

CSCE 355 - Foundations of Computation

- **Credit Hours:** 3 hours
- **Contact Hours:** 3 lecture hours
- **Instructor:** Dr. Stephen Fenner
- **Required Textbooks:** J. E. Hopcroft, R. Motwani, and J. D. Ullman, *Automata Theory, Languages, and Computation (3rd Edition)*. Addison-Wesley-Pearson 2007.
- **Bulletin Description:** Basic theoretical principles of computing as modeled by formal languages, grammars, automata, and Turing machines; fundamental limits of computation.
- **Prerequisites:** CSCE 211, 212, 350
- **Required Course** in CS; **Selective Elective** in CE
- **Course Outcomes:** Students will be able to:
 1. Prove theorems in discrete math by induction, contradiction, or cases
 2. Analyze, design, and manipulate finite state acceptors
 3. Design and manipulate regular expressions
 4. Prove languages not regular or context-free
 5. Design and analyze context-free grammars and push-down automata
 6. Analyze and simulate a Turing machine
 7. Prove problems undecidable via reduction

- **Student Outcomes addressed by course**

Program	Student Outcomes Addressed
Computer Engineering	N/A
Computer Information Systems	N/A
Computer Science	1, 2, 6

- **Topics covered**

1. Proof techniques, numbers, sets, relations
2. Deterministic and nondeterministic finite automata
3. Regular expressions and regular languages
4. Grammars, push-down automata, and context-free languages
5. Turing machines and undecidability