Philosophical Logic 2020
Course description (*tentative*)
December 19, 2019

Valentin Goranko

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 14 three-hour long sessions combining lectures and exercises, during 13.00-16.00, scheduled during March 23 - June 5, 2020, as per timetable on SU TimeEdit.

The course will begin on **Monday, March 23, 2020 at 13.00 in D734, Södra huset, hus D**.

Course webpage: `http://www2.philosophy.su.se/goranko/Courses2020/PhilLogic-2020.html`

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Prerequisites

The course will be accessible to a broad audience with introductory background on classical (propositional and predicate) 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 intuitionistic and many-valued logics, logics of conditionals and relevance 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 per lectures:

Lecture 1: Introduction. Brief historical overview and origins of philosophical logic. An overview of the spectrum of philosophical logics. Modes of truth, modalities and a spectrum of modal logics. Necessary and possible truths. Alethic modal logics.

Lecture 2: Modal logics: technical introduction to the possible worlds semantics.

Lecture 3: Modal logics: introduction to modal deductive systems.

Lecture 4: Reasoning about knowledge. Epistemic modal logics. Multi-agent epistemic reasoning and logics. Group, distributed, and common knowledge.

Lecture 5: Multi-agent epistemic reasoning and logics: formal semantics. Some epistemic puzzles and paradoxes of knowledge and knowability. Reasoning about beliefs and doxastic modal logics.

Lecture 6: Public and private announcements. Dynamic epistemic logic. Epistemic actions and epistemic model updates. Applications to solving some epistemic puzzles.

Lecture 7: Reasoning about time. Tense and modality. Historical necessity and Diodorus' master argument. 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: Modality and quantification. First-order modal logics. Possible worlds semantics. Some philosophical problems and applications.

Lecture 12: First-order temporal and epistemic logics.

Lectures 13: Introduction to intuitionistic and and multi-valued logics.

Lectures 14: Introduction to logics of conditionals and relevance logics.
    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. Stanford Encyclopaedia of Philosophy, `http://plato.stanford.edu`
10. Internet Encyclopedia of Philosophy, `https://www.iep.utm.edu`

Assessment

3 mandatory written individual assignments, due after lectures 5, 9, and 13.
The assignments will be posted at least 2 weeks before the submission deadline.