CS 4384.501
Automata Theory
Spring 2006
CRN 10582

Instructor: Nancy Van Ness
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Time and Location: MW 5:30 p.m. - 6:45 p.m., ECS 2.305

Office Hours:

Mon/Wed	7:00 –8:00 PM	in ECS 4.706
Tues	9:30. –10:30 a.m.	in ECS 4.706
Mon/Wed	10 am - 1 PM	in advising office
	or	by appointment

Textbook: *Introduction to the Theory of Computation* , *2nd ed.*, Michael Sipser.
JFLAP, a graphics package developed by Susan Rogers at Duke University used to simulate finite state machines. Go to http://www.jflap.org and down load the most recent version for your computer. You will find it useful in testing your machines. You must have at least Java 1.4 (including the run-time environment) on your machine. Java can be downloaded from the link provided to Sun's Java page found on the link "How to run JFLAP" if you do not already have the appropriate version.

Material: Selected material from Chapters 1, 2, 3, and 4

This course covers a large amount of material and is quite fast paced. Homework will be assigned approximately weekly. Check WebCT for any changes in the assignment. Hints and answers for the homework are available there as well.

Grading: The grade in this course will consist of two mid terms, a final, quizzes and homework assignments. These will be weighted as follows:

Assignments	10%	see current assignment sheet
Midterm 1	20%	Wednesday, February 1
Mid term 2	20%.	Monday, March 20
Quizzes	20%	See current assignment sheet
Final	30%	
	Wednesday, April 26	
	5:00 p.m.	

Grading Policies: As the number of quizzes and homework assignments is large, 1/3 of these will be dropped. Plan accordingly as late homework is not accepted (once answers have been posted) and no makeups are given for the missed quizzes.

ABET

ABET was established in New York in 1932 as the Engineers Council for Professional Development (ECPD). As a result of surveys conducted by professional engineering societies in the 1920s, ECPD was formed to fill the apparent need for a "joint program for upbuilding engineering as a profession." Hence, ECPD originally focused on the following

Guidance - Supplying information to engineering students and potential students.
Training - Developing plans for personal and professional development.
Education - Appraising engineering curricula and maintaining a list of accredited curricula.
Recognition - Developing methods whereby individuals could achieve recognition by the profession and the general public.

In 1980, ECPD was renamed the **A**ccreditation **B**oard for **E**ngineering and **T**echnology (**ABET**) in order to reflect more accurately its emphasis on accreditation, and it continues to put most of its emphasis on accreditation today. Now active in two additional areas, applied science and computing, **ABET** accredits some 2,700 programs at over 550 colleges and universities nationwide. Each year, over 1,500 volunteers from its now 30 member societies actively contribute to **ABET**'s goals of leadership and quality assurance in applied science, computing, engineering, and technology education, serving as program evaluators, committee members, commissioners, and Board representatives. (The preceding was taken from **ABET** 's web site history link. More information about **ABET** is available at its web site http://www.abet.org.)

UTD is actively pursuing accreditation by **ABET**. To this end each course must have a set of state objectives. The objectives for CS 4384 are as follows.

Ability to design finite state automata and regular expressions
Ability to convert among DFA, NFA, regular expressions
Ability to show that a language is not regular
Ability to design Push-Down Automata and Context-Free Grammars
Ability to convert PDAs to context free grammars and vice-versa
Ability to show a language is not context free.

These objectives will be measured by taking grades on one or more of the following designated problems from the homework, specific problems from the quizzes or specific problems from the exams, midterm 1, mid term 2 or the final. More than one measure may be taken for each objective. In addition a folder must be kept of three samples of all graded work, including exams and homework. The originals will be kept and a copy returned to the student.

Description of the Course

(Undergraduate catalogue) CS 4384 Automata Theory (3 semester hours) A review of the abstract notions encountered in machine computation. Topics include finite automata, regular expressions, PDAs, and context-free languages. Prerequisite: CS 3305. (3-0) S

Looking at the ABET objectives, we see that there are two major types of languages and machines.

1. **D**efinite and **N**ondeterministic **F**inite **A**utomata and regular languages, the class of languages associated with these machines (DFAs and NFAs). Here is where JFLAP will be of most use. Languages and machines will be designed. Characterization of regular languages will be developed.
2. **P**ush **D**own **A**utomata and **C**ontext **F**ree **L**anguages, the class of languages associated with these machines (PDAs and CFLs). Again characterization of Context free Languages will be developed.
3. If time permits, Turing Machines will also be discussed.

Homework will be assigned weekly as it is vital to complete understanding of the concepts. Each week there will be an in class "quiz" which will consist of problems related to the material covered that week. At this time the students may work in groups, use their notes and books or ask me questions, as some of the problems will be difficult and reflect the type of problems that will occur on exams. Approximately one third of the homework and one third of the quizzes will be dropped. Homework hints and answers will be posted on WebCT. After the answers have been posted, no homework can be accepted. Because one third of the quizzes are dropped, no makeups will be allowed. Exams will be closed book but students will be allowed to bring in two sheets of paper on which the students has prepared information. Four sheets will be allowed for the final. Seating during exams will be randomized and identification will be required. No programmable calculators will be allowed.

Additional material will covered if time permits including Turing Machines.

The student will be encouraged to understand structure and not memorization and mimicking of previously solved problems. Connections and similarities of concepts in different contexts and abstraction of structure will be stressed. Applying learned ideas in new situations will be emphasized. In the process, it is hoped that the student will begin to learn how to learn, a technique absolutely essential in the fast-changing technological world of today.

Cheating: Cheating will not be tolerated. Those suspected of cheating will be referred to the university's policy on Scholastic Dishonesty. The following is a statement taken from UTD's website regarding this.

All episodes of suspected scholastic dishonesty will be reported according to University policy. Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students and the University, policies on scholastic dishonesty will be strictly enforced. Penalties that may be assessed for scholastic dishonesty may be reviewed in Subchapter D. Penalties at http://www.utdallas.edu/student/slife/chapter49.html.

Cell phones:

Students are expected to treat other students with respect.

All cell phones should be turned off during class and will not be allowed during exams.