

SYRACUSE UNIVERSITY  
PROGRAMS IN COMPUTER SCIENCE AND ENGINEERING

**Topics Calendar**

**CSE/CIS 607 Mathematical Basis of Computing**

**Topics (Approx. Week by Week from Tuesday, September 29th.**

Final exam to be given during final exam week. Mid-semester exam dates are approximate.

**1. Week of Tuesday 09/29**

- Discussion of Propositional Logic problems, including Tableaux. Use of Catalogs of reductions and equivalences. Duality. Resolution, polarity, auxiliary inference rules, example proofs.

**2. Week of Tuesday, 10/06**

- First-order logic: syntax; elementary formulas; structures; expansions; logical consequence; validity; soundness and completeness. More review for Exam 1.

**3. Week of Tuesday, 10/13**

- Exam 1

**4. Week of Tuesday, 10/20**

- Discussion of Exam 2.
- Part I of: Translation from predicate logic to ordinary language, translation from ordinary language to predicate logic, “All P’s are Q’s”, “Some P’s are Q’s”. Refutations and counterexamples. Prenex form. Quantifier force. Disposing of the concept of quantifier force. Skolemization, quantifier removal. Unification and why it’s needed. More advanced proofs.

**5. Week of Tuesday, 10/27**

- Part II of: Translation from predicate logic to ordinary language, translation from ordinary language to predicate logic, “All P’s are Q’s”, “Some P’s are Q’s”. Refutations and counterexamples. Prenex form. Quantifier force. Disposing of the concept of quantifier force. Skolemization, quantifier removal. Unification and why it’s needed. More advanced proofs.

6. **Week of Tuesday, 11/03**
  - Theories, proofs with theories, Robinson arithmetic, handling equality. Nonstandard models, mathematical induction, mathematical induction in tableau. Review for Exam II.
7. **Week of Tuesday, 11/10**
  - Exam II
8. **Week of Tuesday, 11/17**
  - Discussion of Exam II
  - Computation-tree logic, introduction to model-checking.
9. **Week of Tuesday, 11/24**
  - Computation-tree logic, introduction to model-checking, continued.
10. **Week of Tuesday, 12/01**
  - Dynamic Logic.
11. **Week of Tuesday, 12/08**
  - Review for Final Exam.
12. **Week of Tuesday, 12/15**
  - Final Exam.