

COURSE DESCRIPTION

Dept., Number	CSci 311	Course Title	Models of Computation
Semester hours	3	Course Coordinator	Dawn E. Wilkins, Associate Professor

Current Catalog Description

Introduction to the theoretical foundations of computer science, including automata and formal languages.

Textbook

Peter Linz. *An Introduction to Formal Languages and Automata*, Fourth Edition, Jones and Bartlett, 2006 ISBN: 0-7637-3798-4.

References

Class website: <http://www.cs.olemiss.edu/~dwilkins/CSCI311/fall07/CSCI311.html>

Course Outcomes

Upon successful completion of this course, the students:

1. can interpret and design automata that describe simple languages
2. know about regular expression and their use in programming languages
3. understand grammars, parsing and ambiguity
4. are able to distinguish between regular and non-regular languages
5. understand the Chomsky hierarchy
6. are aware of the limits of computation

Relationship between Course Outcomes and Program Outcomes

1. Be able to interpret and design automata that describe simple languages. Outcomes (a) and (j)
2. Know about regular expression and their use in programming languages. Outcomes (a) and (c)
3. Understand grammars, parsing and ambiguity. Outcomes (a) and (j)
4. Be able to distinguish between regular and non-regular languages. Outcome (a)
5. Understand the Chomsky hierarchy. Outcome (a)
6. Be aware of the limits of computation. Outcome (a)

Prerequisites by Topic

Data structures (CSci 112) and Discrete Mathematics (Math 301)

Major Topics Covered in the Course

<p>Languages, grammars, automata Deterministic Finite Accepters (DFA) Nondeterministic Finite Accepters (NFA) Equivalency of DFA and NFA Regular Expressions Regular expressions in Perl Regular Grammars Closure properties of Regular Languages Nonregular Languages Context-Free Grammars Parsing and Ambiguity CFG's and Programming Nondeterministic Pushdown Automata Pushdown Automata and Context-Free Languages Deterministic Pushdown Automata and Deterministic CFLs Grammars for Deterministic CFLs Closure and Decidability Properties for CFLs Turing machines Recursive and Recursively Enumerable Languages Context-Sensitive Grammars and Languages The Chomsky Hierarchy Halting Problem and Undecidable Problems</p>

Assessment Plan for the Course

<p>A comprehensive, 30-question exam constructed by a faculty committee is administered to each offering of CSci 311. Student performance is analyzed question-by-question to identify needed adjustments in the topics, textbook, lectures, or assignments.</p>

How Data in the Course are Used to Assess Program Outcomes (unless adequately covered already in the assessment discussion under Criterion 4)

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Estimate Curriculum Category Content (Semester hours)

Area	Core	Advanced	Area	Core	Advanced
Programming language concepts	2		Discrete Math	1	