**CENG213 Theory of Computation**

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**Teaching Assistants:**

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**References:**

**Textbook:**

Lewis, Harry R., Papadimitriou, Christos H.;1998; Elements of the Theory of Computation"; 2nd Ed.; Upper Saddle River, NJ: Prentice-Hall ISBN 013-262478-8.

**Other References:**

Cohen, Daniel I.A.;1997; "Introduction to Computer Theory"; 2nd Ed.; John Wiley & Sons, Inc. ISBN 047-113772-3.

Hopcroft, J. E., R. Motwani and J. D. Ullman (2006). Introduction to Automata Theory, Languages, and Computation (3rd Edition), Addison-Wesley Longman Publishing Co., Inc.

Linz, Peter;2001; "An Introduction to Formal Languages and Automata"; 4th Ed.; Jones and Bartlett Publishers, Inc. ISBN 076-373798-4.

Rich, Elaine;2008; "Automata, Computability, and Complexity Theory and Applications"; Upper Saddle River, NJ: Prentice-Hall ISBN 013-228806-0.

**Course Learning Outcomes:**

1 Classify given language definitions.

2 Analyze problems & devise appropriate representations.

3 Demonstrate the ability to abstract.

4 Identify some hard problems of computer science.

**Weekly Schedule**

Week Topic

1 Chapter 1 - Background from Introduction to Computer Theory by Cohen, D. I. A. (1996)

2 Sets, Relations, and Languages from Elements of the Theory of Computation by Lewis, H. R. and C. H. Papadimitriou (1997)

3 Sets, Relations, and Languages from Elements of the Theory of Computation by Lewis, H. R. and C. H. Papadimitriou (1997)

4 Deterministic Finite Automata

5 Nondeterministic Finite Automata

6 NFA to DFA conversion, DFA to regular expression conversion algorithms

7 Myhill-Nerode Theorem, State Minimization

8 Context-free Grammars

9 Midterm

10 Pushdown Automata, Chomsky Normal Form-Dynamic Programming Algorithm to decide whether a given string belongs to a Context-free Language

11 Deterministic Turing Machines

12 Recursive and Recursively Enumerable Languages

13 Nondeterministic and Universal Turing Machines

14 Traveling Salesman Problem, Reachability, Eulerian and Hamiltonian Cycles

**Grading Policy**

Midterm, 35%

Assignments, 30%

Final, 35%