the per choice	Dased Credit Si	COMPUTABILITY vstem (CBCS) scheme	
(Effective fr	om the academ	ic year 2017-2018)	l
	SEMESTER	– V	
Subject Code	17CS54	IA Marks	140
Number of Lecture Hours/Week	4		40
Total Number of Lecture Hours	50	Exam Marks	60
	CREDITS -	Exam Hours	03
Module – 1	OREDITS -	04	
XXII			Teachin
Why study the Theory of Comp Languages. A Language Hierarch	outation, Langu	lade and Cu :	Houre
Languages. A Language Hierarch (FSM): Deterministic FSM,	ny, Computation	n Einite Strings: St	rings, 10 Hour
(FSM): Deterministic FSM,	Regular lang	uages, Designing	hines
Trondctcillillistic FNMs From ECA		al Systems G	FSM,
FSMs, Minimizing FSMs, Canonic Transducers, Bidirectional Transducers	al form of Reg	ular languages First	s for
Transducers, Bidirectional Transduce	ers.	and languages, Finite	State
Textbook 1: Ch 1,2, 3,4, 5.1 to 5.10 Module – 2	7		
Pagela F			
Regular Expressions (RE): what is REs, Manipulating and Simplifyin	a RE?, Kleene'	s theorem Annti-	
REs, Manipulating and Simplifyin Regular Grammars and Regular land	g REs. Regu	lar Grammara, Dec.	s of 10 Hours
Regular Grammars and Regular languages: How many RLs.	guages. Regular	Languages (DI) and a	tion,
regular Languages: How many RLs, properties of RLs, to show some languages	To show that a l	anguage is regular Cl	Non-
properties of RLs, to show some lang Textbook 1: Ch 6.7.8.6144.644	uages are not RI	s.	sure
Textbook 1: Ch 6, 7, 8: 6.1 to 6.4, 7. Module – 3	1, 7.2, 8.1 to 8.4	- 24 Mg	
Context-Free Grammars(CFG): Introc CFGs and languages, designing C	duction to Rewri	te Systems and Gran	
CFGs and languages, designing C Grammar is correct, Derivation and	FGs, simplifyin	g CFGs proving the	ars, 10 Hours
Grammar is correct, Derivation and Pusindown Automata (PDA): Definition	Parse trees, A	mbiguity Normal For	it a
Pusindown Automata (PDA): Definition and Non-deterministic PDAs. No.	on of non-determ	inistic PDA Determini	ills.
and Non-deterministic PDAs, Non-deterministic PDAs, Non-deterministic PDAs, alternative and PDA, alternative and P	n-determinism	and Halting alternat	Suc
equivalent definitions of a PDA, altern Textbook 1: Ch 11, 12: 11.1 to 11.8	atives that are no	ot equivalent to PDA	live
Textbook 1: Ch 11, 12: 11.1 to 11.8, 1 Module – 4	12.1, 12.2, 12,4,	12.5, 12.6	1.
Context-Free and Non-Context-Free Languages(CFL) fit, Showing a languages	Languages: Wh	ere do the Context-E	700 10 YY
and subsection of the subsecti	000 :		ICC III HAHMO
FI. Important closure	age is context-fi	ree, Pumping theorem	ree 10 Hours
FL. Important closure properties of o	TEL 12 COURTEXI-II	ree, Pumping theorem	for
CFL, Important closure properties of Concession Procedures for CFL as Decision	FLs, Determinis	ree, Pumping theorem stic CFLs. Algorithms a	for
CFL, Important closure properties of Coecision Procedures for CFLs: Deciduring Machine: Turing machine models	CFLs, Determinis	ree, Pumping theorem stic CFLs. Algorithms a Un-decidable questio	for
CFL, Important closure properties of Coecision Procedures for CFLs: Deciduring Machine: Turing machine mode of TM. Techniques for TM. design of TM. Techniques for TM.	CFLs, Determinisdable questions, el, Representation	ree, Pumping theorem stic CFLs. Algorithms a Un-decidable question, Language acceptabil	for and ns.
CFL, Important closure properties of Coecision Procedures for CFLs: Deciduring Machine: Turing machine mode of TM. Techniques for TM. design of TM. Techniques for TM.	CFLs, Determinisdable questions, el, Representation	ree, Pumping theorem stic CFLs. Algorithms a Un-decidable question, Language acceptabil	for and ns.
CFL, Important closure properties of Coecision Procedures for CFLs: Deciduring Machine: Turing machine modely TM, design of TM, Techniques for extbook 1: Ch 13: 13.1 to 13.5, Ch 15 Iodule – 5	CFLs, Determinist dable questions, el, Representation TM construction 14: 14.1, 14.2, To	ree, Pumping theorem stic CFLs. Algorithms a Un-decidable question, Language acceptabil. extbook 2: Ch 9.1 to 9.	for and ns. ity
CFL, Important closure properties of Coecision Procedures for CFLs: Decidering Machine: Turing machine mode by TM, design of TM, Techniques for extbook 1: Ch 13: 13.1 to 13.5, Ch 15 Iodule – 5	CFLs, Determinist dable questions, el, Representation TM construction 14: 14.1, 14.2, To	ree, Pumping theorem stic CFLs. Algorithms a Un-decidable question, Language acceptabil . extbook 2: Ch 9.1 to 9.	for and ns. ity
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CFL, Important closure properties of Coecision Procedures for CFLs: Deciduring Machine: Turing machine modely TM, design of TM, Techniques for extbook 1: Ch 13: 13.1 to 13.5, Ch 15 Iodule – 5 ariants of Turing Machines (TM), Techniques of Turing Machines (TM), Techniques of Turing Machines (TM), Techniques balting and the indecidable languages balting and the procedure of the control of the c	CFLs, Determinist dable questions, el, Representation TM construction 14: 14.1, 14.2, To the model of Lithm, decidabilit	tree, Pumping theorem stic CFLs. Algorithms a Un-decidable question, Language acceptabil extbook 2: Ch 9.1 to 9. mear Bounded automaty, decidable language	for and ans. ity .6 10 Hours
CFL, Important closure properties of Coecision Procedures for CFLs: Decidering Machine: Turing machine modely TM, design of TM, Techniques for extbook 1: Ch 13: 13.1 to 13.5, Ch 16 Iodule – 5 ariants of Turing Machines (TM), The ecidability: Definition of an algoriance of the extbook of the ecidable languages, halting problems of the extra properties of the ecidable languages.	EFLs, Determinist dable questions, el, Representation TM construction 14: 14.1, 14.2, To the model of Lithm, decidability of TM, Post of T	ree, Pumping theorem stic CFLs. Algorithms a Un-decidable question, Language acceptabil extbook 2: Ch 9.1 to 9. mear Bounded automatry, decidable language correspondence problem.	for and ans. ity .6 10 Hours
CFL, Important closure properties of Coecision Procedures for CFLs: Decidering Machine: Turing machine modely TM, design of TM, Techniques for Cextbook 1: Ch 13: 13.1 to 13.5, Ch 16 Indule – 5 ariants of Turing Machines (TM), The ecidability: Definition of an algoriance indecidable languages, halting problem complexity: Growth rate of functions computation: quantum computers. Chapter 19 Indule 19 Indul	EFLs, Determinist dable questions, el, Representation TM construction 14: 14.1, 14.2, To The model of Lithm, decidability of TM, Post of S, the classes of	ree, Pumping theorem stic CFLs. Algorithms a Un-decidable question, Language acceptabile. extbook 2: Ch 9.1 to 9. near Bounded automaty, decidable language correspondence problem of P and NP, Quantum	for and ans. ity .6 10 Hours
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- Explain how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).
- Interpret Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.
- Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.
- Classify a problem with respect to different models of Computation.

Question paper pattern:

The question paper will have TEN questions.

There will be TWO questions from each module.

Each question will have questions covering all the topics under a module.

The students will have to answer FIVE full questions, selecting ONE full question from each module.

Text Books:

- 1. Elaine Rich, Automata, Computability and Complexity, 1st Edition, Pearson Education, 2012/2013
- 2. K L P Mishra, N Chandrasekaran, 3rd Edition, Theory of Computer Science, PhI, 2012.

Reference Books:

- 1. John E Hopcroft, Rajeev Motwani, Jeffery D Ullman, Introduction to AutomataTheory, Languages, and Computation, 3rd Edition, Pearson Education, 2013
- 2. Michael Sipser: Introduction to the Theory of Computation, 3rd edition, Cengage learning,2013
- 3. John C Martin, Introduction to Languages and The Theory of Computation, 3rd Edition, Tata McGraw -Hill Publishing Company Limited, 2013
- 4. Peter Linz, "An Introduction to Formal Languages and Automata", 3rd Edition, Narosa Publishers, 1998
- 5. Basavaraj S. Anami, Karibasappa K G, Formal Languages and Automata theory, Wiley India, 2012
- 6. C K Nagpal, Formal Languages and Automata Theory, Oxford University press, 2012.

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