

Philosophy 109: Symbolic Logic

Whitman College – Spring 2004

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Course Description

In this course, you will learn a new language, “FOL,” which makes plain certain fundamental aspects of human reasoning. Our goal will be to build a framework that can be used to assess and construct good arguments based on their *form*, or *structure*; the content is largely irrelevant. (Hence logic, like “Seinfeld,” is *about nothing*.)

More specifically, this course is designed as an introduction to propositional and first-order quantificational logic. You will learn to evaluate the status of logical formulae and arguments, to create examples and counterexamples, and to construct both informal and formal proofs. If time permits, we will cover some of the basic ideas of set theory and mathematical induction. Throughout, we will also consider how the language and techniques of the formal systems relate to ordinary language and reasoning.

The tools and techniques of symbolic logic form the basis of much current work in philosophy, mathematics, computer science and programming, and some areas of linguistics and psychology. For everyone the study of logic is beneficial by enhancing general analytic and argumentative skills.

Although some of you may have encountered this kind of material before, no particular background is presupposed, and students of all levels should be able to excel. The most important thing is to **keep up with the class**. Each new step that we take will presuppose a thorough understanding of the previous step, so if you fall behind, you are liable to find yourself in *serious* trouble.

Class Format

Class time will primarily be spent clarifying and expanding on the reading and homework exercises. We will clear up any aspects of the reading or the homework that students found to be confusing, and then build on that to approach more complex problems and/or new concepts or techniques. It is thus imperative that you **come to class prepared**: make sure that you have read the assigned section(s) very carefully, and have made a serious effort to solve *at least* the assigned exercises.

We will sometimes meet in the Maxey computer lab, so that everyone can have access to the software during class. I will let you know about this as far in advance as I can – but it’s also important for us to remain flexible to address any unexpected issues that arise.

Course Materials

Hardware: Jon Barwise & John Etchemendy, Language, Proof, and Logic (CSLI Publications, 2003).

Software: We will also use the software package that comes with the book. The software cannot be reused, so **you must buy a new copy of the book.**

Also, make sure that you **save the registration number** that's printed on the CD envelope. If you lose that number, you'll have to buy another copy of the book! (If you're nervous, I'd be happy to keep a copy of your registration number as a backup.)

On-Line: The authors of the textbook and software also have a very useful website: <http://lpl.stanford.edu> Among other things, the website contains hints and solutions to some of the exercises, and a download area where you can obtain the contents of the CD using your registration number. (Thus if you lose the CD itself, you can still have access to the software.)

The Teaching Assistants

We are blessed with an outstanding pair of student teaching assistants for this course. Ella and Andy took this course with Patrick Frierson 2 years ago, and have graciously agreed to make their wisdom and expertise available to you. They will hold weekly "office hours" in our regular classroom, at the times indicated at the top of the syllabus. They may also be willing to meet at other times, if needed – just get in touch with them to see.

There are a few important points to keep in mind:

1. Please understand that they have classes and assignments of their own, which may limit when they're able to meet with you.
2. While they'll help in every way that they can, they may not be able to answer absolutely every question or solve absolutely every problem immediately. (Of course, this applies to me too!)
3. Finally, note that they're here to *supplement* my own assistance, not replace it. You are still more than welcome to come by my office hours and/or arrange to meet me at another time.

E-Mail

- I will often distribute important announcements, reminders, and clarifications through e-mail. You should make sure that you **check your account every day.**
- There is also an e-mail list-server set up for the class. Messages sent to phil109a_04sp@whitman.edu will be forwarded to everyone.

Summary of Requirements and Grading

Homework

I view these homework assignments as part of the learning process, and so they won't be graded individually. Instead, you will receive credit simply for completing them:

You may miss up to 4 homework assignments without penalty.

After that, for each assignment you miss, your final grade will be lowered by 1%.

The assigned exercises are the *minimum* that I think every student needs to do to ensure a thorough understanding of the material. If you are having any difficulties, you should certainly consider doing additional exercises – either ones in the textbook that we skip, or others that I can provide for you.

Some of the exercises must be completed using one or more of the computer programs and submitted to the on-line “Grade Grinder,” while others must be completed on paper and turned in to me:

• **Computer Exercises**

Computer exercises must be submitted by 8:00 a.m. to receive full credit. Exercises submitted between 8:00 and class will receive half credit; exercises submitted after class will help you learn, but won't count towards your grade.

Make sure that the Submit program is set to have feedback sent to me, so I know that you've done those exercises. Please send the entire day's homework at once, so my inbox doesn't get too clogged. It is permissible (and even encouraged!) to re-submit exercises, until you've solved them – but please only have the feedback sent to me *once*.

• **Paper Exercises**

Paper exercises must be brought to the beginning of class to receive credit. Exercises completed after class will help you learn, but won't count directly towards your grade.

You may turn in handwritten work, as long as it is neat and legible. Multiple sheets must be *stapled* together. Please print your name, my name, and the course number in the upper left-hand corner of the first sheet.

In case there is a record-keeping glitch or dispute, **make sure that you save all of your completed homework**, including all of the computer files, Grade Grinder reports, and paper exercises with my feedback.

Quizzes – 40% of your total grade (about 6% each)

After each “unit” of material (about every 1-2 weeks), there will be a brief, graded quiz consisting of problems modeled on the homework exercises. The quizzes will *not* be cumulative (at least, no more than the material is). The quizzes will be take-home and open-book, but also time-limited.

Quizzes must be submitted by the beginning of class on the due date to be accepted for credit, since I will then distribute a solution key.

Mid-Term Exam – 20% of your total grade

There will be a mid-term exam given **in class on Friday, March 12**, covering all of the material up to that point. The exam will be taken without the assistance of the book or the computer software.

There will be no early or make-up exams, so make your travel plans accordingly!

Final Exam – 40% of your total grade

There will be a final exam given at the designated time during exam week: **Thursday, May 13 at 2:00**. The exam will be cumulative, but will focus on the material covered after the mid-term. Like the mid-term, the exam will be taken without the assistance of the book or the computer software.

Course Policies

Exceptions to due dates and other policies will be made *only* if:

- You are participating in a Whitman-sanctioned activity, such as athletics, debate, or class field-trip; or
- Your excuse is validated by the Dean of Students.

In those cases, talk to me as early as you can, and I'll gladly make any reasonable accommodation.

Using the LPL Software

- **On Your Own Computer** – You are free to install the software on any non-campus computer(s) that you expect to use. The software will work with any recent version of Windows or Mac O/S (sorry, not Linux).
- **In the Maxey Computer Lab** – WCTS has also installed the software on all of the machines in the Maxey computer lab, for our use in class and for your convenience at other times. You'll find everything in the "LPL Software" folder on the desktop.

There are two important things you need to know about using the software on the Maxey machines:

1. You must *first* open the main program (Fitch, Boole, or Tarski's World) and *then* use that to open the particular exercise file that you'll be using. (If you double-click directly on the exercise file, the computer may open it with a different program.)
 2. The programs are sometimes very *slow* to open – it may look like nothing is happening for 20 or 30 seconds. Be patient! Don't double-click again unless a full minute has passed, or you'll risk crashing the machine.
- **Elsewhere on Campus** – You can also run the software from your CD on any other campus computer. To do so: (1) double-click the "My Computer" icon, (2) double-click the CD/DVD drive icon, (3) double-click the "LPL Software" icon, (4) double-click on the folder for the particular program you'd like to run, and (5) double-click the icon for that program to launch it.

*** You will need your registration number in order to submit anything to the Grade Grinder.**

If you are working on your own computer, you can have that information saved so you don't have to re-enter it each time (see #4 on p. 9 of the textbook).

If you are working on a campus computer, you will need to enter it each time, along with the rest of the personal and course information. If you don't have it handy, you'll have to save your solution files and submit them later.

NOTE: The software has been thoroughly tested and debugged, and WCTS has done its best to adjust the settings on the Maxey machines so everything runs properly. But alas, **there are no guarantees!**

If you experience a computer emergency, please let me know right away, and we'll do our best to fix the problem. In the meantime, you may:

- E-mail your solution files directly to me, and/or
- Print out your solutions and bring them to class, and/or
- Complete the exercises by hand and bring them to class.

Collaboration

As mentioned above, the homework exercises are intended to be part of the learning process – and so the only thing that matters is that you end up (by the time of the quizzes and exams) with a thorough understanding of the material. Hence **I strongly encourage you to work together** in any way you think might help you to achieve that goal.

However, *each* of you must write or submit your *own* solutions to the assigned exercises. Note that the on-line Grade Grinder can detect when files have been shared – in which case, *neither* student will receive credit for completing the homework.

Keep in mind that you will *not* be able to work with anyone else on the quizzes or exams. So make sure that you work with others in a way that furthers your own understanding of the material, not as a crutch or substitute for understanding it.

Academic Honesty

Your work on the quizzes and exams must be entirely your own. I consider cheating to be an extremely serious academic crime, and I will *not* tolerate it in any form. **Any student caught cheating will automatically fail the course**, and may face more severe penalties from the College. (For more details, see the Student Handbook.)

Tentative Schedule of Assignments

**** Note: All assignments are subject to change and/or rescheduling, except the mid-term and final exams.**

Wed. Jan. 21	Read: Introduction, pp. 1-8
Fri. Jan. 23	Read: Sections 1.1 – 1.4
Mon. Jan. 26	Do: “You try it” on p. 8, Exercises 1.2 – 1.5, 1.9, 1.10 Read: Sections 1.5, 2.1 Do: Exercise 1.12, 1.15, 1.16, 2.2, 2.4
Wed. Jan. 28	Read: Sections 2.2 – 2.4 Do: “You try it” on pp. 58 and 60, Exercises 2.15, 2.17 – 2.20
Fri. Jan. 30	Read: Section 2.5 Do: “You try it” on p. 64, Exercises 2.21, 2.24 – 2.27 <i>QUIZ DISTRIBUTED</i>
Mon. Feb. 2	QUIZ DUE Read: Chapter 3, Sections 3.1 – 3.3 Do: “You try it” on pp. 69, 72, 76, Exercises 3.5, 3.8
Wed. Feb. 4	Do: Exercises 3.3, 3.7, 3.10 Read: Sections 3.4 – 3.5 Do: Exercises 3.13 – 3.15

Fri. Feb. 6	Do: Exercises 3.16, 3.17 Read: Sections 3.6 – 3.7 Do: Exercise 3.20
Mon. Feb. 9	Do: 3.18, 3.19, 3.23, 3.24 <i>QUIZ DISTRIBUTED</i>
Wed. Feb. 11	Read: Sections 4.1 – 4.2 Do: “You try it” on p. 100, Exercises 4.1, 4.2, 4.12
Fri. Feb. 13	QUIZ DUE Read: Section 4.3 Do: Exercises 4.20, 4.21, 4.24
Mon. Feb. 16	<i>no class – Presidents’ Day</i>
Wed. Feb. 18	Read: Section 4.4 Do: “You try it” on pp. 114 and 116, Exercises 4.26 – 4.30 <i>QUIZ DISTRIBUTED</i>
Fri. Feb. 20	Read: Sections 5.1 – 5.4 Do: enough of the Exercises to make sure that you understand the material
Mon. Feb. 23	QUIZ DUE Read: Sections 6.1 – 6.2 Do: all “You try it” sections, Exercises 6.1, 6.3, 6.4
Wed. Feb. 25	Read: Section 6.3 Do: all “You try it” sections, Exercises 6.7, 6.9, 6.10
Fri. Feb. 27	Do: Exercises 6.11 – 6.16 Read: Sections 6.4 – 6.6 <i>QUIZ DISTRIBUTED</i>
Mon. Mar. 1	QUIZ DUE Read: Sections 7.1 – 7.2 Do: Exercises 7.1 – 7.4, 7.12
Wed. Mar. 3	Read: Sections 8.1 – 8.2 Do: Exercises 8.1, 8.11, “You try it” on pp. 207, 208, 210, Exercises 8.17 – 8.24
Fri. Mar. 5	Do: Exercises 8.44, 8.46, 8.48, 8.50, 8.52
Mon. Mar. 8	Read: Sections 7.4, 8.3
Wed. Mar. 10	catch up & review for mid-term exam
Fri. Mar. 12	** MID-TERM EXAM **
<i>~ ~ ~ spring break ~ ~ ~</i>	

Mon. Mar. 29	Read: Sections 9.1 – 9.4 Do: “You try it” on p. 238
Wed. Mar. 31	Do: Exercises 9.5, 9.6 Read: Section 9.5 Do: Exercises 9.9, 9.12
Fri. Apr. 2	Read: Section 9.6 Do: Exercises 9.16, 9.17 <i>QUIZ DISTRIBUTED</i>
Mon. Apr. 5	QUIZ DUE Read: Sections 10.1 – 10.2 Do: Exercise 10.1, “You try it” on p. 272, Exercises 10.8, 10.9
Wed. Apr. 7	Read: Sections 10.3 – 10.5 Do: Exercises 10.20, 10.24 – 10.27
Fri. Apr. 9	Read: Sections 11.1 – 11.2 Do: “You try it” on p. 290, Exercises 11.1, 11.2, 11.4, “You try it” on p. 295, Exercises 11.8, 11.11
Mon. Apr. 12	Read: Sections 11.3 – 11.4, 11.6 Do: 11.17, 11.18, 11.22, 11.30 <i>QUIZ DISTRIBUTED</i>
Wed. Apr. 14	Read: Sections 12.1 – 12.4 Do: enough of the Exercises to make sure that you understand the material
Fri. Apr. 16	QUIZ DUE Read: Sections 13.1 – 13.2 Do: “You try it” on pp. 344 and 345, Exercises 13.1 – 13.3, “You try it” on p. 349, Exercises 13.10 – 13.13
Mon. Apr. 19	Read: Section 13.3 Do: “You try it” on p. 356, Exercises 13.19, 13.23 – 13.27, 13.33, 13.35
Wed. Apr. 21	Read: Sections 14.1 – 14.2 Do: “You try it” on p. 368, Exercises 14.1, 14.2, 14.10, 14.11
Fri. Apr. 23	Do: Exercises 13.40 – 13.45, 14.4, 14.12 <i>QUIZ DISTRIBUTED</i>
Mon. Apr. 26	QUIZ DUE Read: Section 8.3
Wed. Apr. 28	Read: Sections 15.1 – 15.3 Do: Exercises 15.12, 15.13, “You try it” on p. 417, Exercises 15.14, 15.15, 15.17

Fri. Apr. 30	Read: Sections 15.4, 15.7 Do: Exercises 15.23, 15.25, 15.54, 15.57, 15.60
Mon. May 3	Read: Sections 15.8 – 15.9 Do: Exercises 15.62, 15.67, 15.72
Wed. May 5	Read: Section 16.1 Do: Exercises 16.1, 16.2, 16.6
Fri. May 7	Read: Sections 16.3 – 16.4 Do: Exercises 16.14, 16.15, 16.20, 16.21
Mon. May 10	catch up & review for final exam
Thu. May 13 2:00 – 4:00	** FINAL EXAM **