CSE 5321 (Approved): Automata and Formal Languages

Course Description

Machine-based and grammatical models of computation; finite automata and regular languages, pushdown automata and context-free languages, Turing machines; non-determinism; Churchs Thesis; halting problem.

Prior Course Number: CSE 625
Transcript Abbreviation: Automata Form Lang
Grading Plan: Letter Grade
Course Deliveries: Classroom
Course Levels: Undergrad, Graduate
Student Ranks: Senior, Masters, Doctoral
Course Offerings: Autumn, Spring
Flex Scheduled Course: Never
Course Frequency: Every Year
Course Length: 14 Week
Credits: 2.0
Repeatable: No
Time Distribution: 3.0 hr Lec
Expected out-of-class hours per week: 3.0
Graded Component: Lecture
Credit by Examination: No
Admission Condition: No
Off Campus: Never
Campus Locations: Columbus
Prerequisites and Co-requisites: (CSE 2231 or CSE 321) and (CSE 2331 or Math 566) and (CSE 2421 or CSE 360)
Exclusions: Not open to students with credit for CSE 3321 or CSE 625
Cross-Listings:

The course is required for this unit's degrees, majors, and/or minors: No
The course is a GEC: No
The course is an elective (for this or other units) or is a service course for other units: Yes

Subject/CIP Code: 14.0901
Subsidy Level: Doctoral Course

Programs

Abbreviation	Description
MS CSE	MS Computer Science and Engineering
PhD CSE	PhD Computer Science and Engineering

Course Goals

Be competent with using regular expressions and finite state machines.
Be competent with using context-free languages, context-free grammars, and push-down automata.
Be competent with proving by contradiction, by ordinary induction and by strong induction.
Be familiar with non-determinism.
Be familiar with Turing machines.
Be exposed to reductions.

Be exposed to decidability and recursive enumerability.
Be exposed to Churchs Thesis.
Be exposed to theory of parsing.

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Formal languages.	3.0							
Regular languages and finite automata.	15.0							
Grammars.	3.0							
Context-free languages and pushdown automata.	12.0							
Recursively enumerable languages and Turing machines.	9.0							

Grades

Aspect	Percent
Homework	20%
Classroom participation	10%
Midterms, final	70%

Representative Textbooks and Other Course Materials

Title	Author
Introduction to Languages and the Theory of Computation	J. C. Martin

ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
***	a	An ability to apply knowledge of mathematics, science, and engineering.
	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
*	c	An ability to design a system, component, or process to meet desired needs.
	d	An ability to function on multi-disciplinary teams.
***	e	An ability to identify, formulate, and solve engineering problems.
	f	An understanding of professional and ethical responsibility.
	g	An ability to communicate effectively.
	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
**	i	A recognition of the need for, and an ability to engage in life-long learning.
	j	A knowledge of contemporary issues.
**	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Additional Notes or Comments

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* Moved exclusion from General Information to Exclusions. --rowland
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