



## TEACHING PLAN

Course Code	Regulation	Course Title	Semester	Branch	Contact Periods /Week	Academic Year	Date of commencement of Semester	
23CST02	R23	FLAT	V	CSE	6	2025-26	09-07-25	
COURSE OUTCOMES								
1	CO1: Understand the fundamentals of Regular and Context-Free Grammars and Languages (K2).							
2	CO2: Relate Regular Languages with Finite Automata and design various automata as acceptors, verifiers, and translators (K3).							
3	CO3: Comprehend the relationship between Context-Free Languages, Pushdown Automata, and Turing Machines (K4).							
4	CO4: Design Pushdown Automata as acceptors and Turing Machines as calculators (K5).							
5	CO5: Analyze the limitations and applications of Finite Automata, Context-Free Grammars, Pushdown Automata, and Turing Machines (K5).							
UNIT	Out Comes / Bloom's Level	Topics No.	Topics/Activity			Text Book / Reference	Contact Hour	Delivery Method
I	C01: Understand Regular & Context-Free Grammars/ Languages. (K2)	1.01	Need of Automata Theory,			T1, R1	1	Chalk and Talk, PPT & Video
		1.02	Central Concepts of Automata Theory			T1, R1	1	
		1.03	Finite Automaton, Transition Systems			T1, R1	1	
		1.04	Acceptance of a String in DFA			T1, R1	1	
		1.05	DFA: Design of DFAs			T1, R1	1	
		1.06	NFA and Design of NFA			T1, R1	1	
		1.07	Equivalence of DFA and NFA			T1, R1	1	
		1.08	Conversion of NFA into DFA			T1, R1	1	
		1.09	Finite Automata with $\epsilon$ -Transitions			T1, R1	1	
		1.10	Minimization of Finite Automata			T1, R1	1	
		1.11	Differences between NFA and DFA			T1, R1	1	
		1.12	Mealy Machines			T1	1	
		1.13	Moore Machines			T1, R1	1	
		1.14	Applications and Limitations of Finite Automata			T1, R1	1	
Total							14	
II	Regular Languages with Finite Automata	2.01	Regular Expressions			T1, R2	1	Chalk and Talk,
		2.02	Regular Sets, Identity Rules			T1, R2	1	
		2.03	Equivalence of Two RE			T1, R2	1	
		2.04	Manipulations of Regular Expressions			T1, R2	1	



		2.05	Finite Automata and Regular Expressions	T1, R2	1	PPT & Video
		2.06	Inter Conversion of Finite Automata and Regular Expressions	T1, R2	1	
		2.07	Equivalence between FA and RE	T1, R2	1	
		2.08	Pumping Lemma for Regular Sets	T1, R2	1	
		2.09	Closure Properties of Regular Sets	T1, R2	1	
		2.1	Grammars and Classification of Grammars	T1, R2	1	
		2.11	Chomsky Hierarchy Theorem	T1, R2	1	
		2.12	Right and Left Linear Regular Grammars	T1, R2	1	
		2.13	Equivalence between RG and FA	T1, R2	1	
		2.14	Inter Conversion between RG and FA	T1, R2	1	
Total					14	
III	CO3: Understand CFLs, PDAs, and TMs (K3)	3.01	Formal Languages	T1, R3	1	Chalk and Talk, PPT
		3.02	Context-Free Grammar	T1, R3	1	
		3.03	Leftmost and Rightmost Derivations	T1, R3	1	
		3.04	Parse Trees	T1, R3	1	
		3.05	Ambiguous Grammars	T1, R3	1	
		3.06	Simplification of Context-Free Grammars	T1, R3	1	
		3.07	Elimination of Useless Symbols, $\epsilon$ -Productions	T1, R3	1	
		3.08	Unit Productions, Normal Forms	T1, R3	1	
		3.09	Chomsky Normal Form and Greibach Normal Form	T1, R3	1	
		3.10	Pumping Lemma for Context-Free Languages	T1, R3	1	
		3.11	Closure Properties of Context-Free Languages	T1, R3	1	
		3.12	Applications of Context-Free Grammars		1	
		3.13	Formal Languages, Context-Free Grammar	T1, R3	1	
		3.14	Leftmost and Rightmost Derivations	T1, R3	1	
Total					14	
IV	CO4: Design PDA as acceptor and TM as calculator (K5)	4.01	Pushdown Automata: Definition, Model	T1, R3	1	Chalk and Talk, PPT & Video
		4.02	Graphical Notation,	T1, R3	1	
		4.03	Instantaneous Description	T1, R3	1	
		4.04	Language Acceptance of Pushdown Automata	T1, R3	1	
		4.05	Design of Pushdown Automata	T1, R3	1	
		4.06	Deterministic and Non-Deterministic Pushdown Automata	T1, R3	1	





		4.07	Equivalence of Pushdown Automata and Context-Free Grammars	T1, R3	1	
		4.08	Conversion between PDA and CFG	T1, R3	1	
		4.09	Two Stack Pushdown Automata	T1, R3	1	
		4.10	Applications of Pushdown Automata	T1, R3	1	
		4.11	Pushdown Automata Examples	T1, R3	1	
		4.11	Review and Summary of Pushdown Automata	T1, R3	1	
<b>Total</b>					<b>11</b>	
<b>V</b>	CO5: Analyze limitations and applications of formal models. (K5)	5.01	Turing Machine: Definition and Model	T1, R3	1	Chalk and Talk, PPT & Video Chalk and Talk, PPT & Video
		5.02	Representation of TMs - Instantaneous Descriptions	T1, R3	1	
		5.03	Transition Tables and Transition Diagrams	T1, R3	1	
		5.04	Language of a TM	T1, R3	1	
		5.05	Design of TMs, Types of TMs	T1, R3	1	
		5.06	Church's Thesis	T1, R3	1	
		5.07	Universal and Restricted TMs	T1, R3	1	
		5.08	Decidable and Undecidable Problems	T1, R3	1	
		5.09	Halting Problem of TMs	T1, R3	1	
		5.10	Post's Correspondence Problem	T1, R3	1	
		5.11	NP-Hard and NP-Complete Problems	T1, R3	1	
		5.12	Modified PCP	T1	1	
		5.13	Classes of P and NP	T1, R3	1	
		5.14	Turing Machine: Definition and Model	T1, R3	1	
<b>Total</b>					<b>14</b>	
<b>CBS</b>	Content Beyond Syllabus	1	Primitive Recursive Functions		1	Chalk & Talk, PPT & Video
		2	Initial Functions		1	
		3	Primitive Recursive Functions over N		1	
		4	Primitive Recursive Functions over {a,b}		1	
<b>Total</b>					<b>4</b>	
<b>CUMULATIVE PROPOSED PERIODS</b>					<b>71</b>	
<b>Text Books:</b>						
<b>Sl. No.</b>	<b>AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION</b>					
1.	Introduction to Automata Theory, Languages and Computation by J. E. Hopcroft, R. Motwani, and J. D. Ullman, 3rd Edition, Pearson, 2008.					



2.	Theory of Computer Science-Automata, Languages and Computation by K. L. P. Mishra and N. Chandrasekharan, 3rd Edition, PHI, 2007.
<b>Reference Books:</b>	
<b>Sl. No.</b>	<b>AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION</b>
1.	Elements of Theory of Computation by Lewis H.P. & Papadimition C.H., Pearson /PHI.
2.	Theory of Computation by V. Kulkarni, Oxford University Press, 2013.
3.	Theory of Automata, Languages and Computation by Rajendra Kumar, McGraw Hill, 2014.
4.	Elements of Theory of Computation by Lewis H.P. & Papadimition C.H., Pearson /PHI.
<b>Web Details</b>	
1.	<a href="https://www.iitg.ac.in/dgoswami/Flat-Notes.pdf">https://www.iitg.ac.in/dgoswami/Flat-Notes.pdf</a>
2.	<a href="https://www.ktunotes.in/ktu-cst301-formal-languages-automata-theory-notes/">https://www.ktunotes.in/ktu-cst301-formal-languages-automata-theory-notes/</a>
3.	<a href="https://www.tecnrt.org/docs/cse/materials/FLAT.pdf">https://www.tecnrt.org/docs/cse/materials/FLAT.pdf</a>
4.	<a href="https://cse.iitkgp.ac.in/~abhij/course/theory/FLAT/Spring21/">https://cse.iitkgp.ac.in/~abhij/course/theory/FLAT/Spring21/</a>
5.	<a href="https://www.jntua.ac.in/gate-online-classes/registration/downloads/material/a159064443559.pdf">https://www.jntua.ac.in/gate-online-classes/registration/downloads/material/a159064443559.pdf</a>

S.No	Name of Faculty & Section		Name	Signature with Date
i.	Faculty I	Sec/A, E.	Mr. B. S. Varaprasad	
ii.	Faculty II (for common Course)	Sec/B, C, D.	Dr. M. Vijay Raju	
iii.	Course Coordinator		Dr. M. Vijay Raju	
iv.	Module Coordinator		Dr. M. Vijay Raju	
v.	Programme Coordinator		Professor. P. Srinivasulu	

Principal