CS 6110 : AUTOMATA AND COMPUTABILITY THEORY

Semester Hours:	3.0		*Contact Hours:* 3
Coordinator:	TBD		
Text:	TBD		
Author(s):	TBD		
Year:	TBD		

SPECIFIC COURSE INFORMATION

Catalog Description:

Mathematical models for algorithmic processes, such as finite automata and Turing machines. Limitations of such models.

Course Type: **ELECTIVE**

SPECIFIC COURSE GOALS

- I know how to show the equivalence between expressions, NFAs and DFAs.

- I am able to determine the language recognized by a given FSA.

- I am able to construct an FSA for a given regular language or regular expression.

- I know how to prove or disprove certain theorem in automata theory using its properties.

- I am able to explain the relationship between Turing machines, Universal machines and decidability.

- I can explain reduction techniques for proving problems.

- I can prove certain problems as being decidable or undecidable.

- I know how to explain the relationship between recursive functions and Turing compatibility.

LIST OF TOPICS COVERED

- Finite-State Machines
    - Various models for finite-state machines
    - Applications to neural nets
    - Limitations of such models
- Infinite Machines
    - Turing machines
    - Variations of the Turing machine model

- o Universal Turing machines
- o Unsolvability of the halting problem
- o Reducing one unsolvable problem to another
- Other Models of Computation
  - o Primitive-recursive, total-recursive, and partial-recursive functions
  - o Enumeration of partial-recursive functions
  - o Other models as time permits
  - o Equivalence of the models of computation