Course Syllabus

CS 4511: Automata Theory and Formal Languages
Department of Computer Science
University of Minnesota, Duluth
Fall, 2003

Course web page: http://www.d.umn.edu/~hudson/4511

Instructor: Hudson Turner
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Office Hours: T: 11:30 to 12:30
W: 3:30 to 4:30
and by appointment

This course introduces elements of the theory of computation, an active research area involving
the formulation of precise questions and answers concerning what is computable, by what means,
in what amount of space and time. Remarkably, such work does not depend essentially on any
particular digital technology or programming language. Instead, computations are expressed and
studied as mathematical objects.

In this spirit, the course emphasizes standard methods for expressing and establishing mathematically
precise claims. We introduce many well-known, widely-studied definitions and carefully
consider what follows from them.

(A more complete description of the anticipated course outcomes and their relationship to
desired Computer Science BS degree program outcomes is available at:
http://www.d.umn.edu/cs/asse/outc/CS4511.pdf.)

PREREQUISITES
The prerequisites for this course are CS 1521 and Math 3355 (or instructor consent).

REQUIRED TEXT

John C. Martin, Introduction to Languages and the Theory of Computation, 3rd Ed. McGraw-

We will cover Part I (Math Notation and Techniques), the basic material in Parts II (Regular
Languages and Finite Automata) and III (Context-Free Languages and Pushdown Automata).
If time permits, we will also study some of Parts IV (Turing Machines and Their Languages)
and V (Unsolvable Problems and Computable Functions).

GRADING

Grades will be based on percentage of total points.

<table>
<thead>
<tr>
<th>Point Distribution</th>
<th>Grading Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pop quizzes</td>
<td>90% guarantees at least an A-</td>
</tr>
<tr>
<td>Exam 1</td>
<td>80% guarantees at least a B-</td>
</tr>
<tr>
<td>Exam 2</td>
<td>70% guarantees at least a C-</td>
</tr>
<tr>
<td>Exam 3</td>
<td>60% guarantees at least a D</td>
</tr>
<tr>
<td>Final Exam</td>
<td>50%</td>
</tr>
<tr>
<td>Homework</td>
<td>250 points</td>
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The pop quizzes are short (15-20 minutes) unannounced quizzes, at most one per class period.
Each will be worth 5 points total. There will be no pop quiz makeup for any reason. (If you
miss a pop quiz, your score for that quiz is 0.) For each student, the lowest three pop quiz scores
will be dropped.

The cutoff percentages in the grading scale will not be raised. In fact, every time I have taught
the course they have been lowered considerably, and I believe that is likely again this semester.
FINIAL EXAM TIME
Friday, December 19, 8:00-9:55.

INCOMPLETES
The grade of “I” can be given only when (a) the student has performed satisfactorily during a substantial portion of the semester, and (b) the student is unable to finish the semester for reasons beyond his or her control. Students will not be assigned an incomplete solely for the purpose of avoiding a poor grade.

STUDENT RESPONSIBILITIES
You are responsible for what goes on in class:

- lecture material,
- active participation in discussion,
- obtaining assignments and handouts,
- turning in homework,
- exams and pop quizzes.

All homework assignments are due at the beginning of class on the due date.

If you are unable to attend a class meeting, it is your responsibility to obtain class notes, assignments, and extra copies of handouts from your study partners or other students; you may turn homework assignments in early or your study partners may turn them in for you on time.

If you miss a pop quiz, your score for that quiz will be 0. (There will be no makeup for pop quizzes, but the lowest three pop quiz scores of each student will be dropped.)

If, due to extremely unusual circumstances, you are unable to take an exam at the scheduled time, the exam may be rescheduled for a later time, but it is your responsibility to arrange this with the instructor at least 24 hours in advance of the scheduled exam time.

ABOUT HOMEWORK

1. Homework assignments will be collected at the beginning of class on the due date. Late assignments will not be accepted.

2. Assignments should be your own work. You may discuss the meaning of the problems and general problem-solving strategies with your classmates, but the actual solutions you turn in should be your own.

3. If you are unable to complete a homework problem, say so. Try to describe what you understand of the problem, and in what way your solution is incomplete. A sincere effort of this kind has the potential to earn more credit than a complete, but incorrect, solution.

4. Many of the homework problems are challenging, and there is an excellent chance you will not be able to complete them all. Don't worry too much about this. After all, the homework assignments make up a rather small portion of the overall grade. But I strongly recommend that you take time and spend the effort to think hard about them. It can also be very helpful to talk to me about them, after you've given them some thought! (Questions via email are welcome; in fact, that is sometimes more effective than face-to-face discussion of challenging problems.)

5. I will make available example solutions of all homework problems after they are handed in. You can learn a lot by thinking about these solutions and noticing how they differ from your own. I hope you'll take advantage of this to deepen your understanding.
MORE ABOUT HOMEWORK

Homework Suggestions
1. Start early enough so you'll have time to ask questions of me if you don't understand something.
2. Read the assignment carefully.
3. If there is anything you do not understand about the assignment, ask questions!!
4. Make more than one draft of your work.
5. I repeat: Start early. Some problems will be routine, but many will require time to think, and possibly several attempts to solve them. (Such effort typically pays off on the exams, of course.)

Homework Formatting Guidelines
1. The first page of your homework must have your name, class, teacher, assignment number, and date at the top.
2. All pages of your homework must be on 8.5 by 11 inch paper.
3. Write on one side of each page only.
4. Use generous margins.
5. Do not cramp your work; use double spacing if necessary.
6. The items required must be numbered, labeled, and in numerical order.
7. Paper torn from a spiral binder is unacceptable.
8. Do not write in red ink or red pencil. Pencil is fine if it shows up well and erasures are invisible. Pen is fine if there are no scribbled out parts or splotches. Recopy your work if necessary.
9. All pages must be numbered sequentially in the upper right corner.
10. All pages must be stapled together in the upper left corner or bound neatly in a binder.
11. Homework is due at the beginning of class on the due date. All work must be compiled before coming to class, including collating and stapling. Your instructor will not provide a stapler.
12. You will be graded on style—neatness, clarity, organization, conciseness, etc.—as well as correctness.
13. State any additional assumptions that you make.
14. Use correct English (including spelling) and mathematical notation.
15. Use clearly labeled diagrams where appropriate.

DIVERSITY and SPECIAL NEEDS

• Equal Opportunity. As instructor I shall make every attempt to treat all students equally, without regard to race, religion, color, sex, handicap, age, veteran status, or sexual orientation. I encourage you to talk to me about your concerns of equal opportunity in the classroom. To inquire further about the University’s policy on equal opportunity, contact the Office of Equal Opportunity, 255 DAdB, phone 6827.

• Students With Disabilities. If you have any disability (either permanent or temporary) that might affect your ability to perform in this class, please inform me at the start of the quarter. I may adapt methods, materials, or testing so that you can participate equitably. To learn about the services that UMD provides to students with disabilities, contact the Access Center, 138 Library, phone 8217.