Course description

COT5310 – Theory of Automata and Formal Languages

General Information

- Place and times: 101 LOV, TR 09:30-10:45AM.
- Course URL: http://www.cs.fsu.edu/~burmeste/COT5310.html
- Instructor: Mike Burmester
- Office hours, location, phone: T 11pm-12noon; W 2:30-3:30pm; R 1:00-2:00pm; Love 214; 644-6410
- email: burmester@cs.fsu.edu

Prerequisites. COP 4020, COT4210.
You should be familiar with the definitions and use of finite automata, regular expressions, CFLs, CFG's and PDA's. You should also be familiar with the notation of predicate logic, and methods of mathematical definition and proof, in particular recursive definitions and proofs by mathematical induction.

If you do not remember this material well, I suggest you get a copy of the undergraduate textbook by Cohen, and read it for review, perhaps in parallel with the Hopcroft & Ullman text.

Textbook

- *Introduction to Automata Theory, Languages, and Computation*, by John E. Hopcroft and Jeffrey D. Ullman, 1979 (1st Edition).
- *Introduction to Automata Theory, Languages, and Computation*, by John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, 2000 (2nd Edition).

Objectives. The objective of this course is to learn to apply several formal models of computation, both to specific examples and to the proofs of general properties of the models. These models include finite automata, pushdown automata, Turing machines, linear bounded automata, regular expressions, regular grammars, context-free grammars, general phrase-structured grammars, context-sensitive grammars, and some variations on these models. Emphasis will be given to (1) computability and non-computability results, (2) the inter-relations of the various models of automata and languages, and (3) the application of formal and informal definition and proof techniques.

Plan. The following plan is based on the assumption that all students in the class have mastered and remember most of the content of COT4210—which roughly corresponds to the first seven chapters of the text, but with more emphasis on examples and facts and less emphasis on proofs. The plan may be revised during the term, if this assumption proves false.

We will start out with a rapid review of Chapters 2 through 6, at approximately one chapter per week. In class, we will cover the proofs of selected theorems and some examples. On your own, you will be expected to read the chapters, and do exercises. I will adjust the pace of this review, if necessary, based on feedback from the class. We will gradually slow down as we move into Chapters 7 (Turing Machines), 8 (Undecidability), and 9 (the Chomsky Hierarchy). Finally, we will cover Sections 1 through 5 of Chapter 13.

Assignments & Grading. The only way to learn this material thoroughly is to work through the details of proofs and applications, pencil and paper in hand, on your own. Therefore, graded homework will contribute 50% of the final grade. Treat graded homework assignments as take-home tests. Do the work yourself: no one else should look at your paper. Giving or accepting help on graded homework assignments is a violation of the student honor code.

Homework to be graded will be collected in class. The solution may be reviewed in the same class. You should be prepared to make oral presentations of your answers in class, as part of such a review. Solutions to some of the exercises in the texbook will be provided, in case you would like some additional practice.

There will also be two midterms and one final examination, contributing 10%, 10%, and 30% to the final grade, respectively.

The final grade may be raised for exceptional class participation or marked improvement over the term, or in cases where the formula above appears skewed by a few exceptionally low grades or work missed for verifiable excusable reasons.

Attendance. You are required to attend all class meetings. Attendance and participation both will have a strong indirect effect on your grade for the course, even though they will not be recorded. You are responsible for all information explained in class, some of which will not be available in written form. I will not feel obligated to repeat homework assignments, schedule changes, or other material presented in class. If you are forced to miss a class, it is your responsibility to get good class notes from a friend and check with me for handouts.

Communication. You are also encouraged to use e-mail to ask questions and report problems.
If you are experience difficulty or are concerned about your progress, please speak with me immediately.

Disabilities. Please notify the Department of Computer Science five working days prior to the event if a reasonable accommodation for a disability is needed. The Department's telephone numbers are 644-2296 (Voice), and 644-0058 (Fax). This syllabus and other class materials are available in alternative format upon request.

First Assignment. The first homework assignment is to read Chapters 1 through 3 of the text, and do as many of the exercises as you are able, for the learning experience. As soon as everyone in the class has a copy of the textbook I will start assigning exercises to be collected and graded.