Philosophical Logic 2018
Course description (tentative)
January 15, 2018

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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 18 two-hour long sessions combining lectures and exercises, grouped in 2 sessions per week over 9 teaching weeks. The weekly pairs of 2-hour time slots (incl. short breaks) allocated for these sessions, will be on **Mondays during 10.00-12.00 and 13.00-15.00**, except for the first lecture. The course will begin on **Wednesday, April 4, 2018 (Week 14) at 10.00 am in D220, Södra huset, hus D**.

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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

Philosophical logic studies a variety of non-classical logical systems intended to formalise and reason about various philosophical concepts and ideas. They include a broad family of *modal logics*, as well as *many-valued, intuitionistic, relevant, conditional, non-monotonic, para-consistent*, etc. logics. Modal logics extend classical logic with additional intensional logical operators, reflecting different *modes of truth*, including *alethic, epistemic, doxastic, temporal, deontic, agentive*, etc. Many-valued logics extend classical logic semantically, by admitting more truth values, in addition to the classical *true* and *false*, which can have various interpretations, e.g. degrees of truth, probability, or uncertainty. On the other hand, intuitionistic logic restricts classical logic by rejecting some non-constructive principles and laws of reasoning, such as the law of excluded middle. Relevant and conditional logics endeavour to capture the notions of relevant implication and conditional (incl. counterfactual) reasoning, whereas non-monotonic and para-consistent logics purport to formalise reasoning with defeasible knowledge and possibly contradictory information.

This course will begin with brief historical overview followed by basic technical background on syntax and possible worlds semantics, and will present some important axiomatic principles and systems of generic propositional modal logic. Then it will offer a brief introduction and discussion of 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 many-valued and intuitionistic logics, and (time permitting) relevant and conditional logics. It will end with technical and philosophical introduction to first-order modal logics.

The emphasis of the course will be mainly on conceptual issues and philosophical applications, whereas technical aspects and methods will play auxiliary role.

Tentative course outline and schedule:

The course will comprise 18 two-hour long sessions combining lectures and exercises, spread over 9 teaching weeks as follows.

Lecture 1: Introduction. Brief history and philosophical origins of logic. Logical ideas in the antiquity: Aristotle, the Stoic and Megarian schools. An overview of the spectrum of philosophical logics.

Lecture 2: Modes of truth, modalities and a spectrum of modal logics. Necessary and possible truths. Alethic modal logics. Possible worlds semantics.

Lecture 3: Modal logics: technical introduction.

Lecture 4: Introduction to modal deductive systems: axiomatic systems, natural deduction and semantic tableaux for basic modal logics.

Lecture 5: Reasoning about knowledge. Epistemic modal logics. Some epistemic puzzles and paradoxes of knowledge and knowability.

Lecture 6: Multi-agent epistemic reasoning and logics. Group, distributed, and common knowledge.

Lecture 7: Public and private announcements. Dynamic epistemic logic. Epistemic actions and epistemic model updates. Applications to solving some epistemic puzzles.

Lecture 8: Reasoning about beliefs. Doxastic modal logics.

Lecture 9: Reasoning about time. Tense and modality. Historical necessity and Diodorus' master argument. Formal models of time. Variety of temporal logics.

Lecture 10: Linear time temporal logics.

Lecture 11: Branching time of possible futures. Branching time temporal logics.

Lecture 12: Modal logics of agency. 'Seeing to it That' (STIT) theory. Some problems relating actions, knowledge and ability.

Lecture 13: Introduction to many-valued and intuitionistic logics.

Lecture 14: *Optional:* Reasoning about obligations and permissions. Deontic logics and deontic paradoxes.

Lecture 15: *Optional (time permitting):* Introduction to logics of conditionals and to relevance logics.

Lecture 16: Interaction between modality and quantification. First-order modal logics. Possible worlds semantics. Some philosophical problems.

Lectures 17-18: First-order temporal, epistemic, and intuitionistic logics. Formal semantics and some philosophical applications. Conclusion of the course.

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 indicative (not prescribed) 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. Graham Priest, An Introduction to Non-Classical Logic, Cambridge University Press, 2008 (2nd Edition).
7. Ted Sider, Logic for Philosophy, OUP, 2010.
8. Tim Williamson, Modal Logic as Metaphysics, OUP, 2013.
9. Ed Zalta (ed.), Stanford Encyclopaedia of Philosophy, `http://plato.stanford.edu`

Assessment

3 written individual assignments.