FIL2405/4405: Philosophical Logic and the Philosophy of Mathematics.
University of Oslo. Spring, 2023
Syllabus and Course Outline

1. Practical Information.

Contacts. Christopher James Masterman. Email: c.j.masterman@ifikk.uio.no. Office: 336 in Georg Morgenstiernes hus. Office hours: Thursdays 13:00–14:00. (*If you want to meet to discuss any aspect of the course but cannot make the office hour for whatever reason, I strongly encourage you to email me and we'll arrange an appointment for when it suits you!*)

Seminar time. See §3, or see the cavnas page for an up to date schedule.

Assessment. The course will be examined by portfolio and the submission deadline is **15 May**. More information about assessment will be included in a separate document to be released.

   After each seminar in which we cover formal material (Week 1, 2, 3, 5, 7, and 8), there will be a worksheet with questions covering the material of that week. Completing these worksheets is not compulsory, but it is highly highly highly recommended that you do so. Completed work-sheets are to be handed in by the following Thursday. Just put them in my pigeon hole on the 3rd floor of Georg Morgenstiernes hus. I will mark them and give written feedback by the following Friday.

2. Overview and Preparation

To help them think about possibility and necessity, philosophers often use modal logic, i.e., logics of possibility and necessity broadly construed. In this course, we will cover the semantics and axiom systems for a variety of propositional modal logics, quantified modal logics, and quantified modal logics with identity. As well as this, we will discuss a variety of philosophical issues which are either best understood using these logics or which arise with the study of these logics, e.g. the question of which axioms for the modal operators are "correct", the question of whether identity is necessary, the actualism-possibilism debate, and the contingentism-necessitism debate. To end, we will look at broader questions about logic itself. In particular, we will look at anti-exceptionalism about logic and Quinean arguments against modal logic as a legitimate logic.

3. Readings

The course will largely follow the presentation of modal logic found in:

- G. E. Hughes and M. J. Cresswell, *A New Introduction to Modal Logic*, Routeledge, 1996

As such, it is essential that you have access to this material. Depending on your background, you may find it useful to familiarise yourself with basic concepts in set theory, logic, and their notation before starting the course. This will all be covered in the first seminar, but you may find it helpful to get a head start. For a nice introduction to the basic concepts in set theory and logic, look at:

- Jc Beall and Shay Allen Logan, *Logic: The Basics*, Routeledge, 2017, Part I.

Each week, the starred readings "*" are essential. It is expected that essential reading for the week is done prior to the seminar for that week. Other readings listed here are recommended for further discussion of the topic. Further still, there are several useful online resources which will help you find more readings on any of the topics covered in the course. The following are particularly useful.

- The *Stanford Encyclopedia of Philosophy* contains a large collection of survey and overview articles on a wide variety of philosophical and logical topics. The bibliographies of these entries are an excellent way for finding further readings.

- *PhilPapers* is an organised database of philosophical articles and books. Often, there are links allowing you to access the paper or book, either through the university, or through the PhilPapers internal catalogue of papers and manuscripts.

- *Google Scholar* is a good way of finding specific articles you are interested in, or authors you are interested in reading. Google Scholar allows you to see who has cited a particular paper and so is useful for finding published discussions of particular papers or books. (PhilPapers also shows 'cited by', but it is restricted to papers and books accessible through PhilPapers.)

(*If you are struggling to find good further reading on a topic that interests you, or want help using these resources, you are very welcome to email me and I will do my best to help!*)

4. Schedule and Readings

Week One: Propositional Logic and Basic Logical Notions   **(27th January)**

A recap of the semantics and the proof theory of non-modal propositional logic. We also recap some basic logic notions, e.g., theoremhood, logical truth, derivation, logical consequence.

Readings.

- *G. E. Hughes and M. J. Cresswell, *A New Introduction to Modal Logic*, 1996, pp. 3-13.

- Jc Beall and Shay Allen Logan, *Logic: The Basics*, Routeledge, 2017, Part I.

Week Two: Propositional Modal Logic (Language and Proof Theory)   **(3rd February)**

We cover propositional modal logic characterised syntactically, or proof theoretically, focusing on axiom systems. This will cover the main normal modal systems of K, T, B, S4, and S5.

Readings.

- *G. E. Hughes and M. J. Cresswell, 1996, pp. 13-36, 51-56, 58-60, 62-63.

Week Three: Propositional Modal Logic (Semantics—Model Theory)   **(10th February)**

We cover propositional modal logic characterised semantically, focusing on model-theoretic semantics for normal modal logics, including K, T, B, S4, and S5. We also cover the general completeness theorem for normal propositional modal logics.

Readings.

- *G. E. Hughes and M. J. Cresswell, 1996, pp. 36-50, 56-57, 60-62, 63-64, Chp. 6

Note that there is no seminar on 17th February

Week Four: Which system is "right"? (24th February)

An important philosophical question concerns which of the logics we have already discussed are "right" for different varieties of necessity and possibility. We will focus on which of the logics already discussed is right for metaphysical modality, as well as discuss what we might mean by "right" when we say one logic is the right modal logic.

Readings.

- *Salmon, N, "The Logic of What Might Have Been", *The Philosophical Review*, 1989, pp. 3-34.

- *Dummett, M, "Could There Be Unicorns?" in *The Seas of Language*, OUP, 1996, pp. 328-348.

- Hale, B, "S5 as the Logic of Metaphysical Modality: Two Arguments for and Two Arguments against", in *Essence and Existence*, Bob Hale and Jessica Leech (eds.), OUP, 2020, pp. 141-148.

Week Five: Simple Quantified Modal Logic (3rd March)

Here, we look at how we can add quantifiers to propositional modal logic, focusing on SQML.

Readings.

- *G. E. Hughes and M. J. Cresswell, Chp. 13

Week Six: SQML, Actualism, and Possibilism. (10th March)

Here, we look at some philosophical issues raised by simple quantified modal logic, focusing on how actualists—those who think that everything actually exists—and possibilists—those who think that, in some sense, there are things which do not actually exist—approach SQML.

Readings.

- *Menzel, C, "Actualism", The Stanford Encyclopaedia of Philosophy, (Summer 2022 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/ sum2022/entries/actualism/>, §§ 1–2.

- *Linsky, B and Zalta, E, "In Defense of the Simplest Quantified Modal Logic", *Philosophical Perspectives*, Vol. 8, 1994, pp. 431-458.

- *Bennett, K, "Proxy "Actualism"", *Philosophical Studies*, Vol. 129, No. 2, 2006, pp.263-294

- Williamson, T, "Truthmakers and the Converse Barcan Formula", *Dialectica*, Vol. 53, No. 3/4, 1999, pp. 253-270.

Week Seven: Quantified Modal Logic and Identity   (17th March)

Here, we look at how we can add identity to quantified modal logic, and the issues this raises.

Readings.

- *G. E. Hughes and M. J. Cresswell, pp. 312-314.

- *Kripke, S, *Naming and Necessity*, Harvard University Press, 1980, Lecture III.

Week Eight: Contingentism, Necessitism, and Modal Logic.   (24th March)

We look at a philosophical issue raised by simple quantified modal logic with identity: the debate between contingentists—those who think that there might have been something which might not have existed—and necessitists—those who think that, necessarily, everything necessarily exists.

Readings.

- *Williamson, T, *Modal Logic as Metaphysics*, Oxford University Press, 2013, Chp. 1.

- *Nelson, M, "The Contingency of Existence", in *Metaphysics and the Good: Themes from the Philosophy of Robert Merrihew Adams*, Newlands and Jorgensen (ed.), OUP, 2009, pp. 95-155.

- Goodman, J, "Williamson on necessitism", *Canadian Journal of Philosophy*, Vol. 46, No. 4/5, 2016, 613-39.

Week Nine: Not-so-simple Quantified Modal Logic.   **(31st March)**

Here, we will look at various means of setting up quantified modal logic to avoid the issues that arise in connection with Simple Quantified Modal Logic.

Readings.

- *G. E. Hughes and M. J. Cresswell, pp. 289-296

Note that there is no seminar on 7th April

Week Ten: Anti-Exceptionalism about Logic I.   **(14th April)**

Here, we look at a broad way of understanding logic, anti-exceptionalism—the view that logical theories are continuous with, and not exceptional to, theories in the sciences. This view of logic has lay behind many of the arguments already discussed in the course, particularly in the debate over contingentism and necessitism.

Readings.

- *Williamson, T, "Methodological Afterword", in *Modal Logic as Metaphysics*, OUP, 2013, pp. 423-429.

- *Williamson, T, "Logic, Metalogic and Neutrality", *Erkenntnis* 79, 2014, pp. 211-231.

- Russell, G, "The Justification of the Basic Laws of Logic", *Journal of Philosophical Logic*, 44, 2015, pp. 793-803

Week Eleven: Anti-Exceptionalism about Logic II.   **(21st April)**

Here, we look at arguments against anti-exceptionalism about logic, and, in turn, some arguments against the methodological underpinnings of some arguments for necessitism.

Readings.

- *Hjortland, O. T, "Anti-Exceptionalism About Logic", *Philosophical Studies* 174, 2017, pp. 631-658.

- *John MacFarlane, "In what sense (if any) is logic normative for thought", delivered at the American Philosophical Association Central Division meeting.

Week Twelve: Is Modal Logic a Logic at all?   (28th April)

Here, we end by looking at skepticism of modal logic as logic, focusing on Quine's arguments.

Readings.

- *W. V. O. Quine, "Reference and Modality", in *From a Logical Point of View*, Quine (ed.), 1953.

- *Borghini, A, *Critical Introduction to the Metaphysics of Modality*, 2016, § 2.2, "Quinean Skepticism".

- Divers, J, "How Skeptical is Quine's "Modal Skepticism"?", *The Monist*, 100(2), 2017, pp. 194-210.