

Syllabus of CSE 355 : Introduction to Theoretical Computer Science, Spring 2015

T Th 4:30 PM-5:45 PM Tempe - COOR L1-20

Instructor: Prof. Chitta Baral, chitta@asu.edu, Rm 572 BYENG, Office hrs: T Th 3:00 - 4:00 PM.

TA: Nguyen Vo, Nguyen.H.Vo@asu.edu, Th 2 – 3PM, F 4:30 – 5:30PM.

Arindam Mitra, amitra7@asu.edu, MW 9 -10 AM.

TAs will hold two recitations before each exams.

Credits: 3

Prerequisite: CSE 310

Objectives:

- Introduction to formal language theory and automata.
 - Proof Techniques (By contradiction, Induction, Diagonalization)
 - Regular Languages (DFA, NFA, RE, Pumping Lemma, Properties of RL)
 - Context Free Languages (CFG, PDA, Pumping Lemma, Properties of CFL)
- Turing Machines.
- Recursive function theory. Decidability / undecidability. (Halting Problem)
- Introduction to complexity theory. (P, NP, NP-Completeness)

Grading: Class quizzes count for 5%, homework assignments constitute 25%, and the remaining 70% will be based on the 3 tests and the final exam. The final exam will be optional and can replace one of the three tests. With that flexibility, there will not be any replacement for the test or the final exam. There will be 20-25 class quizzes given in the beginning of classes. Latecomers will not be given the quizzes. Some randomly chosen quizzes will be graded; others will count towards attendance. This class covers a lot of material and is very different from other CS classes. Thus students are suggested to come prepared by brushing up with the materials covered in the last classes. That will enable them to do well in the quizzes (which will be given in almost all classes) and understand the material discussed in the class.

Schedule:

- Test 1: 26th February 2015
- Spring Break: March 8-15
- Test 2: April 2nd 2015
- Test 3: Last day of Class (Thursday, April 30, 2015)
- Finals: Day of Finals (Thursday, May 7, 2014, 2:30 - 4:20 PM)

Main Text: "Introduction to automata theory, languages and computation", Hopcroft, Motwani and Ullman; 3rd ed, Addison Wesley Book website: <http://www-db.stanford.edu/~ullman/ialc.html> . We will cover 1.2-1.5, 2.2-2.5, 3.1-3.3, 4.1-4.4, 5.1-5.4, 6.1-6.4, 7.1-7.4, 8.1-8.2, 9.1-9.2, 10.1-10.3. Handouts will be given that supplement 1.2-1.4, 9.1-9.2 and 10.1-10.3.

Supplemental Reading:

- "Introduction to the Theory of Computation", Michael Sipser, 3rd edition.
- "Languages and Machines – An Introduction to the Theory of Computer Science", Thomas A. Sudkamp, Addison Wesley Longman, Incorporated, ISBN: 0201157683(hardcover).