

CSE 541

Logic in Computer Science

[www.cs.sunysb.edu/~cse541](http://www.cs.sunysb.edu/~cse541)

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# Course Description

This course provides an introduction to computational logic. It covers the fundamentals of classical logic with an emphasis on computational aspects. There will be in-depth discussions of basic deduction methods and of a variety of logical systems, such as modal logics, that are relevant to applications in computer science.

# Course Topics

1. Review of propositional logic [Chapter 1]
  - (a) The language of propositional logic (syntax) [1.3]
  - (b) Semantics of propositional logic [1.4]
  - (c) Normal forms [1.5]
  - (d) Davis-Putnam method
  - (e) Proof theory - Natural Deduction [1.2]
  
2. Verification by model checking [Chapter 3]
  - (a) Syntax of computation tree logic [3.2]
  - (b) Semantics of computation tree logic [3.3]
  - (c) Model checking [3.5 - 3.7]
  - (d) Alternatives and extensions of CTL [3.8]
  
3. Predicate logic [Chapter 2]
  - (a) Predicate logic as a formal language [2.2]
  - (b) Semantics of predicate logic [2.4]
  - (c) Proof theory of predicate logic [2.3]
  - (d) Theorem proving: resolution calculus

- 4. Modal logics [Chapter 5]
  - (a) Basic modal logic [5.2]
  - (b) Logic engineering [5.3]