Lesson Plan

	DPG Institute of Technology and Management **Sector 34, Gurugram HR 122004**
	Lesson Plan
	Course Name: Formal Languages & Automata
	Faculty Name: Ms. Bhawna kumari

No. of Lecture Hours/Week	**3**	**Exam Hours**	**3**
Total No. of Lecture Hours	**33**	**Exam Marks**	**75**
Course Code	**PCC-CSE-305G**		

Objectives of the course:

The objective of this course is to develop methods by which computer scientists can describe and analyze the dynamic behavior of discrete systems, in which signals are sampled periodically.

1. To understand basic concepts of formal languages and automata theory and to study the types of Automata i.e. NFA, DFA, NFA with ϵ-transition and their interconversion methods and importance.
2. To Study formal languages of different kinds, such as regular and context-free languages. Understand the concept of grammar and its types. Removal of ambiguity and reduced form and Normal forms of grammar.
3. To develop the concepts and design of higher-level automata to accept the language not accepted by finite automata such as PDA &Turing machine.
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Detailed Lesson Plan

Lecture No.	Topics to be ~~covered~~	Mode of Delivery	Teaching Methodology/ Pedagogy	Remark/CO
UNIT-1				
1	Set Introduction	Physical Mode	Lecture with interaction	CO1
2	Alphabet, Languages and Grammars basics	Physical Mode	Lecture with Interaction	CO1
3	Production & Derivation	Physical Mode	Lecture with Interaction.	CO1
4	Deterministic and Non deterministic finite automata	Physical Mode	Lecture with Interaction	CO1
5	Equivalence of DFA & NDFA	Flipped Classroom	Lecture with Interaction	CO1
6	Conversion of NFA to DFA	Blended learning	Lecture with Interaction	CO1
7	Minimization of finite automata	Blended learning	Lecture with Interaction	CO1
8	Mealy & Moore machines	Blended learning	Lecture with Interaction	CO1
9	Equivalence of Mealy & Moore machines	Physical Mode	Lecture with Interaction	CO1

10	Properties & limitations of Finite automata	Physical Mode	Lecture with Interaction	CO1
11	Finite automata with null moves , Acceptability of string by finite automata	Physical Mode	Lecture with Interaction	CO1
UNIT-2				
12	Arden's theorem(state , proof , questions)	Blended learning	Lecture with Interaction	CO2
13	Regular Expressions basics , Regular expression conversion to finite automata and vice versa	Blended learning	Lecture with Interaction	CO2
14	Pumping lemma	Physical Mode	Lecture with Interaction	CO2
UNIT-3				
15	Chomsky hierarchy of languages , relation between different types of grammars	Physical Mode	Lecture with Interaction	CO3
16	Derivation & parse tree	Physical Mode	Lecture with Interaction	CO3
17	Ambiguity in regular grammar and their removal	Blended learning	Lecture with Interaction	CO3
18	Reduced forms: removal of useless symbols, null and	Physical Mode	Lecture with Interaction	CO3
19	Reduced forms: removal of useless symbols, null and	Physical Mode	Lecture with Interaction	CO3
20	Normal forms: CNF(Chomsky normal form)	Flipped Classroom	Lecture with Interaction	CO3
21	Normal forms: CNF(Chomsky normal	Physical Mode	Lecture with Interaction	CO3
22	Pushdown Automata	Physical Mode	Lecture with Interaction	CO3
23	Pushdown Automata	Physical Mode	Lecture with Interaction	CO3
24	Pushdown Automata	Physical Mode	Lecture with Interaction	CO3
UNIT-4				
25	Turing Machine (basic model, Deterministic Turing machine and	Physical Mode	Lecture with interaction	CO4
26	Turing machines equivalence	Blended learning	Lecture with interaction	CO4
27	Variants of Turing Machines	Blended learning	Lecture with Interaction	CO4
28	Halting problem of Turing machines	Physical Mode	Lecture with Interaction	CO4
29	PCP problem of Turing machines	Physical Mode	Lecture with Interaction	CO4
30	Linear Bounded Automata	Physical Mode	Lecture with Interaction	CO4
31	Pushdown Automata	Physical Mode	Lecture with Interaction	CO4
32	Undecidability Introduction, Rice's theorem	Blended learning	Lecture with Interaction	CO4

33	Church Turing thesis , universal Turing machine	Physical Mode	Lecture with Interaction	CO4
34	Revision	Physical Mode	Lecture with Interaction	CO4
35	Revision	Physical Mode	Lecture with Interaction	CO4
36	Revision	Physical Mode	Lecture with Interaction	CO4

Course Faculty: Ms. Bhawna Kumari **Signature:**	**HOD: Dr. Sarika Chaudhary** **Signature:**

Suggested books:

1. Introduction to Automata Theory, Languages, and Computation, 3nd Edition, John E. Hopcroft Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
2. Introduction to the Theory of Computation, Michael Sipser, 3rd edition, Cengage Learning.

Suggested reference books:

1. K. L. P Mishra, N. Chandrashekaran (2003), Theory of Computer Science-Automata Languages and Computation, 2nd edition, Prentice Hall of India, India.
2. Raymond Greenlaw, H. James Hoover, Fundamentals of the Theory of Computation, Principles and Practice, Morgan Kaufmann, 1998.
3. John C. Martin: Introduction to Languages and Automata Theory, 3rd edition, Tata Mcgraw- . Hill, 2007

Course Outcomes:

1. To use basic concepts of formal languages of finite automata techniques.
2. To Design Finite Automata's for different Regular Expressions and Language .
3. To Construct context free grammar for various languages.
4. To solve various problems of applying normal form techniques, push down automata and Turing Machines.