CENG213 Theory of Computation

Asst. Prof. Dr. Selma Tekir, selmatekir@iyte.edu.tr

Teaching Assistants:

Samet Tenekeci, samettenekeci@iyte.edu.tr

Burak Topçu, buraktopcu@iyte.edu.tr

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%