

CSI 3430: Theory of Computation

Credits Hours: 4 credits, 3.57 contact hours/week.

Instructor: John Meyer, Ph.D.

Text book: Introduction to Computer Theory [paperback]. Daniel I. A. Cohen, John Wiley & Sons, Inc. ISBN-13: 978-0-471-13772-6

Supplementary Text: Formal Languages and Automata [paperback] Peter Linz, Jones & Bartlett Learning ISBN-13: 978-1-4496-1552-9

Specific course information

Formal models of computation, including finite state automata, pushdown automata and Turing machines. Regular and context-free languages. The computational models are used to discuss computability issues.

Prerequisites: APM 3667, CSI 3610

Required course for CS major

Course Objectives: Upon successful completion of this course, students should be able to

- Explain and design Finite State Automata, both deterministic and nondeterministic, identify the languages recognized by them (Regular Languages) [ABET CS: (a, j)]
- Explain the Pumping Lemma for Regular Languages, represent Regular Languages by Regular Expressions, and identify the languages that are not Regular Languages [ABET CS: (a)]
- Explain and design Push Down Automata with one stack (1PDA), identify the Context Free languages (CFL) recognized by them, describe and explain the Pumping Lemma for CFL, and identify the languages that are not CFL [ABET CS: (a, c)]
- Explain a Turing Machine with its variations. Identify languages accepted, recognized, and non-recognized by these machines [ABET CS: (a, j)]
- Describe computability [ABET CS: (a)]

List of Topics:

- Models of computation
- Finite state automata
- Pushdown automata
- Turing machines.
- Regular languages
- Context-free languages