Meets: Tuesday, Thursday, 1:00pm - 2:20 pm
Place: ESS 079
Professor Anita Wasilewska
   e-mail address: anita@cs.sunysb.edu
   Office phone number: 632 8458
   Office location: Computer Science Department building, office 1428.
Professor Office Hours: Tuesday, Thursday, 11:30am - 12:30 pm and by appointment.
TA: t.b.a
TA Office Hours: tba
Textbook:
   AN INTRODUCTION TO CLASSICAL and NON-CLASSICAL LOGICS
   Anita Wasilewska

This is a book in progress

Full Book Text and Lecture Slides are in Downloads on the course web page.

Course Reading Book: Introduction to Mathematical Logic, Fourth Edition
   Elliot Mendelson

Course Description: The goal of the course is to make student understand the need of logic as a field
and to learn the its formality and basic techniques. I will progress relatively slowly, making sure
that the pace is appropriate for all students in the class. The book is written with students on my
mind so that they can read and learn by some parts by themselves. The book, and the course is
developed to teach not only intuitive understanding of different logics, but (and mainly) to teach
formal logic as scientific subject, with its languages, definitions, main theorems and problems.

Grading

There will be TWO MIDTERMS and a FINAL examination. There also will be assigned sets of homew-
work problems students must work out and learn for the tests. The complete solutions to all
problems are posted on the course webpage. Students are also responsible to learn and work put
all Examples and Exercises in the text book and some PROOFS of the main Theorems.
Homework Problems

Students are responsible for working out and writing DETAILED solutions for Exercises-Homework Problems posted on the course web page and posted in the book.

Solutions to ALL of them are posted - but I encourage students to work on them without looking at the solutions- and check the results with posted solutions.

Students are also responsible to learn and work out all Examples and Exercises in the text book as well as some PROOFS of the main Theorems.

GRADES for the tests will depend on the form, details, and carefulness of written solutions.

TESTS: there will be 3 regular tests and two practice tests

Midterms 1, 2 (100pts each)

Final (100pts)

Practice Midterm 1 (10 extra points)

It is a practice IN CLASS test

Practice Final or Practice Midterm 2 (10 extra points)

It is a practice take home test.

All test are CLOSED NOTES and CLOSED BOOK. If a student is found using notes or a book during a test, he/she will receive AUTOMATICALLY 0 pts for a given test.

Practice tests policy

Practice tests are designed to help you to learn what and how much you have learned and what you still don’t understand from the material covered by the test. You can take them for your own practice (don’t need to submit it), or for extra points (need to submit it).

Final grade computation

During the semester you can earn 300pts or more (in the case of extra points). The grade will be determine in the following way: \# of earned points divided by 3 = % grade.

The % grade is translated into letter grade in a standard way i.e.

100 - 90 % is A range; A (100-96%) A- (95- 90%),
89 - 80 % is B range: B- (80 - 83%), B (84 -86%), B+ (87 -89%) ,
79 - 70 % is C range: C- (70- 72%), C (73-76%), C+ (77-79%),
69 - 60 % is D range and F is below 60%.

None of grades will be curved
Remark that by the Syllabus you can get 20 extra points that are PART of computation of your grade in the course.

I might add additional 20 extra points for work in the course to be allowed to count for the grade computation.

In case of additional extra points above allowed 40pts - they might be counted in your grade computations - but only for grades below A range that is a range for passing Ph.D. Quals.

It means that your grade A range can be obtained by ONLY using your tests grades plus additional 40 extra points - if obtained by additional assignments.

It means also that the highest grade one can obtain by using extra points above allowed 40pts is B+

All grades below A-range will be normalized accordingly

Course Contents and Schedule

The course will follow the book very closely and in particular we will cover some, or all of the following subjects chapters.

Part one Motivation, history, syntax and semantics for classical propositional calculus. Formal symbolic propositional and predicate languages, formal definitions of model, counter model, tautology for propositional logic.

Part two Semantics for some three valued logics.

Part three Formal deductive systems, called also proof systems. General definition and examples. Definition of a formal proof. Relationship between proof systems and their semantics, i.e general definition of notions of soundness and completeness of a given proof systems relatively to given semantics. Definition of a logic as a complete proof system.

Part four Hilbert style proof systems for classical propositional logic. Proofs of DEDUCTION theorem, and two different proofs of the COMPLETENESS theorem for propositional classical logic.


Part six A Hilbert style proof system for Intuitionistic Logic. Relationship between Intuitionstic and Classical logics.

Part seven Automated proof systems 2: Gentzen proof system for Intuitionistic Logic. Heuristic decision procedures.

Part eight Languages and semantics for classical predicate logic; Hilbert Proof systems and proof of completeness theorem.

Part ten  A Hilbert style proof systems for Modal Logics S4 and S5. Relationships with Intuitionistic Logic.

In particular we will cover the following chapters.

Chapter 1  Introduction: Mathematical Paradoxes and Computer Science Puzzles
Chapter 2  Introduction to Classical Propositional Logic (reading)
Chapter 3  Propositional Languages
Chapter 4  Classical Propositional Semantics
Chapter 5  Some Extensional Three and Many Valued Logics Semantics
Chapter 6  Classical tautologies, Logical Equivalences and Equivalences of Languages
Chapter 7  General Proof Systems
Chapter 8  Hilbert Proof Systems; Deduction Theorem
Chapter 9  Two Proofs of Propositional Classical Logic Completeness Theorem.
Chapter 10  Hilbert Proof Systems for Intuitionistic Propositional Logic, Connections between Classical and Intuitionistic Logics.
Chapter 11  Classical Automated Proof systems for Classical Propositional Logic: System RS and original Gentzen System.
Chapter 12  Gentzen Proof Systems for Intuitionistic Logic
Chapter 13  Predicate Logic Languages, Classical Predicate Logic Semantics, Hilbert Proof system and proof of Completeness Theorem.
Chapter 14  Automated Proof systems for Classical Predicate Logic: System QRS and original Gentzen System.
Chapter 15  Hilbert and Gentzen Proof Systems for Intuitionistic Predicate Logic
Chapter 16  Introduction to Modal Logics, Modal S4 and S5 and its connections with Intuitionistic logic.

Mendelson Book  Goedel Incompleteness Theorem

TESTS SCHEDULE

This is preliminary schedule and it might be changed.
Changes will be advertised on the course web page.

Practice Midterm 1  Thursday, March 5, in class.

Midterm 1  Tuesday, March 10, in class.
Spring Break March 16 - 23

Midterm 2 Tuesday, April 28, in class.

FINAL Finals week May 13 - 22, exact time and place t.b.a.

Academic Integrity Statement Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person’s work as your own is always wrong. Any suspected instance of academic dishonesty will be reported to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at http://www.stonybrook.edu/uaa/academicjudiciary/

Stony Brook University Syllabus Statement If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact Disability Support Services at (631) 632-6748 or http://http://studentaffairs.stonybrook.edu/dss They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website:

http://www.sunysb.edu/ehs/fire/disabilities.shtml