CSE371, MAT371
LOGIC

Professor Anita Wasilewska

Web page: www.cs.stonybrook.edu/~ cse371

Fall 2017

Lecture MONDAY, WEDNESDAY 5:30pm - 6:50 pm

Location LGT Eng Lab 102

Professor Anita Wasilewska, e-mail: anita@cs.stonybrook.edu
Please e-mail the professor with serious concerns only.

Phone number 632 8458

Office Hours Monday, Wednesday 12:30 pm - 2:00 pm and by appointment.

New Comp. Science Building room 208, telephone: 2-8458.

TA TBA

e-mail

TA Office Hours TBA

Important There is no recitations, but I will cover solutions to homework assignments and held questions/answers sessions each week in class.

BOOKS

Main text: Anita Wasilewska, *LOGICS for COMPUTER SCIENCE: Classical and Non-classical*,

Book under a contact SPRINGER to appear in Spring 2018

All book chapters, and lecture slides on are posted on the course webpage; please print them and bring to class.

Additional texts:

Introduction to Mathematical Logic, Fourth Edition, Elliot Mendelson, Wadsworth&Brooks/Cole Advanced Books &Software, PACIFIC GROVE, CALIFORNIA

A Friendly Introduction to Mathematical Logic, C.C. Leary, Printice Hall, 2000.

Any Logic Textbook you find in the Library

Course Goal The goal of the course is to make student understand the need of, and to learn the formality of logic. I will progress relatively slowly, making sure that the pace is appropriate for the undergraduate class. But it doesn't mean that you can just come to class and listen without doing work at home!! You have to go over the text in proper chapters; in fact to go over and over again! The book is written with students on my mind so that they can read and learn by themselves, even before coming to class. For sure, it is essential to study after the class.
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 language, definitions and problems.

Workload There will be 2 quizzes, TWO midterms and no final examination.

The consistency of your efforts and work is the most important for this course.

None of the grades will be curved.

Quizzes: total 50 pts There will be 2 quizzes (25 minutes), 25 points each.

NO MAKE-up for quizzes.

I might give some **additional quizzes** for extra credit

Quizzes will be given on Wednesdays - at the end of the class. I will answer students questions before distributing the Quiz.

Each quiz will consist of **2 -3 questions** only: one will cover theoretical material, mainly **definitions** from the list of definitions you must know that I publish in **Review Lectures** on the course webpage, the others will be simple problems.

The problems will MAINLY be taken from Problems Solved in the Book and very similar to Homework Assignments located at the end of the chapters of the book, or from Lectures, or from previous published quizzes and Tests

Quizzes and Tests are **closed book** examinations.

Midterm 1 (75pts) Midterm 1 will cover material from Q1 and material covered after Q1

Midterm 2 (75pts) Midterm 2 will cover material from Q2 and material covered after Q2

Extra Credit I will give some extra credit problems on Tests and Quizzes; I also scheduled an extra credit Q3.

Previous TESTS and Quizzes I posted a collection of past Quizzes and Tests on the course Webpage.

They are designed to help you to learn what 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)

Practice tests policy published Practice quizzes and 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.

Final grade computation You can earn up to 200 points + x extra credit points = (200 + x) points during the semester.

Extra points are BENEFICIAL for students as they add to the TOTAL number of points!!

None of the grades will be curved The grade will be determined in the following way:
# of earned points divided by 2 = % grade.

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

$100 - 95$ % is A, $94 - 90$ is $A-$,
$89 - 86\%$ is $B+$, $85 - 83$ % is B, $82 - 80$ % is $B-$,
$79 - 76$ % is $C+$, $75 - 73$ % is C, $72 - 70$ % is $C-$,
$69 - 60$ % is D range and F is below 60%.

Tentative Quizzes and Tests schedule
Changes (if any) will be advertised on the course webpage

Observe that we have no class on September 4

Q1 Wednesday, September 27

MIDTERM 1 Wednesday, October 18 in class

Q2 Wednesday, November 15

Thanksgiving Break November 22 - 26

Q3 Wednesday, November 29 **Extra Credit**

MIDTERM 2 Monday, December 4 in class

Last Class Wednesday, December 6

FINAL - no final

COURSE CONTENT The course will to cover in depth the following subjects.

1. Intuitive Introduction to classical Logic: propositional and predicate languages. AI languages. Basic propositional and predicate tautologies. Equational Laws for quantifiers.'

2. Classical and non-classical languages. Formal syntax and semantics for classical propositional logic. Formal definitions of model, counter model, tautology. Semantics for some three valued logics.

3. 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.

4. Hilbert style proof systems for classical propositional logic. Proofs of the Deduction theorem, and two different proofs of the completeness theorem.

5. Automated Gentzen type proof systems: RS proof system for classical propositional logic. Examples of the automatic proof-search. Constructive proof of the completeness theorem. Original Gentzen proof systems.

6. A Hilbert and Gentzen style proof systems for Intuitionistic Logic. Heuristic decision procedures. Relationship between Intuitionstic and Classical logics.

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

8. Formal Introduction to Predicate (First Order) Logic. Completeness Theorem. QRS poof system.

9. Theories based on the classical predicate logic. Properties of First-Order Theories. Consistency, inconsistency, completeness, incompleteness of theories. Formal Number Theory Gödel's Incompleteness and InconsistencyTheorems.

ACADEMIC INTEGRITY STATEMENT (Adopted by the Undergraduate Council September 12, 2006)

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/

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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