CS4124 Theory of Computation MWF 10:10–11:00 McBryde 307 CRN 15104

Instructor: L. T. Watson, 630 McBryde, 231-7540, `ltw@cs.vt.edu`
Office Hours: 11:00–12:00 MWF, and by appointment.

Prerequisites: Math 3134 or Math 3034.

Text: J. E. Savage, *Models of Computation*, Addison-Wesley, 1998.

Topics Covered: Logic circuits, Boolean function normal forms, prefix computations, arithmetic, circuit complexity, finite-state machines, random-access machines, Turing machines, simulation, pushdown automata, regular and context-free languages, models of computability, reducibility and unsolvability, recursive function theory, parallel computation, space-time tradeoffs.

Grading: FINAL GRADE will be the average of two in-class exams (50%), a final examination (25%), and homework and class participation (25%). All questions regarding grades must be raised within three days of the date the assignment is returned.

Final Exam: 07:45–9:45am Monday, May 6, 2002.

References:

Clark and Cowell, *Programs, Machines, and Computation*, McGraw Hill, 1976.

D. I. A. Cohen, *Introduction to Computer Theory*, 2nd Ed., Wiley, 1997.

Davis, Sigal, and Weyuker, *Computability, Complexity, and Languages*, 2nd Ed., Academic Press, 1994.

Denning, Dennis, Qualitz, *Machines, Languages, and Computation*, Prentice-Hall, 1978.

Gill, *Introduction to the Theory of Finite State Machines*, McGraw-Hill, 1962.

Hopcroft, Ullman, *Introduction to Automata Theory, Languages, and Computation*, Addison-Wesley, 1979.

Kain, *Automata Theory, Machines, and Languages*, McGraw-Hill, 1972.

Kfoury, Moll, Arbib, *A Programming Approach to Computability*, Springer-Verlag, 1982.

Manna, *Mathematical Theory of Computation*, McGraw-Hill, 1974.

McNaughton, *Elementary Computability, Formal Languages, and Automata*, Prentice Hall, 1982.

Minsky, *Computation: Finite and Infinite Machines*, Prentice-Hall, 1967.

B. M. Moret, *The Theory of Computation*, Addison-Wesley, 1998.

Rogers, *Theory of Recursive Functions and Effective Computability*, McGraw-Hill, 1967.

R. G. Taylor, *Models and Computation and Formal Languages*, Oxford, 1998.

Homework Assignments

All problems are from the text unless otherwise indicated.

Due 1/18/02: 1.3, 1.5, 1.10, 1.13.

Due 1/25/02: 1.14, 1.18, 1.19, 1.21.

Due 2/1/02: 2.3, 2.5, 2.8, 2.9.

Due 2/8/02: 2.11, 2.12, 2.13.

Due 2/22/02: 2.17, 2.18, 2.20, 2.26.

Due 3/15/02: 3.4, 3.7, 3.17, 3.20.

Due 3/29/02: 3.23, 3.30, 3.34.

Due 4/5/02: 4.5, 4.9, 4.17, 4.18.

Due 4/12/02: 4.22, 4.25, 4.32, 4.47.

Due 4/29/02: 5.13, 5.17, 5.18, 5.24.