SWARNANDHRA
COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

Accredited by National Board of Accreditation, AICTE, New Delhi, Accredited by NAAC with "A" Grade – 3.32 CGPA, Recognized under 2(f) & 12(B) of UGC Act 1956, Approved by AICTE, New Delhi, Permanent Affiliation to JNTUK, Kakinada
Seetharampuram, W.G.DT., Narsapur-534280, (Andhra Pradesh)

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

TEACHING PLAN

Course Code	Course Title	Semester	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
20AM5T02	AUTOMATA THEORY	V	A&B	5	2024-25	03-06-24

COURSE OUTCOMES	
1	Understand the concept of abstract machines and their power to recognize the languages(K1)
2	Employ finite state machines for modelling and solving computing problems. (K2)
3	Design context free grammars for formal languages (K2)
4	Distinguish between decidability and undecidability (K2)
5	Gain proficiency with mathematical tools and formal methods (K2)

Unit	Out Comes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
UNIT-I: Introduction & Finite state machine						
I	CO1: Understand the concept of abstract machines and their power to recognize the languages(K1)	1.1	Structural Representations, Automata and Complexity	T1,R1	1	Chalk ,talk
		1.2	the Central Concepts of Automata Theory	T1,R1	1	Chalk ,talk
		1.3	Alphabets, Strings, Languages, Problems.	T1,R1	1	Chalk ,talk
		1.4	Definition and Finite Automation model	T1	1	Chalk ,talk
		1.5	Acceptance of strings and languages	T1,R1	1	Chalk ,talk
		1.6	DFA (Deterministic Finite Automata)	T1,R1	1	Chalk ,talk
		1.7	NFA(Non-Deterministic Finite Automata)	T1,R1	1	
		1.8	NFA with E- transitions	T1	1	Chalk ,talk
		1.9	Example of NFA with E- transitions	T1	1	
		1.10	Equivalence between NFA with and without E- transitions	T1,R1	1	PPT
		1.11	Various examples Equivalence between NFA with and without E-transitions	T1,R1	1	PPT
		1.12	NFA to DFA conversion	T1,R1	1	Chalk ,talk

		1.13	Examples onNFA to DFA conversion	T1,R1	1	
		1.14	Minimization FSM	T1	1	PPT
		1.15	Examaples on minimization of FSM	T1,R1	1	Chalk, talk,PPT
		1.16	Output machines- Moore and Mealy machine	T1	1	PPT
		1.17	Moore and Mealy machine Examples	T1	1	Chalk ,talk
	Content beyond Syllabus (if needed)		Nondeterministic Finite Automata and S-extended Type 3 Grammars		1	PPT
				Total	**17**	
UNIT-II: Regular Languages						
II	CO2: Classify the devices according to their computational power (K4)	2.1	Regular Sets	T1	1	Chalk ,talk
		2.2	Regular Expressions	T1,R1	1	Web Resources
		2.3	Identity Rules	T1	1	Chalk , talk
		2.4	Constructing Finite automata for a given regular expressions	T1,T2	1	Chalk ,talk
		2.4.1	Examples of Constructing Finite automata for a given regular expressions	T1,T2	1	Chalk ,talk
		2.5	Conversion of Finite automata to regular expressions	T1,T2	1	PPT
		2.5.1	Examples of Conversion of Finite automata to regular expressions	T1,T2	1	Chalk ,talk, ppt
		2.6	Pumping lemma of regular sets	T1	1	PPT
		2.7	Closure properties of regular sets (proofs not required)	T1,R2	1	Web Resources
	Content beyond Syllabus (if needed)		Decidability Properties of Regular Languages		1	Chalk ,talk
			Total		**10**	
UNIT-III: Context Free Grammar						
III	CO3: Analyze the concepts of the Formal grammars and languages	3.1	Derivation trees	T1	1	Chalk ,talk
		3.2	Sentential forms	T1,T2	1	Chalk ,talk,
		3.3	Right most and left most derivations of strings	T1	1	Chalk ,talk
		3.3.1	Various examples Right most and left most derivations of strings	T1	1	Chalk ,talk
		3.4	Ambiguity in Context free Grammars	T1,T2	1	PPT
		3.5	Minimization of Context free grammars	T1	1	Web Resources
		3.6	CNF	T1	1	Chalk ,talk
		3.7	GNF	T1	1	Chalk ,talk

	(K4)	3.8	Pumping Lemma for Context Free Languages	T1,T2	1	Chalk ,talk
		3.9	3.7 Enumeration of properties of CFL (proofs omitted)	T1,T2	1	Chalk ,talk
	Content beyond Syllabus (if needed)		The Cocke-Younger-Kasami Parser		1	Chalk ,talk
				Total		**11**
UNIT-IV: Push down Automata						
IV	CO4: Identify the concept and the techniques in Push down Automata (K1)	4.1	Definition	T1	1	PPT
		4.2	Model of PDA	T1	1	Web Resources
		4.3	Acceptance of CFL	T1	1	Chalk ,talk
		4.4	Acceptance by final state and acceptance by empty state and its equivalence.	T1,R1	1	PPT
		4.4.1	Various examples of Acceptance by final state and acceptance by empty state and its equivalence.	T1,R1	1	Chalk ,talk
		4.5	Equivalence of CFL and PDA	T1	1	Chalk ,talk
		4.6	Introduction to DCFL and DPDA	T1	1	Chalk ,talk
	Content beyond Syllabus (if needed)	Parsing Classes of Deterministic Context-Free Languages			1	Chalk ,talk, ppt
				Total		**08**
UNIT-V: Turing Machine						
V	CO5: Explain the Turing machine concept and the techniques applied in computers (K2)	5.1	Definition	T1,T2	2	Web Resources
		5.2	Model	T1	2	Web Resources,
		5.3	Design of TM	T1,R1	1	Chalk ,talk, ppt
		5.3.1	Various examples on Design of TM	T1,R1	1	PPT
		5.4	Computable functions	T1,R1	1	Web Resources
		5.5	Recursively enumerable languages	T1	1	Chalk ,talk
		5.6	Church's hypothesis	T5,R2	1	Web Resources
		5.7	Counter machine	T5	1	Chalk ,talk, ppt
		5.8	Types of Turing	T1,R1	1	Chalk ,talk

			Machines		
	Content beyond Syllabus (if needed)	Iterated Counter Machines and Counter Machines		1	Chalk ,talk, PPT
			Total		**14**
			CUMULATIVE PROPOSED PERIODS		**60**

Text Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	Formal Languages and Automata Theory by Basavarj S. Anami,Karibasappa K.G,WILEY-INDIA,2016.
2	H.E.Hopcroft, R.Motwani and J.D Ullman, "Introduction to Automata Theory, Languages and Computations", Second Edition, Pearson Education, 2013.

Reference Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	Mishra,Chandra Shekaran -Theory of Computer Science, Automata languages and computation, 2/e,Mishra, PHI,2007.
2	H.R.Lewis and C.H.Papadimitriou, —Elements of The theory of Computationl, Second Edition, Pearson Education/PHI, 2012.
3	J.C.Martin, —Introduction to Languages and the Theory of Computationl, Third Edition, TMH, 2016.

Web Details

1	https://www.tutorialspoint.com/automata_theory/automata_theory_tutorial.pdf
2	https://www.iitg.ac.in/dgoswami/Flat-Notes.pdf
3	https://mrcet.com/downloads/digital_notes/IT/Formal%20Languages%20Automata%20Thery.pdf

		Name	Signature with Date
i.	Faculty	Dr G Sudhakar	
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Principal