**UE19CS205**

**Automata Formal Language And Logic**

**Course Information**

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| **Hours** | **Unit** | **Topic** | **Chapter & Section** | **% Coverage** | |
| **Unit** | **Total** |
| 1 | 1 | Mathematical Preliminaries | T1-1.1 | 18 | 18 |
| 2 | Basic Notations | T1-1.2 |
| 3 | Deterministic Finite Acceptors | T1-2.1 |
| 4 |
| 5 |
| 6 |
| 7 | Non -Deterministic Finite Acceptors, 𝛌-NFA | T1-2.2 |
| 8 | Equivalence of Deterministic and Non-deterministic Finite Acceptors | T1-2.3 |
| 9 | Reduction of the number of states in Finite Automata(Minimization of DFA) | T1-2.4 |
| 10 |
| 11 | 2 | Regular Expressions | T1-3.1 | 18 | 36 |
| 12 |
| 13 | Connection between Regular Expressions Regular Languages | T1-3.2 |
| 14 |
| 15 | Regular Grammars | T1-3.3 |
| 16 |
| 17 | Properties of Regular Languages | T1-4.1, 4.2 |
| 18 | Pumping Lemma and identifying Non–Regular Languages | T1-4.3 |
| 19 |
| 20 |
| 21 | 3 | Context Free Grammars | T1-5.1 | 21.3 | 57.3 |
| 22 |
| 23 | Parsing and Ambiguity | T1-5.2 |
| 24 | Formal Definitions of Pushdown Automata | T1-7.1 |
| 25 | Deterministic Pushdown Automata | T1-7.3 |
| 26 |
| 27 | Non Deterministic Pushdown Automata | T1-7.1 |
| 28 |
| 29 | Methods for Transforming Grammars | T1-6.1 |
| 30 | Two important Normal Forms | T1-6.2 |
| 31 | A Membership Algorithm for Context–Free Languages | T1-6.3 |
| 32 | Pushdown down Automata and Context Free Languages | T1-7.2 |
| 33 | 4 | Properties of Context–Free Languages | T1-8.2 | 21.3 | 78.6 |
| 34 | Pumping Lemma for Context–Free Languages | T1-8.1 |
| 35 | The Standard Turing Machine | T1-9.1 |
| 36 |
| 37 | Combining Turing Machine for Complicated Tasks | T1-9.2 |
| 38 | Turing Thesis | T1-9.3 |
| 39 | Recursive and Recursively Enumerable Languages | T1-11.1 |
| 40 | Context Sensitive Grammar and Languages | T1-11.3 |
| 41 | The Chomsky Hierarchy | T1-11.4 |
| 42 | Some Problems that Cannot be solved by Turing Machine, PCP | T1-12.1, 12.3 |
| 43 |
| 44 | Undecidable Problems for Recursively Enumerable Languages | T2-12.2 |
| 45 | 5 | Propositional Logic : A very simple logic | T2-7.4 | 21.4 | 100 |
| 46 | Syntax | T2-7.4.1 |
| 47 | Semantics | T2-7.4.2 |
| 48 | A simple knowledge Base | T2-7.4.3 |
| 49 | A simple Inference procedure | T2-7.4.4 |
| 50 | Inferences and Proofs | T2-7.5.1 |
| 51 |
| 52 | Proof by resolution | T2-7.5.2 |
| 53 | First Order Logic : Syntax and Semantics of First order logic | T2-8.2 |
| 54 |
| 55 | Numbers, Sets and Lists | T2-8.3.3 |
| 56 | Example - The electronic circuit Domain | T2-8.4.2 |

**Text Book(s):**

1. “An Introduction to Formal Languages and Automata”, Peter Linz, Jones and Bartlett, New Delhi, India, 5th Edition, 2011.
2. Artificial Intelligence – A Modern Approach”, Stuart Russell and Peter Norvig, Pearson, 3rd Edition (Paperback),2016

**References:**

1. “Theory of Computation”, Michael Sipser, Cengage Learning, New Delhi, India, 2008.
2. “Introduction to Automata Theory, Languages, and Computation”, John E Hopcroft, Rajeev Motwani, Jeffrey D Ullman, Pearson Education, New Delhi, India, 3rd Edition, 2009.
3. “Theory of Computation: A Problem–Solving Approach”, Kavi Mahesh, Wiley India, New Delhi, 2012.