

# CPMA 511: Logic and Proof

Fall 2006

**Dr. Donald Simon**

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**Office Hours:** TTH 2:00-3:00 pm, W 4:00-5:00 pm

**Home page:** <http://www.mathcs.duq.edu/profs/simon.html>

**Text:** *Logic in Computer Science: Modelling and reasoning about systems*, Second Edition, by Michael R. A. Huth and Mark D. Ryan

There is a web page associated with the book at [www.cs.bham.ac.uk/research/projects/lics](http://www.cs.bham.ac.uk/research/projects/lics).

**Course Objectives:** In this course, we will discuss logic, focusing in on computational logics. We begin with a background of propositional and predicate calculus using both a system of natural deduction and resolution methods to find proofs. We will also discuss computational tree logic (CTL) and several other modal logics. We will use formal methods for verifying properties of simple programs. We conclude with work in axiomatic set theory including the continuum hypothesis. We will use several automated tools: Otter for resolution theorem proving, SMV for CTL, and ACL2 for program verification.

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## Grading:

Assignments 75%

Final 25%

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The grading scale is:

100-90 = A, 89-80 = B, 79-70 = C, 69-60 = D, below 60 = F.

Plus/minus grading will **not** be used.

There will be six homework and/or computer assignments, and a final. The final will be a take-home test assigned on the last day of class. There will be a week to complete the final.

**Honor Policy:** See the College of Liberal Arts policy for scholastic dishonesty. Any student guilty of plagiarism will receive a grade of ``F" for the course. Work done in this course is to be by the individual, not a group. You may not share (copy, give, show) your homework with other students in the course.

**Late Work:** Late assignments will not be accepted for credit.

**Students with Disabilities:** Students with documented disabilities are entitled to reasonable accommodations if needed. If you need accommodations, please contact the Office of Freshman Development and Special Student Services in 309 Duquesne Union (412-396-6657) as soon as possible. Accommodations will not be granted retrospectively.

**Tentative Schedule:**

<b>Date</b>	<b>Topic(s)</b>	<b>Readings</b>
1. 8/30	Introduction, Propositional Logic	H & R, Chap. 1, <a href="#">Homework #1</a>
2. 9/6	Predicate Logic, Resolution, ATP	H & R, Chap. 2, <a href="#">Homework #2</a> , <a href="#">notes</a> <a href="#">Prover9 home page</a> , <a href="#">notes</a> , <a href="#">example 1</a> , <a href="#">example 2</a> , <a href="#">Prover9 manual</a> <a href="#">Prover9 examples</a>
3. 9/13	Model Checking, SMV	H & R, Chap. 3, <a href="#">Homework #3</a> , <a href="#">SMV example 1</a> , <a href="#">SMV example 2</a>
4. 9/20	Program Verification, ACL2	H & R, Chap. 4, <a href="#">Homework #4</a> , <a href="#">ACL2 Version 2.5</a> , <a href="#">notes</a>
5. 9/27	Modal Logics	H & R, Chap. 5, <a href="#">Homework #5</a>
6. 10/4	Higher Order Logic	Homework #6, <a href="#">HOL</a>
7. 10/11	Binary Decision Diagrams	H & R, Chap. 6

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Last modified: Aug. 28, 2006

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