LESSON #1: Introductions; Overview of text and software; course syllabus; first-order logic (FOL) as an artificial language

POWERPOINT SLIDES #1-5

Go over syllabus and semester schedule with students (they can find these in Blackboard under Course Documents –they should read it carefully in its entirety and be prepared to ask any questions next class about what they still don't understand).

Instructions for installing CD, getting registered with Grade Grinder.

Note that the textbook is provided in a pdf version, as well as the software programs.

They should read the relevant portions of the user manual that came with the CDs and text to understand how to use the software programs (starting with Tarski's World).

As part of your homework, complete the "You Try It" on pp. 8-10 to register with GradeGrinder.

Open Tarski's World and show how to open an exercise (Wittgenstein's world and sentences).

POWERPOINT SLIDES #6-7

Reading pp. 1-11: Gives you an overview of what logic is and why it is important.

What is logic? It is assumed by every field of inquiry and science – *standards of rationality*
what counts as a *good argument*,
what you can *conclude* from given information,
what is *convincing* and what is not,
what is *valid reasoning* and what is not.

POWERPOINT SLIDES #8-10

In this course, we will focus on a particular (and important) variety of logic: **deductive inference**. Starting with a set of *premises* or assumed facts, what *follows* from it—what can you *infer*—in an airtight way--a series or chain of valid, ***certain*** conclusions.

There are other kinds of logic—most notably ***inductive*** logic—where the conclusions are only *probable* to some degree or other. In this course we will focus instead on the traditional core of logic (going back to **Aristotle**) that deals with the airtight arguments (the most basic sort of which is called a '**syllogism**', for example):

Socrates is a man; (premise)
All men are mortal; (another premise)
Therefore, Socrates is mortal. (conclusion or inference)

Is this syllogism airtight? Is the conclusion *certain*?

ANSWER: *If* the premises are true, then the conclusion is definitely true as well – precisely because of the *form* of the logical argument involved guarantees a valid result.

And because the validity of the conclusion rigorously follows from the premises in this way due to the *form* of the argument, logicians have found it useful to *formalize* the whole process and, when trying to understand how logic works, work with **artificial, formal languages** that resemble a calculus.

POWERPOINT SLIDE 11

One very important such formal language is **the language of First Order Logic**, or **FOL**, and this semester you will learn how to work out logical arguments in this language. Here's an example of an argument stated in terms of the FOL you'll be working with later in the course, referring to objects in an artificial 'blocks' worlds like those in the Tarski's World program.

1. ∀x (Cube(x) v Tet(x) v Dodec(x))
2. ¬∃x (Cube(x) v Dodec(x))

3. ∀x Tet(x)

It translates something like:

1. Every object (in some particular world) is either a cube or a tetrahedron or a dodecahedron. (premise)
2. There are no cubes or dodecahedrons. (premise)
3. Therefore, every object is a tetrahedron. (conclusion)

Hopefully you can see from the translation, even without being able to read FOL itself yet, that this is a 'good' argument, that the conclusion must be true if the two premises are true.

Powerpoint #12

We call this relation between the premises and the conclusion a relation of **logical consequence**, and it is one of the most important concepts of the entire course. From p. 4 of your text – "one claim is a **logical consequence** of another if there is no way the latter could be true **without** the former also being true" (this is the airtightness I just talked about)

Logical consequence is the basis for deductive inference—it is the logical relation that makes a good deductive argument 'work.' In this course you'll be learning all about it, the different types of consequence relations there are and, more importantly, how to *prove* that logical consequence holds in an argument, using the formal proof rules of logic.

Powerpoints #13-14

Summary of assignments for next class.

(Note that pp. 5-11 of the textbook contain important information you'll need to know in order to complete your homework exercises—be sure to read them and do the "You Try It" exercise. Also, note that on **p. 16** it gives you the **website address for LPL**, where you can get hints and solutions to some exercises and get help for technical issues.)

*Be sure to read both the **syllabus** and the **semester schedule** asap so that you'll be up and running.

*Note that our **first quiz will be this Friday**!!!!!

*I will hold office hours this Friday by appointment, if you let me know ahead of time. Otherwise, my first office hours will be next Friday the 24th ...