Syllabus

Contents

CS 4-5723 Automata Theory

Spring 2020, Section 001, TR 12:30pm-1:45pm, CSM 212 (3 credits)

Instructor

Dr. Jeff Jenness

Office	CSM 132	**Office Hours**	TR 11:00am-12:00pm and MW 11:00pm-12:00pm
Phone	870-972-3978 ext. 8117	**Email**	jeffj@astate.edu

Course Description

CS 4-5723. Automata Theory

Study formal languages and equivalent models of computation, finite state automata and regular expressions, push down automata and context free grammars, pumping lemmas and closure properties, and turing machines. **Prerequisites: CS 3113**. Fall odd.

Program Specific Outcomes

- (Reinforced) Graduates of the B.S./B.A. Computer Science degree program attain the ability to apply knowledge of computing and mathematics appropriate to the discipline.
- (Reinforced) Graduates of the B.S./B.A. Computer Science degree program attain recognition of the need for and an ability to engage in continuing professional development.

Program Specific Outcomes

- (Reinforced) M.S. Computer Science graduate students should have a deeper understanding of the theory and application of algorithms, programming languages, and computer processes.

Course Objectives

The student will perform basic proofs in the foundations of computer science. The student will understand some of the theory behind regular languages and automata. The student will be able to construct grammars, automata and turing machines.

Course Outcomes

- Understand the basic principles behind mathematical induction
- Be able to construct basic proofs for sets and languages
- Understand the idea of deterministic and nondeterministic automata
- Construct simple machines and grammars for a variety of languages
- Prove properties for both regular and context-free languages
- Be able to construct turing machines for solving problems

Grading

Grades are assigned on a standard scale with the following weights:

Tests (3)	70%
Final	30%

Schedule

(subject to change)

Week	Topic	Reading	Assignment
1		Chapter 1: Introduction to finite state machines	
2		Chapter 1: Formal definitions, Proofs of closure of operations	
3		Chapter 1:.Nondeterminism, proof of equivalence	

4	Chapter 1: Regular Expressions, proof of equivalence
5	Chapter 1: Pumping Lemma and non-regular languages
6	Chapter 1: Applications of Pumping Lemma
7	Review and Test
8	Chapter 2: Context-free languages, grammars and ambiguity
9	Chapter 2: Nondeterministic Push-down Automata
10	Chapter 2: Equivalence of CFG's and PDA's
11	Chapter 2: Pumping Lemma and Non-context-free languages
12	Chapter 2: Deterministic Context-free languages
13	Review and Test
14	Review for Final

Dates to Remember

Assignments

Homework

Materials

Textbook

Introduction to the Theory of Computation, 3rd ed. (ISBN: 978-1133187790), by Michael Sipser. Course Technology, 2012. (Amazon)

Resources

Go to the online repository

Software Downloads

JFLAP is software for exploring and experimenting with automata, machines and grammars.

Course Policies

See Department Policies which will be adhered to within the course.

See Also

- **Mathematical Induction** en.wikipedia.org/wiki/Mathematical_induction Wikipedia article