

Logic and Argumentation II: Sets, Predicates and Modalities (7,5 ECTS credits)

Level: 1st cycle

Discipline: PHILOSOPHY

Course ID: 0421

Admission requirements

General admission requirements for university studies. Students taking part in the course as a part of their Bachelor's degree program must have completed Course A, Introduction in Philosophy and Theology (30 ECTS credits) as well as the course *Logic and Argumentation* (0126, 7,5 ECTS credits), or an equivalent course. Students taking part in the course as a freestanding course are expected to have corresponding prior knowledge.

Educational goals

After having completed the course the students are expected to be able to:

- Translate between natural language and symbolic logic, in using the formal concepts and formal language of set theory and predicate logic, to treat predicate logic syntactically and semantically as well as give an account of basic concepts of set theory, predicate logic and the modal concepts such as “necessity”, “possibility”, “obligatory”, “permissible”, and “possible worlds”.
- Analyse logical validity and soundness of arguments expressed in natural language by applying the relevant logical methods studied in the course, such as set-theoretical proofs, model theory and natural deduction in predicate logic.
- Reason about the basic principles of validity in the context of the possible-world semantics.
- Reason about the relation between symbolic logic, on the one hand, and argumentation in different areas and especially theology, on the other. Reason about the advantages, as well as the limits, of using formal languages in analysing the logical quality of human reasoning

Course content

In this course, the strongest focus is on the formal languages and methods used in set theory and predicate logic. Certain focus is also devoted to the formal languages and methods of the basic modal logic. Several logical methods for analysing the validity of the related types of arguments are studied and practiced, as well as the principles for developing valid arguments by means of these formal methods. The course involves training in skills of applying the related formal logical analyses in various contexts of reasoning. There is also a slight focus on possible limitations of the formal methods for analysing human reasoning.

Teaching and examination

The course is taught in English. The examination is in the form of a written exam taking place at the end of the course.

Bibliography

For the entire course:

- (1) *A compendium* written by Taeda Tomić will be distributed to the students.
- (2) Power Point presentations, that the lecturer will put on Moodle, after every lecture.

Set theory, and predicate logic:

- (3) Suppes, Patrick (1957). *Introduction to Logic*. New York, Cincinnati, Toronto, London, Melbourne: van Nostrand. Chapter 3, 4, 9, 10 and parts of Chapter 11.
- (4) Hansen, Kaj Børge (2003, 4e upplaga). *Grundläggande logik*. Lund: Studentlitteratur. Chapters 6-10, for those who can read Swedish.

N. B.! Each student may individually choose between (3) and (4).

Introduction to basic modal logic:

- (5) Garson, James, "Modal Logic", *The Stanford Encyclopedia of Philosophy* (Spring 2024 Edition), Edward N. Zalta & Uri Nodelman (eds.), URL = <https://plato.stanford.edu/archives/spr2024/entries/logic-modal/>

Sections 1-8 (only 9 pages).

- (6) Chellas, Brian F. (1980). *Modal Logic: An Introduction*. Cambridge: Cambridge University Press. Chapter 1 (introduction) and pages 25-41 from Chapter 2.

See also "Kursplaner: allmänna bestämmelser" (Course plans: General rules)

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