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| **Course Description** | |
| **Course weighted** | Assignments 10%  Quizzes 10%  Mid-1 15%  Mid-2 15%  Final 50% |
| **Reference books** | **John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, 2/E, Addison-Wesley 2001. ISBN 0-201-44124-1.** |
| **Reference Material** | 1. **Daniel I. A. Cohen, Introduction to Computer Theory 2/E,**   **John Wiley & Sons, Inc 1997. ISBN 0-471-13772-3**   1. Mathematical Foundations of Programming Frank S. Beckman 2. Mathematical Theory of Computation Zohar Manna   Computation: Finite and Infinite Machines Marvin L. Minsky |
| **Topics Coverage:** | **Introduction to Automata and formal Languages**  **Review of proof techniques**  Chap: 1, 2.1  Introduction to decidability and un-decidability  Recursive Functions and Recursive Definitions  **Finite Automata and Regular Language**  **Deterministic/Non Deterministic**  Chap: 2.2 – 2.3  **Equivalence (NFA to DFA)**  **Epsilon NFA (eNFA to DFA)**  Chap: 2.4 – 2.5  MID - 1 |
|  | **Regular Expressions & Languages**  **Regular expressions**  **Finite Automata and Regular Expressions**  Chap 3.1 – 3.4  **Properties of Regular Languages**  **Algorithms for Regular Languages**  **Pumping Lemma for Regular Languages**  Chap: 4.1 – 4.4  **Context-free Languages (CFL)**  **Context-free grammars (CFG)**  Chp: 5.1 – 5.3  **Parse Trees**  **Derivations and ambiguity**  **Elimination of ambiguity**  Chp: 5.4  MID - 2 |
|  | **Push down automata (PDA)**  **PDA/CFG Equivalence**  **Deterministic PDA’s**  Chp: 6.1 – 6.4  **Properties of Context-free Languages**  **Chomsky-normal-form grammars**  **Pumping Lemma (Optional)**  **Introduction to Lexical Analysis and Parser (Optional)**  **Closure Properties**  **Algorithms for CFL’s**  Chp: 7.1 – 7.4  **Turing Machines**  **Introduction and Formalities**  Chp: 8.1 – 8.3  Designing Turing Machine for real problems.  **Turing Machine as Acceptors/Transducers**  **Turing Machine Variations**  Chp: 8.4 – 8.5  **Decidability**  **Recursive & recursively enumerable languages**  **Chomsky Hirearchy**  **Some real un-decidable problems (Halting problem, Diagnolization)**  Chp: 9.1 – 9.2, 9.3 – 9.5  FINAL Exam |