

# Modal Logics: a philosophical perspective

2017 Course description (tentative)

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## Introduction

This 7.5 hp course is mainly intended for students in philosophy and is generally accessible to a broad audience with basic background on formal classical logic and general appreciation of philosophical aspects of logic.

## Practical information

The course will be given in English. It will comprise 13 weekly double lecture sessions. Weekly 3-hour slots (incl. breaks and discussion time) are allocated for these sessions, mostly on **Tuesdays during 13.00-16.00**.

The course will begin on **February 21, 2017 (Week 8) in room D734, Södra huset, hus D**.

### Lecturer's info:

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**Course webpage:** <http://www2.philosophy.su.se/goranko/Courses2017/ModalLogics-2017.html>

## Prerequisites

The course will be accessible to a broad audience with introductory background on classical formal logic. Some basic knowledge of modal logics would be an advantage but not a prerequisite.

## Brief description

Modal logics extend classical logic with additional 'modal' logical operators, reflecting different *modes of truth*. The study of modal logics originated from philosophical problems and considerations, and flourished after the introduction of the possible worlds semantics in the late 1950s. This course will begin with basic technical background on syntax and possible worlds semantics, and will present some important axiomatic principles of generic propositional modal logic. Then it will give an overview and will discuss philosophical aspects of some of the most important and popular families of modal logics, including alethic, epistemic, doxastic, temporal, deontic, and agentive propositional modal logics, as well as some first-order modal logics. The emphasis will be on conceptual issues and philosophical applications, rather than on technical developments and results.

## Tentative course outline and schedule:

**Lecture 1:** Introduction. Brief history and philosophical origins of modal logic. An overview of the spectrum of modal logics. Necessary and possible truths. Alethic modal logics.

**Lecture 2:** Possible worlds semantics: technical introduction.

**Lecture 3:** Reasoning about knowledge and beliefs. Epistemic and doxastic modal logics. Some epistemic puzzles and paradoxes of knowledge and knowability.

**Lecture 4:** Multi-agent epistemic reasoning and logics. Group, distributed, and common knowledge.

**Lecture 5:** Dynamic epistemic logic. Epistemic actions and epistemic model updates.

Applications to solving some epistemic puzzles.

**Lecture 6:**

Reasoning about time. Tense and modality. Historical necessity and Diodorus' master argument.

**Lecture 7:** Formal models of time. Variety of temporal logics. Linear time temporal logics.

**Lecture 8:** Branching time of possible futures. Branching time temporal logics.

**Lecture 9:** Modal logics of agency. 'Seeing to it That' (STIT) theory. Some problems relating actions, knowledge and ability.

**Lecture 10:** Reasoning about obligations and permissions. Deontic logics and deontic paradoxes.

**Lecture 11:** First-order modal logics informally. Interaction between modality and quantification. Formal semantics and some philosophical applications.

**Lecture 12:** First-order temporal and epistemic logics. Formal semantics and some philosophical applications.

**Lecture 13:** Capita selecta. Concluding discussion.

## Course literature

The course literature will consist of a selection of readings from chapters of books and handbooks and some papers. All these are available online or will be provided electronically. In addition, some summary slides will be provided after each lecture.

Listed below are a few general references.

1. Johan van Benthem, *Modal Logic for Open Minds*, CSLI publ., 2010.
2. John Burgess, *Philosophical Logic*, Princeton University Press, 2009.
3. Rod Girle, *Modal Logics and Philosophy*, McGill-Queen's UP, 2nd ed., 2010.
4. Lou Goble, *The Blackwell Guide to Philosophical Logic*, Wiley, 2001.
5. Lloyd Humberstone, *Philosophical Applications of Modal Logic*, College Publications, 2016.
6. Ted Sider, *Logic for Philosophy*, OUP, 2010.
7. Tim Williamson, *Modal Logic as Metaphysics*, OUP, 2013.
8. Ed Zalta (ed.), *Stanford Encyclopaedia of Philosophy*, <http://plato.stanford.edu>

## Assessment

3 written individual assignments.