

COT 4420 Formal Languages and Automata Theory

Credits: 3

Text book, title, author, and year: Peter Linz "*An Introduction to Formal Languages and Automata*", Fifth Edition, Jones and Bartlett, 2012, ISBN-13: 9781449615529.

- a. **Supplemental materials:** none.

Specific course information

- a. **Catalog description:** An introduction to the formal languages and automata, with emphasis on context-free and regular languages. Topics will include regular grammars, deterministic and nondeterministic finite state machines, parsing algorithms, linear-bounded automata and the use of Turing machines to introduce the P/NP problem.
- b. **Prerequisites:** COP 3530, MAD 2104
- c. **Required, elective, or selected elective:** required

Specific goals for the course

- a. **Specific outcomes of instruction:** By the end of the course students will be able to: (i) Students will explain relationships among languages, grammars, and model computational devices. (ii) Students will define regular languages using finite automata. (iii) Students will define regular languages using regular expressions and regular grammars. (iv) Students will define context-free languages using pushdown automata. (v) Students will design Turing machines that accept a given language or compute a given function. (vi) Students will identify and characterize languages in the Chomsky Hierarchy and will associate them with the corresponding automata.

Brief list of topics to be covered:

- Introduction to the Theory of Computation
- Finite Automata
- Regular Languages and Regular Grammars
- Properties of Regular Languages
- Context-Free Languages
- Simplifications of Context-Free Grammars and Normal Forms
- Pushdown Automata
- Properties of Context-Free Languages
- Turing Machines
- Hierarchy of Formal Languages and Automata