LOG131   Modal logic, 7.5 credits
Modallogik, 7,5 högskolepoäng
Second Cycle

Confirmation
This course syllabus was confirmed by Department of Philosophy, Linguistics and Theory of Science on 2020-01-13 and was last revised on 2022-12-22 to be valid from 2023-01-16, spring semester of 2023.

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).

The course can also be given as a freestanding course.

Main field of studies	*Specialization*
Logic	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.

English 6 or equivalent is also required.

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 relations,
- 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 correspondance results, as well as of lemmas that are used in the proofs,
- formalise argumentation using 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 perspective on 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.

Language of instruction: English

Assessment

The course is assessed through a small number of compulsory home assignments and a final written examination.

When 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).

If a student has received a recommendation from the University of Gothenburg regarding pedagogical support for students with disabilities, the examiner may decide, in the case where this is compatible with the learning outcomes for the course, and provided no unreasonable resources are required, to give the student an adjusted examination or an alternative form of examination.

In the case where a course has been discontinued or has undergone major changes, the student shall normally be guaranteed at least three examination sessions (including the regular examination session) during a period of at least one year on the basis of the course's former structure.

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.

Additional information

The course requires access to a computer (or the equivalent) with Internet connection.

The course may not be included in a degree together with the course LOG130.