MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

COURSE PLAN

Department	:	Computer science and Engineering
Course Name & code	:	Formal Languages and Automata Theory & CSE-2201
Semester & branch	:	IV & CSE
Name of the faculty	:	Giridhar N S, Shanthi P.B, Govardhan Hegde. Praveen Pai
No of contact hours/week:		3 1 0 4

ASSESSMENT PLAN

Course Outcomes (COs)

	At the end of this course, the student should be able to:	No. of Contact Hours	Marks
CO1:	Use automata as a tool to describe computing	8	16
CO2:	Analyze grammars and languages as they are applied to computer languages.	16	33
CO3:	Exposed to context free languages and pushdown automata .	8	17
CO4:	Design turing machine for a given computation and the languages.	8	17
CO5:	To understand the hierarchy of formal languages.	8	17
	Total	48	100

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Components	Surprise Quizzes	Sessional Tests	End Semester/ Make-up Examination
Duration	20 to 30 minutes	60 minutes	180 minutes
Weightage	20 % (4 X 5 marks)	30 % (2 X 15 Marks)	50 % (1 X 50 Marks)
Typology of Questions	Understanding/ Comprehension; Application; Analysis; Synthesis; Evaluation	Knowledge/ Recall; Understanding/ Comprehension; Application	Understanding/ Comprehension; Application; Analysis; Synthesis; Evaluation
Pattern	Answer one randomly selected question from the problem sheet (Students can refer their class notes)	MCQ: 10 questions (0.5 marks) Short Answers: 5 questions (2 marks)	Answer all 5 full questions of 10 marks each. Each question may have 2 to 3 parts of 3/4/5/6/7 marks
Schedule	4, 7, 10, and 13th week of academic calendar	Calendared activity	Calendared activity
Topics Covered	Quiz 1 (L L1-9 & T 1-3) **(CO 1)** Quiz 2 (L **10-18** & T 4-6) **(CO 2 &3)** Quiz 3 (L 19-27 & T 7-9) **(CO 3 &4)** Quiz 4 (L 28-33 & T 10-11) **(CO 5)**	Test 1 (L 1-15 & T 1-5) **(CO 1&2)** Test 2 (L 16-30 & T 6-T9) **(CO 3&4)**	Comprehensive examination covering full syllabus. Students are expected to answer all questions **(CO 1-5)**

Course Plan

L. No.	Topics	Course Outcome Addressed
L0	Introduction to Formal Languages and Automata	CO
L1	Mathematical Preliminaries and Notation	CO1
L2	Three basic concepts, Some Applications	CO1
L3	Finite Automata (FA)	CO1
T1	Tutorial on FA	CO1
L4	Deterministic Finite Accepters (DFA) and Nondeterministic Finite Accepters (NFA)	CO1
L5	Equivalence of Deterministic and Nondeterministic Finite Accepters	CO1
L6	Reduction of the number of states in finite automata	CO1
T2	Tutorial on DFA and NFA	CO1
L7	Regular Expressions (RE)	CO2

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L8	Regular Languages (RL)	CO2
L9	Connection between Regular Expressions and Regular Languages	CO2
T3	Tutorial on RE, RL	CO2
L10	Regular Grammars, Closure Properties of Regular Languages	CO2
L11	Elementary Questions about Regular Languages	CO2
L12	Identifying Non-regular Languages Pumping Lemma	CO2
T4	Tutorial on Pumping Lemma	CO2
L13	Context-free languages (CFL), Context-Free grammars	CO2
L14	Parsing and Ambiguity	CO2
L15	Context-Free Grammars and Programming Languages	CO2
T5	Tutorial on CFL	CO2
L16	Implification of context-free grammars	CO2
L17	Simplification of context-free grammars (Contd.)	CO2
L18	Two important Normal Forms: CNF and GNF	CO2
T6	Tutorial on Normal forms	CO2
L19	Pushdown Automata (PDA), NPDA	CO3
L20	Pushdown Automata and CFL	CO3
L21	Deterministic Pushdown Automata (DPDA) and Deterministic Context-Free Languages	CO3
T7	Tutorial on NPDA and CFL	CO3
L22	Two Pumping Lemmas	CO3
L23	Properties of context-free languages	CO3
L24	Closure Properties and Decision Algorithms for Context-Free Languages	CO3
T8	Tutorial on TM	CO3
L25	Minor Variation on the Turing machine	CO4
L26	Turing Machine with more Complex Storage, NTM	CO4
L27	A Universal Turing Machine, Linear Bounded Automata (LBA)	CO4
T9	Tutorial on LBA	CO4
L28	Minor Variation on the Turing machine	CO4
L29	Turing Machine with more Complex Storage, NTM	CO4

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L30	A Universal Turing Machine, Linear Bounded Automata (LBA)	CO4
T10	Tutorial on LBA	CO4
L31	Recursive and Recursively Enumerable Languages, Unrestricted Grammars	CO5
L32	Context Sensitive grammars and Languages The Chomsky Hierarchy, Some Problems that cannot be Solved By Turing Machines	CO5
L33	The Chomsky Hierarchy, Some Problems that cannot be Solved By Turing Machines	CO5
T11	Tutorial on Unrestricted Grammars and Context Sensitive grammars	CO5
L34	Undecidable Problems for recursively Enumerable Languages	CO5
L35	The Post Correspondence Problem (PCP)	CO5
L36	Undecidable Problems for Context-Free Languages	CO5
T12	Tutorial on undecidable problems	CO5
L/T		

References:

1.	eter Linz, "An Introduction To Formal Languages and Automata", Fifth Edition, Jones & Bartlett Learning, 2011
2.	John C Martin, "Introduction to Languages and the Theory of Computation", McGraw Hill,India, Third Edition, 2007
3.	J E Hopcroft, Rajeev Motwani & Jeffrey D Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson Education, 3rd Edn. 2006
4.	K.L.P. Mishra, N.Chandrashekharan "Theory of Computer Science", PHI publications, 3rd Edn., 2007
5.	Michael Sipser, "Theory of Computation", Cengage Learning, 2007
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Submitted by: GIRIDHAR N S

(Signature of the faculty)

Date: 12-01-2019

Approved by: DR ASHALATHA NAYAK

(Signature of HOD)

Date: 12-01-2019

FACULTY MEMBERS TEACHING THE COURSE (IF MULTIPLE SECTIONS EXIST):

FACULTY	SECTION	FACULTY	SECTION
Govardhan Hegde.	A		
Praveen Pai	B		
Giridhar N S	C		
Shanthi P.B	D		

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