Logic

Instructor: Mike Griffin (griffinm@ceu.edu)
2 credits/4 ECTS Credits
Mandatory for MA students
Winter term 2019

This course will focus primarily on the formal properties of statements and sets of statements. It will be shown how to determine which statements are logical truths or tautologies, i.e., true by virtue of their logical form, and how to determine when a statement follows from, or is entailed by, other statements as a matter of logic alone. We will develop the methods for formally deriving conclusion from premises, or logical truths from no premises at all. We will show that our logical system has certain desired features: (1) soundness – any statement that can be derived in the system is a logical truth, and (2) completeness – any logical truth can be derived in the system. We will also discuss the basics of predicate logic with quantifiers. Time permitting, we will discuss further extensions of logic relevant to philosopher, e.g., modal logic. By the conclusion of the course students will be able to formalize arguments contained in philosophical texts and evaluate them for formal properties such as validity. Student will also be able to employ concepts such as logical truth, necessary and sufficient conditions and entailment.

Reading material for the course will be in the form of handouts. There will be homework on a weekly basis. There will be a final exam at the end of the term which you must pass in order to pass the class. Class time will be divided between the introduction of new material and solving problems. The pace of the class will depend on the rate the material is absorbed. Students who are having difficulty with the material are encouraged to see me outside class.

Topics:

Propositional Logic:
Atomic and compound statements
Truth-functional connectives
Validity and soundness
Semantics for logical truth, logical equivalence and entailment (truth-tables, truth trees)
Rules of derivation
Deriving statements from no premises (i.e., proving logical truths)
Soundness and completeness proofs for propositional logic

Quantification theory:
Translating statements with quantifiers
Basic derivation principles
Translating statements with identity