CS 5349.501 Spring 2005
CRN 14456

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Book : *Introduction to the theory of Computation* by Michael Sipser, PWS Publishing Company, ISBN 0 – 534 – 95651 – 3
Material: The material in this course is the "fundamental mathematical properties of computer hardware, software, and applications thereof " as stated in the introduction of the text. Underlying concepts are important. There are two main topics to be covered: finite automata (and regular languages) and context free languages (and push down automata). Turing machines will also be introduced. As this is a combined course, more will be expected from the graduate students. The assignments will be different as will be the exams.

IMPORTANT NOTICE:

Beginning August 1, 2004, all official student email from the UTD Office of the Registrar will be sent to the student's U.T. Dallas email address.

U.T. Dallas provides each student with a free email account that is to be used in all communication with university personnel. This allows the university to maintain a high degree of confidence in the identity of all individuals corresponding and the security of the transmitted information.

The Department of Information Resources at U.T. Dallas provides a method for students to forward email from other accounts to their U.T. Dallas address and have their U.T. Dallas mail sent on to other accounts.

Students may go to the following URL to establish or maintain their official U.T. Dallas computer account: http://netid.utdallas.edu.

The Chapters to be covered are as follows:

Chapter 1: Introduces regular languages and all of their forms. Deterministic and nondeterministc finite automata are introduced and shown to be equivalent. Finite state machines are discussed. Non-regular languages are shown to exist. In addition there will be a handout for minimization of finite automata. The Pumping lemma for regular languages is discussed at length.

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Chapter 2: Context free languages are discussed both as languages accepted by Pushdown Automata and generated by context free grammars. These are shown to be equivalent in describing context free languages. Languagges which are not context-free are shown to exist. A Pumping lemma for CLS is used.

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Chapter 3: The concept of Turing machines and many of equivalent descriptions are introduced. A state machine is drawn and then a higher level Turing Machine is developed. Hilbert's 10^{th} problem and the Church-Turing Thesis are discussed.

Chapter 4: Introduces the concept of languages being decidable and recognizable. Many languages developed previously are shown to be decidable as well as recognizable. It is shown that there are languages which are not decidable and are not even recognizable. Thus it is possible that a Turing Machine must exist that does not halt on all input.

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Schedule of topics covered: Chapter 1: 6 weeks; Chapter 2: 4 weeks; Chapters 3 and 4: 4 weeks.

Homework: There will be almost weekly homework due. It will count 10%. However, approximately 1/3 of this will be dropped. Plan wisely..

NO LATE HOMEWORK WILL BE ACCEPTED.
NO EXCEPTIONS.

Exam: There will be 2 Midterm Exams and a Final. Each Midterm will count 20%. The final will count 30%.

Quizzes: There will be weekly quizzes that will count 20%. Approximately 1/3 of these will be dropped and there will be no makeup quizzes because of the drops.

Important Dates:

First day classes	Monday, January 10
Graduation application deadline	Tuesday, January 18
Adding a Course (last day)	Friday, January14
Martin Luther King Day NO SCHOOL	Monday, January 17
Census Day (Last Day to drop without "W")	Wednesday January 26
Undergrad WP or WF begins	Monday February 14
Midterm #1	Wednesday, February 16
Incomplete removal deadline	Monday, March 7
Spring Break	March 7 – March 12
Undergrad last day to withdraw with WP/WF	Monday, March 14
Midterm #2	Wednesday, March 23
Last Day of Classes	Monday, April 25
Final Exam	**5 PM Wednesday April 27**

Students are expected to be courteous to all other students. Therefore it is requested that all cell phones be turned off during class.

CHEATING will not be tolerated. All students suspected of cheating will be subject to the University's code on cheating. Penalties may include a zero on the exam or an "F" in the course or other penalties may apply.

The Computer Science Department is in the process of being accredited by Accreditation Board for Engineering and Technology, Inc. or ABET (see: http://www.abet.org/)

About ABET

ABET, Inc., the recognized accreditor for college and university programs in applied science, computing, engineering, and technology, is a federation of 31 professional and technical societies representing these fields. Among the most respected accreditation organizations in the U.S., ABET has provided leadership and quality assurance in higher education for over 70 years. ABET currently accredits some 2,500 programs at over 550 colleges and universities nationwide. Over 1,500 dedicated volunteers participate annually in ABET activities. ABET also provides leadership internationally through agreements such as the Washington Accord, and offers educational credentials evaluation services to those educated abroad through ECEI. ABET is recognized by the Council on Higher Education Accreditation.

This means that all undergraduate courses have a list of objectives. At the moment, the following are listed as the objectives for this class.

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 that a language is not context free.