



## DEPARTMENT OF PHILOSOPHY, LINGUISTICS AND THEORY OF SCIENCE

### **LOG131 Modal logic, 7.5 credits**

Modallogik, 7,5 högskolepoäng

*Second Cycle*

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#### **Confirmation**

This course syllabus was confirmed by Department of Philosophy, Linguistics and Theory of Science on 2020-01-13 to be valid from 2020-08-30, autumn semester of 2020.

*Field of education:* Science 100%

*Department:* Department of Philosophy, Linguistics and Theory of Science

#### **Position in the educational system**

The course can be part of the following programme: 1) Logic, Master's (120 credits) programme (H2LOG) and 2) Computer Science, Master's Programme (N2COS) and can also be given as a freestanding course.

#### *Main field of studies*

Logic

#### *Specialization*

A1N, Second cycle, has only first-cycle course/s as entry requirements

#### **Entry requirements**

Admission to the course requires successful completion of

- at least 60 credits in total in the subject areas mathematics, logic, computer science or formal linguistics, or
- at least 90 credits in philosophy or linguistics, and at least 30 credits in total in the subject areas mathematics, logic, computer science or formal linguistics, or equivalent knowledge.

#### **Learning outcomes**

On successful completion of the course the student will be able to:

*Knowledge and understanding*

- account for Kripke semantics for modal logic, including correspondence between modal formulas and properties of binary relationships,
- account for basic model theory of modal logic, e.g., connections between bisimulation and modal equivalence,
- account for some central applications of modal logic, e.g., epistemic logic, provability logic, or dynamic logic,

*Competence and skills*

- formulate, and present proofs of, the most important results in the course, including completeness, decidability and correspondence results, as well as of lemmas that are used in the proofs,
- formalise argumentation that is depending on non truth-functional sentence operators,

*Judgement and approach*

- show awareness of the relationships between systems of modal logic and other types of logics,
- contrast an intensional and an extensional approach to modal logic.

**Course content**

The course gives a mainly semantically oriented introduction to modern modal propositional logic and Kripke semantics. It offers both a solid mathematical basis and an introduction to some of the many applications within, e.g., philosophy, metamathematics and computer science.

Example contents:

- Kripke semantics
- proof systems
- completeness theorems via canonical models, and refined constructions
- decidability
- incompleteness
- bisimulation and invariance
- correspondence between the validity of modal formulas and properties of binary relations

The course is mainly theoretically oriented, but also contains practical exercises.

**Form of teaching**

Teaching is given in the form of lectures, seminars, exercises, individual assignments and group assignments. Compulsory attendance can apply to certain course components, which is indicated in the course schedule.

*Language of instruction:* English

**Assessment**

The course is examined individually in written and/or oral form. There may be compulsory homework assignments during the course.

If a student, who has failed the same examined component twice, wishes to change examiner before the next examination, a written application shall be sent to the department responsible for the course and shall be granted unless there are special reasons to the contrary (Chapter 6, Section 22 of Higher Education Ordinance).

In cases where a course has been discontinued or has undergone major changes, the student shall normally be guaranteed at least three examination sessions (including the ordinary examination) during a period of at least one year from the last time the course was given.

**Grades**

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).

**Course evaluation**

Students who are currently taking the course or have completed it will be given the opportunity to express their views and share their experiences in an anonymous course evaluation. A compilation of the course evaluation and the course coordinator's reflections on it will be made available to the students within reasonable time after the end of the course. The next time the course is taught the compilation and any measures based on it will be presented to the students.