		COMPUTABILITY	
(Effective fr	sased Credit Sy	ystem (CBCS) scheme  ic year 2016 -2017)	
(Sitetave II)	SEMESTER	- V	
Subject Code	15CS54	IA Marks	20
Number of Lecture Hours/Week	4	Exam Marks	
Total Number of Lecture Hours	50	Exam Hours	80
	CREDITS -		03
Course objectives: This course wil	enable students	104	
Introduce core concepts in A	utomata and Th	S 10	
Identify different Formal lan	miaga Classes s	eory of Computation	
Design Grammars and Recognition	guage Classes a	nd their Kelationships	
Prove or disprove theorems in the decidable.	in automata thac	rent formal languages	
Determine the decidability as  Module 1	nd introctability	ory using their properties	
Module – 1	nd intractability	of Computational proble	The second secon
			Teachin
Why study the Theory of Comp Languages. A Language Hierarch	outation Lang	uages and Ct C.	Hours
2 Stanguage Theraic	hv. Computation	on Finite State Mee	rings, 10 Hour
Nondeterministic FSMs, From FSI FSMs, Minimizing FSMs Canonic	Me to Operation	not Court of I	
		gular languages Finite	State
Bidirectional Transmic	ers	January Time	State
Textbook 1: Ch 1,2, 3,4, 5.1 to 5.10			
Module – 2	0.		
Regular Expressions (RE): what is	a RE?, Kleene	e's theorem, Application	ns of 10 Hour
Regular Expressions (RE): what is REs, Manipulating and Simplifying			
Regular Grammars and Regular Ian	mages Possile	ular Grammars: Defin	ition,
Regular Grammars and Regular lan regular Languages: How many RIs	guages. Regula	ular Grammars: Defin or Languages (RL) and	ition,
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Undecidable languages, halting problem of TM, Post correspondence problem. Complexity: Growth rate of functions, the classes of P and NP, Quantum Computation: quantum computers, Church-Turing thesis.

Textbook 2: Ch 9.7 to 9.8, 10.1 to 10.7, 12.1, 12.2, 12.8, 12.8.1, 12.8.2

Course outcomes: The students should be able to:

- Acquire fundamental understanding of the core concepts in automata theory and Theory of Computation
- Learn how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).
- Design 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:

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

## Reference Books:

- John E Hopcroft, Rajeev Motwani, Jeffery D Ullman, Introduction to AutomataTheory, Languages, and Computation, 3rd Edition, Pearson Education, 2013
- Michael Sipser: Introduction to the Theory of Computation, 3rd edition, Cengage learning, 2013
- John C Martin, Introduction to Languages and The Theory of Computation, 3<sup>rd</sup> Edition, Tata McGraw –Hill Publishing Company Limited, 2013
- Peter Linz, "An Introduction to Formal Languages and Automata", 3rd Edition, Narosa Publishers, 1998
- 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.

H.O.D.

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