

| Week    |                              | Content   | Reading                              | HW Assigned                        | PA Assigned                        |
|---------|------------------------------|---|--------------------------------------|------------------------------------|------------------------------------|
| week 1  | Tuesday, September 5, 2023   | Course policies, introduction to Th. Of Comp.<br><i>First look at Finite State Automata (FSA)</i>               | Chapter 0                            |                                    |                                    |
|         | Thursday, September 7, 2023  | Terminology and formal definition of FSAs<br>state diagrams, regular languages (RL)<br><i>operations on RLs</i> | Chapter 1.1                          | PS1 Out<br>Due Fri, 09/22, 11:59pm |                                    |
| week 2  | Tuesday, September 12, 2023  | Closure of RLs under operations of union<br>and intersection,<br>the product machine                            | Chapter 1.1                          |                                    |                                    |
|         | Thursday, September 14, 2023 | Non-deterministic Finite Automata,<br>closure under concatenation & Kleene star                                 | Chapter 1.2                          |                                    | PA1 Out<br>Thu, 10/12, 11:59pm     |
| week 3  | Tuesday, September 19, 2023  | Other regular operations<br>Equivalence of NFAs and DFAs,<br>Subset Construction                                | Chapter 1.2                          |                                    |                                    |
|         | Thursday, September 21, 2023 | NFAs whose DFAs have exponential size,<br>Regular Expressions,<br>Conversion from REs to NFAs/DFAs              | Chapter 1.3                          | PS2 Out<br>Due Fri, 10/06, 11:59pm |                                    |
| week 4  | Tuesday, September 26, 2023  | RE to DFA conversion Example<br>GNFAs and conversion from DFAs $\Rightarrow$ REs                                | Chapter 1.3                          |                                    |                                    |
|         | Thursday, September 28, 2023 | Distinguishable & equivalent states in a DFA,<br>Distinguishability Lemma, the Quotient<br>automaton            | Hopcroft, et al. 4.4                 |                                    |                                    |
| week 5  | Tuesday, October 3, 2023     | State minimization algorithm for DFAs,<br>the Pumping Lemma for regular languages                               | Hopcroft, et al. 4.4.3<br>Sipser 1.4 |                                    |                                    |
|         | Thursday, October 5, 2023    | Examples of non-regular languages, using the<br>the Pumping Lemma to prove non-regularity                       | Chapter 1.4                          | PS3 Out<br>Due Fri, 10/20, 11:59pm |                                    |
| week 6  | Tuesday, October 10, 2023    | Monday Schedule/No class  |                                      |                                    |                                    |
|         | Thursday, October 12, 2023   | Context Free Grammars   | Chapter 2.1                          |                                    |                                    |
| week 7  | Tuesday, October 17, 2023    | Parse Trees, CFG ambiguity<br>converting DFAs to CFGs   | Chapter 2.1                          |                                    | PA2 Out<br>Due Tue, 11/14, 11:59pm |
|         | Thursday, October 19, 2023   | Review  |                                      | PS4 Out<br>Due Fri, 11/03, 11:59pm |                                    |
| week 8  | Tuesday, October 24, 2023    | MIDTERM EXAM  |                                      |                                    |                                    |
|         | Thursday, October 26, 2023   | CFL Closure Properties, Chomsky's normal<br>form  | Chapter 2.1                          |                                    |                                    |
| week 9  | Tuesday, October 31, 2023    | Pushdown Automata   | Chapter 2.2                          |                                    |                                    |
|         | Thursday, November 2, 2023   | Equivalence of CFGs and NPDAs<br>CFL Pumping Lemma  | Chapter 2.2, 2.3                     | PS5 Out<br>Due Fri, 11/17, 11:59pm |                                    |
| week 10 | Tuesday, November 7, 2023    | CFL Pumping Lemma Examples & Proof  | Chapter 2.3                          |                                    |                                    |
|         | Thursday, November 9, 2023   | Turing Machines   | Chapter 3.1                          |                                    |                                    |
| week 11 | Tuesday, November 14, 2023   | Equivalence of Multi-tape, Nondeterministic<br>and<br>Single-Tape Machines                                      | Chapter 3.2                          |                                    | PA3 Out<br>Due Thu, 12/05, 11:59pm |
|         | Thursday, November 16, 2023  | Decidable Languages, Enumerators  | Chapter 4.1                          | PS6 Out<br>Due Fri, 11/28, 11:59pm |                                    |
| week 12 | Tuesday, November 21, 2023   | Undecidable & Unrecognizable Languages  | Chapter 4.2                          |                                    |                                    |
|         | Thursday, November 23, 2023  | Thanksgiving!   |                                      |                                    |                                    |
| week 13 | Tuesday, November 28, 2023   | Reductions and Examples of Undecidable<br>Languages   | Chapter 5.1                          | PS7 Out<br>Due Thu, 12/09, 11:59pm |                                    |
|         | Thursday, November 30, 2023  | The Class of Polynomial Languages   | Chapter 7.1, 7.2                     |                                    |                                    |
| week 14 | Tuesday, December 5, 2023    | The Class NP  | Chapter 7.3                          |                                    |                                    |
|         | Thursday, December 7, 2023   | Polynomial Reductions, NP Complete Problems   | Chapter 7.4                          |                                    |                                    |
| week 15 | Tuesday, December 12, 2023   | Examples of NP Complete Problems  | Chapter 7.4, 7.5                     |                                    |                                    |
|         | Thursday, December 14, 2023  | FINAL EXAM  |                                      |                                    |                                    |