Department of Computer Engineering
(Academic Year :2023-2024)

Course Code: CSC501 (Div A)	
Course Name: Theoretical Computer Science	
Course Teacher: Mrs. Sangeeta Parshionikar	
Course Outcomes (CO): *At the End of the course students will be able to*	
CO.1	Explain the concepts of finite automata in the context of Theoretical Computer Science.
CO.2	Construct regular expressions (RE) for regular language and derive the equivalence of languages described by finite automata and regular expressions.
CO.3	Design context free grammars to recognize the language.
CO.4	Design Pushdown Automata to recognize the language.
CO.5	Develop an understanding of different types Turing Machines and applications.
CO.6	Determine decidability and undecidability of computational problems with fundamental understanding
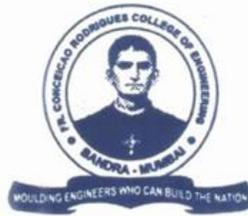
Course Lesson Plan

Sr. No.	Proposed Date	Actual Date	Topics	CO	Teacher's Remark	HoD's Remark
			Module No. 1 - Basic Concepts and Finite Automata			
1	10-07-23		Importance of TCS, Course Outcomes	1	Lecture	
2	11-07-23		Alphabets, Strings, Languages, Closure Properties.	1,2	Online Lecture	
3	12-07-23		Finite Automata and Finite State Machine (Divide by 3 – FSM)	1	Lecture	
4	17-07-23		DFA Definition, Transition Diagrams and Language recognizers examples	1	Lecture	
5	18-07-23		DFA – Design problems	1	Online Lecture	
6	19-07-23		NFA Definition and Design problems	1	Lecture	
7	24-07-23		NFA to DFA conversion.	1,2	Lecture	
8	27-07-23		NFA with e-transitions and NFA equivalence	1,2	Online Lecture	
9	28-07-23		Minimization of DFA	1,2	Lecture	
10	31-07-23		FSM with output: Moore Machine	1	Lecture	
11	03-08-23		FSM with output: Mealy Machine	1	Lecture	
12	04-08-23		Applications and Limitations of DFA	1	Lecture	
13	07-08-23		Importance of TCS, Course Outcomes	1,2	Lecture	
			Module 2 - Regular Expressions and Languages		Lecture	
14	10-08-23		Regular Expressions, RE and FA equivalence	1,2	Assignment 1	
15	11-08-23		Arden's Theorem	2	Lecture	
16	14-08-23		Regular Language (RL), Closure and desicion properties of RL	1,2	Online Lecture	
	15-08-23		**Independence Day**			
	16-08-23		**Parsi New Year**			

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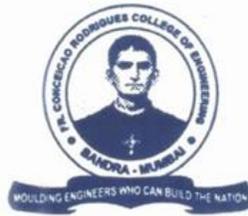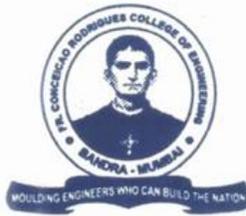*(Approved by AICTE & Affiliated to University of Mumbai)*

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17	17-08-23		Pumping Lemma of RL	2	Flipped Class Activity	
18	18-08-23		Pumping Lemma of RL	2	Assignment 2	
			Module 3 - Grammars			
19	21-08-23		Grammars and Chomsky hierarchy	3	Lecture	
20	24-08-23		Regular Grammar(RG), Left linear and Right linear Grammar	3	Assignment 3	
21	25-08-23		Equivalence of RG and FA	3	Lecture	
	29-08-23 to 31-08-23		**Unit Test-1**			
20	01-09-23		Context Free Grammar: Design	3	Lecture	
21	04-09-23		Parse tree and Ambiguity	3	Lecture	
22	07-09-23		Chomsky Normal Form	3	Quiz on Modules 2 & 3	
23	08-09-23		Greibach Normal Form	3	Lecture	
24	11-09-23		CFLs- Pumping Lemma	3	Lecture	
25			**Module 4 - Pushdown Automata(PDA)**		Assignment 4	
	14-09-23		Push Down Automata :Definition, transitions, Applications	4	Lecture	
26	15-09-23		PDA-as generator, decider	4	Lecture	
	19-09-23 to 22-09-23		Shri Ganesh Festival			
27	25-09-23		PDA-as acceptor	4	Assignment 5	
	28-09-23		Anant Chaturdashi			
28	29-09-23		Deterministic PDA	4	Lecture	
			Module 5 - Turing Machine (TM)		Lecture	
	02-10-23		Turing Machine: Definition, Transitions	5	Quiz 2	
29	05-10-23		Turing Machine as generator, decider	5	Lecture	
30	06-10-23		Variants of Turing Machine, Universal TM	5	Lecture	
	09-10-23 to 13-10-23		Unit Test-2			
			Module 6 - Undecidability			
31	16-10-23		Non-deterministic PDA, Decidability and Undecidability	6	Lecture	

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					Assignment 6	
32	19-10-23		Halting Problem, Recursive and Recursively Enumerable Languages	6	Lecture	
33	20-10-23		Rice's Theorm, Post Correspondence Problem	6	Lecture	
	30/10		Dashahera			
	31/10		**Course Exit Survey**			
42	17-10-23		Remedial Session			
			University ESE Examination			

Text Books:
1. John E, Hopcroft, Rajeev Motwani, Jeffery D. Ullman, "Introduction of Automata Theory, Languages and Computation, Pearson Edition
2. Michael Siper, "Theory of Computation", Cengage Learning
3. Vivek Kulkarni, :Theory of Computation", Oxford University Press. India

Reference Books:
1. J. C. Martin, " Introduction to languages and Theory of Computation", Tata McGraw Hill.
2. Kavi Mahesh, " Theory of Computation: A Problem Solving Approach", Wiley-India.

Course Instructor: Prof. Sangeeta Parshionikar