CS 5100 : FORMAL LANGUAGE THEORY

Semester Hours:	3.0	*Contact Hours:* 3
Coordinator:	Ray Kresman	
Text:	An Introduction to Formal Languages and Automata (5th edition)	
Author(s):	PETER LINZ	
Year:	2012	

SPECIFIC COURSE INFORMATION

Catalog Description:

Various types of languages (context-sensitive, context-free, regular). Discussion of recognition devices such as pushdown automata, linear bounded automata and Turing Machines. Some topics of current interest. Prerequisite: Full Admission to MS in CS program or consent of department.

Course type: **ELECTIVE**

SPECIFIC COURSE GOALS

- I can specify regular expressions for matching strings in a language.
- I can show the equivalence between regular expressions, NFAs, and DFAs.
- I can determine the language recognized by a given FSA.
- I can construct a FSA for a given regular language or regular expression.
- I can construct a derivation tree for a given context-free grammar.
- I can construct a PDA for a given context-free grammars.
- I can prove or disprove closure properties of certain languages.
- I can explain the application of the pumping lemma.
- I can build Turing machines for simple computable functions.
- I can explain the difference between recursively enumerable and recursive languages.
- I can analyze relevant research and communicate my findings.

LIST OF TOPICS COVERED

- Languages and Their Representation

- Types of Languages
    - Unrestricted Languages
    - Context-sensitive Languages
    - Context-free Languages
    - Regular Languages
- Grammars
    - The Formal Notion of a Grammar
    - Types of Grammars
    - Recursiveness
    - Derivation Trees
- Recognition Devices
    - Turing Machines
    - Linear Bounded Automata
    - Pushdown Automata
- Finite Automata