GOAPAL KRISHNA COLLEGE OF ENGINEERING AND TECHNOLOGY
GOURAHARI VIHAR, PO: RANIPUT, JEYPORE – 764 005

LESSON PLAN

Name of the Subject: Theory Of Computation

Session : 2025-26
Name of the Faculty:Pranati Nayak
Semester:5th **Branch:**Computer Sc.&Engg.
Semester From: JULY **No. of Weeks:** 15 Weeks

Week	Day	THEORY TOPICS	Classes
		Module-I: FUNDAMENTALS AND FINITE AUTOMATA	**8Hrs**
1	1	Basic definition- alphabets, strings, language and operation on language.	50Min
	2	Introduction to finite automata	50Min
	3	Deterministic finite automata (DFA)	50Min
2	4	Nondeterministic finite automata(NFA) & transition diagram	50Min
	5	Language recognition	50Min
	6	Equivalence & conversion between NFA & DFA	50Min
3	7	Epsilon transition in NFA & their elimination	50Min
	8	Minimization of finite state machine	50Min
	9	Conversion between moore and mealy machines	50Min
4		**Module-II: REGULAR LANGUAGES AND EXPRESSIONS**	**8Hrs**
	10	Regular expressions and identity rules.	50 Min
	11	Construction of finite automata	50 Min
	12	Regular expressions	50 Min
5	13	Regular grammars: right linear and left linear forms.	50 Min
	14	Conversion between different regular representations	50 Min
	15		50 Min
6	16	Pumping lemma for regular languages and its application.	50 Min
	17	Closure properties of regular languages.	50 Min
	18	Revision class	50 Min
		Module III: CONTEXT-FREE GRAMMARS AND PUSHDOWN AUTOMATA	**8Hrs**
7	19	**Definition and examples of context-free grammars (CFGs)**	50 Min
	20	Derivation trees, leftmost and rightmost derivations, ambiguity in CFGs.	50 Min
	21	Simplification of CFGs,	50 Min

8	22	Chomsky and Greibach normal forms.	50 Min
	23	Pumping lemma for context-free languages and its applications.	50 Min
	24	Pushdown automata (PDA):	50 Min
9	25	Equivalence between CFG and PDA.	50 Min
	26	Introduction to deterministic and nondeterministic PDA, andcomparison.	50 Min
	27	Revision class	50Mins
10		**Module IV:: TURING MACHINES AND COMPUTABILITY**	**8Hrs**
	28	Turing Machine (TM): formal definition, configurations	50Min
	29	Design of TMs.	50Min
	30	Variants of TMs and their equivalence.	50Min
11	31	Linear bounded automata (LBA)	50Min
	32	Context-sensitive languages.	50Min
	33	Computable functions, recursively enumerable and recursive languages.	50Min
12	34	Church–Turing thesis.	50Min
	35	Decidability and undecidability	50Min
	36	Reductions and mapping reducibility.	50Min
13		**Module V: COMPLEXITY THEORY AND CHOMSKY HIERARCHY**	**8Hrs**
	37	Chomsky hierarchy:classification of languages and corresponding machines.	50Min
	38	Introduction to complexity theory	50Min
	39	Efficiency of computation	50Min
14	40	Time and space complexity.	50Min
	41	Complexity classes P and NP, NP-completeness,	50Min
	42	Introduction to polynomial-time reductions	50Min
15	43	Basic NP-complete problems.	50Min
	44	Language families andtheir relationships.	50Min
	45	Revision class	50Min