
Department of Philosophy

PHIL 220: SYMBOLIC LOGIC 2 — *Katalin Bimbo*

[Course description — Fall term (2020)]

First-order logic (FOL) has been thoroughly investigated in the last 140 or so years, and it is a very well-understood logic. FOL gains its importance from its *wide applicability* and from its place in the landscape of logical calculi and formal languages, and in turn, from the importance of logic in philosophy, mathematics, computer science and informatics.

Some elements of classical logic are studied in Phil 120, which is a prerequisite for this course. (The prerequisite can be waived upon request in certain cases.) This course is a *more detailed* and *more formal* study of some of the same topics that were touched upon in Phil 120, together with new and more complex questions and methods from FOL and beyond. For example, in this course, we will look at some first-order theories, which are concrete *applications of FOL* often discussed and referenced in analytic philosophy.

The course intends to *develop* and *advance* your understanding of FOL, its building blocks and how they fit together. Some of these components are the truth-functional connectives, the quantifiers, the identity predicate, as well as *proof systems* and *models*. The course will enhance your ability to formalize some subtle and crafty natural language sentences. Toward the end of the term, you will have a chance to learn about *resolution*, which is a proof system for FOL that is widely used in computer science applications, and to take a glimpse at induction and set theory.

We will use a textbook that was written by *world-class logicians* who aimed at providing an *excellent text* and *superior tools* for learning logic. The textbook is accompanied by a software package that contains *Boole*, *Fitch* and *Tarski's world*. (A fourth program called *Submit* can facilitate your getting rapid feedback.)

- *Boole* makes it easier and speedier the construction of *truth tables*.
- *Fitch* implements the so-called Fitch-style natural deduction system. Using this program, you can prove FOL theorems and check your proof at each step.
- Tarski's world allows you to construct a small *model* comprising Platonic solids and evaluate sentences. You can vary the model and the sentences, and you can play games with *Tarski's world* to clarify and visualize the truth condition of a sentence in a concrete model.

These programs provide a lot of opportunity for *learning*, *experimentation* and *exploration*. (No programming or computer science experience is required for success in this course.)

Time: M, W, F 10:00 am–10:50 am

Textbook: Barker-Plummer, D., Barwise, J. and J. Etchemendy, *Language, Proof and Logic*, 2nd ed., CSLI Publications, Stanford, CA, 2011. (required)

For **further information**, please contact the instructor at <bimbo@ualberta.ca>
The (official) **course outline** is available in the e-classroom during the course.
