PHIL 120 A1: Symbolic Logic I
Fall 2022 - MWF 1:00-1:50 pm

Instructor: Dr. Hassan Masoud

Course Description

This is an introductory course in symbolic logic which covers what is known as 'elementary logic'. Symbolic logic is a mathematical model of logical reasoning. This course covers both 'truth-functional logic' (or sentential logic, or logic of propositions) and first-order logic (or predicate logic, or logic of quantifiers). In each of truth-functional logic (TFL) and first-order logic (FOL), three topics are discussed:

- Language and Syntax
- Semantics
- Proofs

The goal of the first topic, namely "language and syntax", is to learn a formal (symbolic) language and how to translate sentences from natural language to that symbolic language; the second topic, that is "semantics", is concerned with the interpretation of symbolic sentences; and the third with giving proofs (derivations) by using inference rules. The proof method adopted in this course is natural deduction.

Course Objectives and Expected Learning Outcomes

At the end of the term, you will be able to:

1. explain the specific logical sense of a sentence, an argument, and premises and the conclusion of an argument
2. distinguish deductive arguments from other types of arguments
3. explain fundamental concepts of deductive reasoning, such as validity, soundness, logical consequence, theorem, and axiom
4. analyze the meanings of sentential connectives, such as "and", "or", "if-then", and "not", and quantifiers, such as "all", "some", and "none", in English and distinguish their specific meanings in symbolic logic
5. use a symbolic language characterized with a mathematical precision
6. translate sentences from English into that symbolic language
7. interpret sentences in the symbolic language, and apply those interpretations to determine the validity of arguments
8. use the rules of inference and analyze how they determine the meanings of sentential connectives and quantifiers with a mathematical precision
9. apply those rules and construct derivations or proofs to analyze how the information of a conclusion can be extracted from the information contained in the premises step-by-step with a mathematical rigor