Symbolic Logic

Spring 2004

It is a sadly limited view of the power of mind in man to suppose that only truth employs or pleasures it. It appears ... that thought itself proceeds by quantities and extensions, yet one may contemplate the most purely abstract and most purely quantitative system for the values of the system’s sake, and so far as this is done, and is the end of such pure systems, they, and the opposite pole of art, have the same appreciative aim, and are in value much akin; for creative thought and creative imagination are not so much stirred on by truth in any synthetic sense as by sublimity – a vision of absolute organization.

– William H. Gass

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A Brief Overview

The topic of this course is symbolic logic. In particular, we will look at two extremely influential and useful systems of symbolic logic: ‘sentential logic’ and ‘predicate logic’. During the course of the semester, we will cover material from the following chapters, in the following order, time permitting:

- Chapter 1: Basic Notions of Logic
- Chapter 2: Sentential Logic: Syntax
- Chapter 3: Sentential Logic: Semantics
- Chapter 4: Sentential Logic: Derivations
- Chapter 7: Predicate Logic: Syntax
- Chapter 8: Predicate Logic: Semantics
- Chapter 10: Predicate Logic: Derivations
- Chapters 6 & 11: Metatheory

Because it is difficult to predict precisely the speed at which we will move through this material, a complete meeting-by-meeting breakdown is precluded. However, a breakdown of the material up to the first test is given at the end of this document.

¹ Note: There is also a third edition widely available. However, homework assignments will frequently be drawn from the fourth edition. Additionally, there is some difference in content between the 3rd and 4th editions. If a student wishes to attempt to use the 3rd addition for this course, the responsibility for acquiring the correct homework assignments, as well as assessing differences in content, lies with the student.
**Homework**

Given the nature of the subject, this is a homework-intensive class.

For each class meeting (with some exceptions) there will be a homework assignment due. Homework is due at the beginning of each class period, and late homework will not be accepted. Homework must be handed in as a hard-copy; no email submissions will be accepted.

Because of the size of this course and the lack of any grader (human or otherwise), I cannot hope to check every problem on each homework, for most assignments. Consequently, for each assignment, zero or more problems from each assignment will be graded in-depth, and all-or-none credit will be given on remaining problems simply on the basis of whether they were done or not. Each assignment is worth 20 points.

For each assignment, answers will be posted to the website after the due-date for that assignment, and students are expected to make use of these documents for self-evaluation of homework problems.

There are approximately 30 homework assignments for the semester. At the end of the semester, for each student, the assignments with the three lowest scores will be dropped, and will not figure into the final homework score. Note that midterm grades, if given, will not reflect this.

If you have a question concerning the grading of a homework assignment, please see me within two weeks of the date on which the homework was returned. After this time, I cannot guarantee that any scores will be changed.

A note on the text: Each chapter is divided into sections 1, 2, ..., etc. Exercises are located at the end of each section. The text indicates the exercise section by appending an ‘E’ to the section number. For example, exercises from chapter 2, section 7, are referred to by ‘2.7E’. Within each set of exercises, there may be multiple groups of problems, with each group numbered 1, 2, ... etc. For example, section 1.6E has 6 groups of problems. We can refer to a group by providing the section number along with the group number. For example, ‘1.6E.4’ refers to the fourth group of problems in the exercises for chapter 1, section 6. Homework assignments make use of this convention. For example, ‘1.6E.4: Starred problems’, means ‘do each problem marked with an asterisk in group 4 of the exercises in chapter 1, section 6’.

**Homework Strategies**

In addition to specific strategies discussed in class, three additional recommendations are as follows. First, assignments utilize only a fraction of the available exercises for each section. You are encouraged to practice by doing
additional problems; answers to all un-starred exercises are available on the CD-ROM included with the text.

Second, you are encouraged to work in groups on homework assignments. The utility of working in groups cannot be overemphasized. If you do work in a group for a given assignment, you may hand in the assignment as a group, i.e., as a single document, provided all the members of the group are clearly indicated on the front page.

Second, when working on derivations (i.e., proofs) in sentential logic or predicate logic, you are encouraged to make use of the Bertie3 computer program, available for free online (see the course website for a link). This program was written specifically for use with (an earlier version of) the text for the course, and can be used with many of the homework problems in the current edition.

Meetings
During the semester, there will be two mandatory 15-minute informal meetings with the instructor. The purpose of these meetings is to (i) give the instructor an opportunity to provide some feedback concerning your work, and (ii) give each student an opportunity to voice their opinions on the workings of the class, offer suggestions, and so forth. The first meeting will occur Thursday, February 12th or Friday, February 13th, and the second will occur Thursday, April 8th, or Friday, April 9th. Sign-up sheets will be made available in class.

Exams
If we stay on schedule, there will be six tests: Test #1 covers chapters 1-3, test #2 covers chapter 5, test #3 covers chapter 7, test #4 covers chapter 8, test #5 covers chapter 10, and the last test (#6) covers a smattering of material drawn from chapters 6 and 11. If we do not make it to all of this material, then there will be fewer tests.

Regardless of the number of tests, the following holds. First, all tests will be in-class or take-home, except for the last test, which will be taken during finals week at your leisure. Second, as noted above, for purposes of the final grade, each test is equally weighted. Third, no test will be comprehensive, except insofar as later material builds upon our knowledge of earlier material.

Grading
Each student’s final grade is based on (i) the tests, and (ii) homework. The number of tests depends on the amount of material we are able to cover (see above). Each test factors equally in determining the final grade, and the overall homework score (see above) has the same weight as a test. For example, if there were four tests, each test would be worth 20% of the final grade, and the homework would constitute the remaining 20%.
Some important dates

Tuesday, February 17th: Last day to drop (without a DR)
Tuesday, April 13th: Last day to drop (with a DR)
Friday, May 7th – Thursday, May 13th: Exams
Sunday, May 23rd: Commencement

Schedule for the first four weeks

1. W Jan 28: Introduction – overview of the course

2. F Jan 30: 1.3-1.5: Deductive Arguments and Validity
   HW #1: 1.4E.1: Starred exercises (due Monday, February 2nd)

3. M Feb 2: 1.6-1.7: Equivalence etc. and Validity Revisited
   HW #2: 1.6E.2: d, f, j; 1.6E.4: b, h, l; 1.6E.6: b, d, f, n (due Wednesday, February 4th)

4. W Feb 4: 2.1: Symbolization
   HW #3: 2.1E.1: b, f, l, n; 2.1E.5: d, f, n, p; 2.1E.7: b, d

5. F Feb 6: 2.4: The Syntax of Sentential Logic
   HW #4: 2.4E.1: b, d, f; 2.4E.3: b, d, f, h 2.4E.5: b, d, j

6. M Feb 9: 3.1: The Semantics of Sentential Logic I (Truth Tables)
   HW #5: 2.4E.4: b, d, f; 3.1E.2: b, d, f; 3.1E.3: b, d, j

7. W Feb 11: 3.2 & 3.3: Semantics II (Tautologies etc.)
   HW #6: 3.2E.1: b, d, f, h; 3.2E.4: b, d, f; 3.3E.1: b, d, f

8. F Feb 13: 3.4 & 3.5: Consistency and Entailment
   HW #7: 3.4E.1: b, d, f; 3.4E.2: b, d, f; 3.5E.1: b, d, h, j

9. M Feb 16: 3.6: Truth-functional properties and consistency
   HW #8: 3.5E.2: b, d; 3.6E.1:b; 3.6E.2: b

10. W Feb 18: Discussion / Review
    HW #9: TBD

11. F Feb 20: Test #1 (covers chapters 1-3)