Introduction to Logic

In this course, we'll look at logic — sometimes called 'the science of truth'. After a cross-cultural historical introduction to the field, we'll cover propositional logic and first-order logic (predicate logic) learning how to formalize an argument and prove logical theorems. Once we are all comfortable 'doing logic', we will then work out what exactly it is we are doing. What makes an argument valid? What is a logical truth? Is it like a law of physics, a 'law of thought', or something else? In the process, we'll learn about the ideas of philosophers like Frege, Ruth Barcan Marcus, and Nagarjuna.

Our text will be: forall *x*: Calgary, An Introduction to Formal Logic,
Link: https://forallx.openlogicproject.org/

Week: 1. What is Logic?
Ideas: Validity, soundness, inference, syllogism, propositions, proof
Reading: Excerpt from 'Thinking to Some Purpose' by Susan Stebbing

Week 2. Propositional Logic
Ideas: Truth-functional connectives, formalization, truth tables
Reading: forall *x* chapters 2,3

Week 3. Propositional Proof Theory
Ideas: Natural deduction rules, the principle of non-contradiction
Reading: forall *x* chapter 4

Week 4. Indian logical traditions
Ideas: Negation (Prasaja and Paryudāsa), catuṣkoṭi, anumāna
Reading: Bimal Krishna Mitlal, 'Introducing Indian Logic'

Week 5. First-order logic
Ideas: Frege's Big Idea, quantifiers, disambiguation examples
Reading: forall *x* chapter 5

Week 6. First-order logic: Proof Theory
Ideas: Natural deduction rules, proofs
Reading: forall *x* chapter 7

Week 7. A mathematical interlude
Ideas: Relations, functions, identity (Leibniz's laws)
Reading: forall *x* chapter 6

Week 8. First-order logic: Semantics
Ideas: Interpretation, models, semantic proofs
Reading: forall *x* chapter 6

Week 9. Propositional Modal logic
Ideas: Possible worlds, Kripke frames
Reading: forall *x* chapter 8

Week 10. Logic Metatheory
Ideas: Functional completeness consistency, soundness, completeness
Reading: forall *x* chapter 9

Week 11. What is logic (now you know some logic)?
Ideas: Husserl on psychologism, laws of logic, modal logic as metaphysics
Reading: Penelope Maddy, 'The Philosophy of Logic'

Week 12. Non-classical logics
Ideas: Three-valued logic, intuitionism, dialetheism, Buddhist logic
Reading: Graham Priest, 'What's So Bad About Contradictions?'

Week 13. Logic and language
Ideas: Meaning as truth-conditions, implicature, what cannot be said
Reading: Paul Grice, 'Logic and Conversation'

Week 14. How to be logical
Ideas: Bayes' theorem, heuristics (base-rate neglect, anchoring effects, conjunction fallacy)
Reading: Tversky & Kahneman "Judgment under Uncertainty: Heuristics and Bias"