LOGIC

Instructor: Hanoch Ben-Yami; Teaching Assistant: Hongkai Yin
US Credits: 2; ECTS Credits: 4
Fall Term
Mandatory for 2nd year Philosophy
Prerequisites: None

Learning objectives: The course offers an introduction to basic topics in formal logic relevant to philosophy, and to some of their applications.

Learning outcomes: Students will be familiar with the basics of propositional and predicate logic, properties of propositions (tautology, contradiction etc.), relations between propositions (consistency, entailment...) and properties of calculi (soundness, completeness...). They will also be familiar with several proof methods (truth tables, natural deduction). Translation of natural language sentences into formal languages will also be discussed.

Learning activities/teaching methods: The course is based on lectures in class, with a summary and additional material distributed following the class. A reader summarising the principles of the formal systems will also be distributed. There will be little preparatory reading. Homework will be given on most weeks, consisting mainly of exercises with the formal systems studied, and parts of it will be discussed in class. Each assignment will be returned with comments.

Assessment
Class attendance and participation: 10%
Homework: 40%
Final exam: 50%

Division into Weeks

Week 1
Logic's subject matter; definition of valid argument etc., contradictions etc.; why study logic?

Week 2
Propositional Logic 1: truth value connectives, truth tables, truth operators in natural language, what is said vs. what is implied, the conditional.

Week 3
Formal work on truth tables. Constructing a truth table, checking whether a formula is a tautology or..., checking argument validity. Equivalence between formulas: reducing the number of connectives; how many are necessary?

Week 4
Natural Deduction: a formal systematisation of the way we argue. Derivation rules, examples.

Week 5

**Week 6**
Relation of the proof systems and the truth tables: can everything valid be proved? Can only valid arguments be proved? Is there a method of proof? Soundness and completeness.

**Week 7–8**
Relations between sentences due to their internal structure. Some Aristotelian Logic.

**Week 9**
Beyond Aristotelian logic: relations, connectives... Fregean logic. Formalisation of natural language sentences.

**Week 10**
Natural Deduction for the Predicate Calculus.

**Week 11**

**Week 12**
Revision.