MOHAMMED SATHAK A J COL
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	LESSON PL
	Department of Computer Scie
Name of the	Theory of Computation
Subject Code	CS8501
Acad Year	2022-2023
	Course Objec

1. To understand the language hierarchy

2. To construct automata for any given pattern and find its equivalent regular expressions

3.To design a context free grammar for any given language

4.To understand Turing machines and their capability

5. To understand undecidable problems and NP class problems

Course Outco

Upon completion of the course, the students will be able to:

1.Construct automata, regular expression for any pattern.

2 Write Context free grammar for any construct.

3 Design Turing machines for any language.

4 Propose computation solutions using Turing machines.

5. Derive whether a problem is decidable or not.

Sl. No.	Topic(s)
UNIT-I	**AUTOMATA FUNDAMENTALS**
1	Introduction to formal proof
2	**Additional forms of Proof**
3	Inductive Proofs
4	Finite Automata
5	Deterministic Finite Automata
6	Non-deterministic Finite Automata
7	Finite Automata with Epsilon Transitions

Suggested Activity: Assignment / Case Studies / Tutorials/ Quiz / Mini Projects / Model Developed/others Plann
Evaluation method

UNIT II	REGULAR EXPRESSIONS AND LANGUAGES
8	Regular Expressions
9	FA and Regular Expressions
10	Proving Languages not to be regular
11	Closure Properties of Regular Languages
12	Equivalence and Minimization of Automata

Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planne
Evaluation method

UNIT III	CONTEXT FREE GRAMMAR AND LANGUAGES
13	CFG – Parse Trees
14	Ambiguity in Grammars and Languages
15	Definition of the Pushdown Automata
16	Languages of a Pushdown Automata
17	Equivalence of Pushdown Automata and CFG
18	**Deterministic Pushdown Automata.**

Suggested Activity: Assignment / Case Studies / Tutorials/ Quiz / Mini Projects / Model Developed/others Plann

Evaluation method

UNIT IV	PROPERTIES OF CONTEXT FREE LANGUAGES
19	Normal Forms for CFG
20	Pumping Lemma for CFL
21	Closure Properties of CFL
22	Turing Machines
23	Programming Techniques for TM

Suggested Activity: Assignment / Case Studies / Tutorials/ Quiz / Mini Projects / Model Developed/others Plann

Evaluation method

UNIT V	UNDECIDABILITY
24	Non Recursive Enumerable (RE) Language
25	Undecidable Problem with RE
26	Undecidable Problems about TM
27	Post's Correspondence Problem
28	The Class P and NP

Suggested Activity: Assignment / Case Studies / Tutorials/ Quiz / Mini Projects / Model Developed/others Plann

Evaluation method

Content Beyond the Syllabus Planned

1	**1.Discuss in detail about DFA & NDFA** **2.Illustrate 2 The functnalty of CFG Simplification**

Text Books

1	J.E.Hopcroft, R.Motwani and J.D Ullman, —Introduction to Automata Theory, Languages ar
2	

Reference Bo

1	Mishra K L P and Chandrasekaran N, "Theory of Computer Science - Automata, Languages and Com
2	Harry R Lewis and Christos H Papadimitriou, "Elements of the Theory of Computation", Second Editi
3	Peter Linz, "An Introduction to Formal Language and Automata", Third Edition, Narosa Publishers, N
4	Kamala Krithivasan and Rama. R, "Introduction to Formal Languages, Automata Theory and Comput
5	http://nptel.ac.in/

Website / URL Re

1	https://www.tutorialspoint.com
2	.

Blooms Lev

Level 1 (L1) : Remembering	Lower Order Thinking
Level 2 (L2) : Understanding	
Level 3 (L3) : Applying	

Mapping syllabus with Bloom's Taxonomy LOT an

Unit No	Unit Name
Unit 1	AUTOMATA FUNDAMENTALS
Unit 2	REGULAR EXPRESSIONS AND LANGUAGES
Unit 3	CONTEXT FREE GRAMMAR AND LANGUAGES
Unit 4	PROPERTIES OF CONTEXT FREE LANGUAGES
Unit 5	UNDECIDABILITY

Total
Total Percentage

CO PO Mappi

	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	0	2
CO2	3	3	3	0	2
CO3	3	3	3	0	2
CO4	3	3	3	0	2
CO5	3	3	3	0	2
Avg					

Justification for CO-P

CO1	Students get the ability to kn
CO2	Students able to apply the
CO3	Students able to understand the
CO4	Students can analyze of computatio
CO5	Students able to understand the basic c

3	High level	2

Name & Sign of Subject Expert	: PANDEESWARI M
Head of the Department	:CSE

AN					
nce & Engineering					
	Name of the		Mrs. PANDEESWARI M		
	Year / Sem		III/V		
	Batch		2020-2024		
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ome					

T / R* Book	Periods Required	Mode of Teaching (BB / PPT / NPTEL / MOOC /	Blooms Level (L1-L6)	CO	PO
T1	1	PPT	L1	CO1	PO3
T1	1	BB	L2	CO1	PO1
T1	1	BB	L1	CO1	PO5
T1	1	BB	L3	CO1	PO5
T1	1	BB	L1	CO1	PO1
T1	2	BB	L3	CO1	PO5
T1	2	BB	L1	CO2	PO1

ed if any: Quiz

T1	1	BB	L2	CO2	PO5
T2	2	PPT	L2	CO2	PO5
T2	2	PPT	L3	CO2	PO1
T1	2	BB	L3	CO2	PO5
T2	2	PPT	L1	CO2	PO5

ed if any: Quiz

T1	1	BB	L1	CO3	PO5
T1	2	PPT	L3	CO3	PO1
T1	2	BB	L2	CO3	PO5
T1	2	PPT	L3	CO4	PO5
T1	2	BB	L2	CO4	PO1

ed if any: Assignment

	T2	1	BB	L1	CO4	PO3
	T2	2	BB	L2	CO4	PO1
	T2	2	BB	L2	CO4	PO1
	T2	2	BB	L3	CO4	PO3
	T2	2	BB	L2	CO5	PO1

ed if any: Assignment

	T2	1	BB	L3	CO5	PO1
	T2	2	BB	L3	CO5	PO3
	T2	2	BB	L3	CO5	PO1
	T2	2	BB	L2	CO5	PO5
	T2	2	PPT	L2	CO5	PO5

ed if any:Quiz

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nd Computations‖, Second Edition, Pearson Education, 2003.

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putation", Third Edition, Prentice Hall of India, 2004

ion, Prentice Hall of India, Pearson Education, New Delhi, 2003.

Jew Delhi, 2002.

tation", Pearson Education 2009

ferences

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Fixed Hour Exams		Level 4 (L4) : Analysing					Higher Order Thinking	Projects / Mini Projects
		Level 5 (L5) : Evaluating						
		Level 6 (L6) : Creating						

d HOT

L1	L2	L3	L4	L5	L6	LOT	HOT	Total
5	1	3	0	0	0	9	0	9
2	3	4	0	0	0	9	0	9
1	4	4	0	0	0	9	0	9
1	6	2	0	0	0	9	0	9
0	5	4	0	0	0	9	0	9
9	19	17	0	0	0	45	0	45
20	42.2	37.8	0	0	0	100	0	100

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PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
0	0	0	0	0	0	0	3	2
0	0	0	0	0	0	0	3	2
0	0	0	0	0	0	0	3	2
0	0	0	0	0	0	0	3	2
0	0	0	0	0	0	0	3	2

O mapping

ow the regular expression

e Context free grammar

e concepts of Turing machines

n solutions using Turing machines

oncept of problem is decidable or not.

	Moderate level	1	Low level