PHIL 150

Elementary Logic I

6/22/15 - 8/30/15

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Course Description: In this course we learn the basics of mathematical proofs through the study of first-order logic. With the help of interactive software included with the textbook, we will learn a first-order natural deduction system.
Prerequisite(s): None.
Note(s): This course requires the use of a software package included with the textbook. This textbook must be purchased new, as license to use the software is included in the purchase. You will not be able to receive credit in this course without appropriate access to a computer that is compatible with this software package and the internet. Please make appropriate arrangements to accommodate this requirement prior to enrolling in this course.
Credit Hours: 3

Text(s): *Language, Proof, and Logic*, 2nd Edition
Author(s): David Barker-Plummer, John Barwise, and John Etchemendy
ISBN-13: 978-1575866321

Grade Distribution:

Assignments	60%
Midterm Exam	20%
Final Exam	20%

Letter Grade Distribution:

$\geq$ 93.00	A	73.00 - 76.99	C
90.00 - 92.99	A-	70.00 - 72.99	C-
87.00 - 89.99	B+	67.00 - 69.99	D+
83.00 - 86.99	B	63.00 - 66.99	D
80.00 - 82.99	B-	60.00 - 62.99	D-
77.00 - 79.99	C+	$\leq$ 59.99	F

Course Policies:

- **General**
  - The midterm and final exams are closed book, closed notes. The final exam is not cumulative.
  - **No makeup quizzes or exams will be given.**
- **Grades**
  - Grades in the **C** range represent performance that **meets expectations**; Grades in the **B** range represent performance that is **substantially better** than the expectations; Grades in the **A** range represent work that is **excellent**.
  - Students are responsible for tracking their progress by referring to the online gradebook.
- **Assignments**
  - Students are expected to work independently. **Offering** and **accepting** solutions from others is an act of **plagiarism**, which is a serious offense and **all involved parties will be penalized according to the Academic Honesty Policy**. Discussion amongst students is encouraged, but when in doubt, direct your questions to the professor.
  - **No late assignments will be accepted under any circumstances**.
- **Attendance and Absences**
  - Attendance is expected. Homework is due at the beginning of each class period. Logic, like any branch of mathematics, requires regular practice. Without this practice a passing grade should not be expected.
  - Students are responsible for all missed work, regardless of the reason for absence. It is also the absentee's responsibility to get all missing notes or materials.

Academic Honesty Policy Summary:

Introduction

In addition to skills and knowledge, Northwestern University aims to teach students appropriate Ethical and Professional Standards of Conduct. The Academic Honesty Policy exists to inform students and Faculty of their obligations in upholding the highest standards of professional and ethical integrity. All student work is subject to the Academic Honesty Policy. Professional and Academic practice provides guidance about how to properly cite, reference, and attribute the intellectual property of others. Any attempt to deceive a faculty member or to help another student to do so will be considered a violation of this standard.

Instructor's Intended Purpose

The student's work must match the instructor's intended purpose for an assignment. While the instructor will establish the intent of an assignment, each student must clarify outstanding questions of that intent for a given assignment.

Unauthorized/Excessive Assistance

The student may not give or get any unauthorized or excessive assistance in the preparation of any work.

Authorship

The student must clearly establish authorship of a work. Referenced work must be clearly documented, cited, and attributed, regardless of media or distribution. Even in the case of work

licensed as public domain or Copyleft, (See: http://creativecommons.org/) the student must provide attribution of that work in order to uphold the standards of intent and authorship.

Declaration

Online submission of, or placing one's name on an exam, assignment, or any course document is a statement of academic honor that the student has not received or given inappropriate assistance in completing it and that the student has complied with the Academic Honesty Policy in that work.

Consequences

An instructor may impose a sanction on the student that varies depending upon the instructor's evaluation of the nature and gravity of the offense. Possible sanctions include but are not limited to, the following: (1) Require the student to redo the assignment; (2) Require the student to complete another assignment; (3) Assign a grade of zero to the assignment; (4) Assign a final grade of "F" for the course. A student may appeal these decisions according to the Academic Grievance Procedure. (See the relevant section in the Student Handbook.) Multiple violations of this policy will result in a referral to the Conduct Review Board for possible additional sanctions.

The full text of the Academic Honesty Policy is in the *Student Handbook*.

Tentative Course Outline:
The weekly coverage might change as it depends on the progress of the class. The sections assigned might change as they are based on the 1^{st} edition of the textbook.

Week	Content
Week 1	• Logic and Atomic Sentences • Chapters 1 and 2 • 1.1-1.5, 2.1, 2.2
Week 2	• The Connectives • Chapters 2 and 3 • 2.4, 2.5, 3.1-3.6
Week 3	• Boolean Logic and Methods of Proof • Chapters 4 and 5 • 4.1-4.5, 5.1-5.4
Week 4	• Natural Deduction System • Chapter 6 • 6.1-6.6
Week 5	• MIDTERM EXAM • Conditionals • Chapter 7 and 8 • 7.1-7.2, 8.1-8.2, 8.4
Week 6	• Quantification • Chapter 9 • 9.1-9.5, 9.7
Week 7	• The Logic of Quantifiers • Chapter 10 • 10.1-10.5
Week 8	• Multiple Quantification and Methods of Proof • Chapter 11, 12 • 11.1-11.2, 12.1-12.5
Week 9	• First-Order Natural Deduction System • Chapter 13 • 13.1-13.3
Week 10	• More Practice • FINAL EXAM

Extra Credit: Translations from a first-order formal language to languages like English will not be the focus of this course. Learning a natural deduction system is challenging enough for a 10 week course on its own. However, the relationship between the formal language and natural language should not be dismissed entirely. As such, translation problems from the following sections will be considered extra credit: $3.7, 7.3, 9.6, 11.3 - 11.6, 11.8$.