



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 COMPUTER SCIENCE AND ENGINEERING

TEACHING PLAN

Course Code	Course Title	Semester	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
16CS5T03	FORMAL LANGUAGE AND AUTOMATA THEORY	V	CSE A,B,Shift	5	2020-21	

COURSE OUTCOMES

1	Analyze and Understand fundamentals in design of Finite Automata (K2)
2	Classify the devices according to their computational power (K4)
3	Analyze the concepts of the Formal grammars and languages (K4)
4	Identify the concept and the techniques in Push down Automata (K1)
5	Explain the Turing machine concept and the techniques applied in computers (K2)
6	Remember the basic complexity classes like P & NP (K1)

Unit	Out Comes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Cont act Hour	Delivery Method
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UNIT-I: Introduction & Finite state machine

I	CO1: Analyze and Understand fundamentals in design of Finite Automata (K2)	1.1	Definition and Finite Automation model	T1	1	Chalk ,talk
		1.2	Acceptance of strings and languages	T1,R1	1	Chalk ,talk
		1.3	DFA (Deterministic Finite Automata)	T1,R1	1	Chalk ,talk
		1.4	NFA(Non-Deterministic Finite Automata)	T1,R1	1	
		1.5	NFA with E- transitions	T1	1	Chalk ,talk
		1.5.1	Example of NFA with E- transitions	T1	1	
		1.6	Equivalence between NFA with and without E- transitions	T1,R1	1	PPT
		1.6.1	Various examples Equivalence between NFA with and without E- transitions	T1,R1	1	
		1.7	NFA to DFA conversion	T1,R1	1	Chalk ,talk
		1.7.1	Examples on NFA to DFA conversion	T1,R1	1	
		1.8	Minimization FSM	T1	1	PPT
		1.8.1	Examaples on minimization of FSM	T1,R1	1	Chalk, talk,PPT
		1.9	Output machines- Moore and Mealy	T1	1	PPT



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			machine			
		1.9.1	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					15	
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 (K4)	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
		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



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					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	1	Web Resources
		5.2	Model	T1	1	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 Machines	T1,R1	1	Chalk ,talk
	Content beyond Syllabus (if needed)	Iterated Counter Machines and Counter Machines			1	Chalk ,talk, PPT
					Total	10
UNIT-VI: Computability Theory						
VI	CO6: Remember the basic complexity classes like P & NP (K1)	6.1	Decidability of problems	T1,R1	1	Web Resources,
		6.2	Universal TM	T1,T2	1	Chalk ,talk, ppt
		6.2.1	Various examples on Universal TM	T1,T2	1	PPT



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		6.3	Un decidable problems about Turing Machine	T1,R1	1	Web Resources
		6.3.1	Example on Un decidable problems about Turing Machine	T1	1	Chalk ,talk
		6.4	6.4 Post's Correspondence Problem	T1	1	Web Resources
		6.5	6.5 The classes P and NP	T1	1	Chalk ,talk, ppt
	Content beyond Syllabus (if needed)		The complexity class P is the set of all decision problems		1	PPT
Total						8
CUMULATIVE PROPOSED PERIODS						62

Text Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	Basavaraj S. Anami, Karibasappa K.G, Formal Languages and Automata Theory, 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, , PHI, 2007.
2	. H.R.Lewis and C.H.Papadimitriou, —Elements of The theory of Computation, Second Edition, Pearson Education/PHI, 2012.
3	J.C.Martin, —Introduction to Languages and the Theory of Computation, 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	Mr.S. Uma Maheswara Rao	
ii.	Faculty II (for common Course)	Mr. M. Laxminarayana	
iii.	Course Coordinator	Mr.S. Uma Maheswara Rao	
iv.	Module Coordinator	Mr. N.Tulasi Raju	
v.	Programme Coordinator	Dr.P.Srinivasulu	

Hod

Principal