Phil 1304: Introduction to Logic

Summer 2015, University of Texas, El Paso
Class Meets: M-F 4:20—6:30 p.m., UGLC 232

Contact Information

Professor: Marc A. Moffett
Phone: 915.747.5804
Email: mamoffett@utep.edu

Office: Worrell 202
Office Hrs by appointment.

Text:
Bonevac, Daniel. 2003. *Deduction: Introductory Symbolic Logic* (2nd ed.). Malden, MA: Blackwell.

Description:
Logic is the theory of *correct* reasoning. It is, therefore, a normative theory: it does not aim to describe how people actually do reason, but rather how they *ought* to reason.

For most people, the medium in which they reason is some natural, informal language such as English. Symbolic logic aims to regiment this informal reasoning by means of an artificial, precisely specified language. The idea is that natural languages have historically developed not solely (or even primarily) for purposes of reasoning, but for the sake of more general communicative goals (e.g., ease of expression). By contrast, the formal logician aims to develop a language which "strips away" these logically extraneous features so that she can focus more carefully on only the logically relevant features of the language.

It is important to realize, however, that this is more easily said than done. What features of a language are logically extraneous? What features are important, even essential? There are no simple, uncontroversial answers to these questions. Nevertheless, it is possible to make some progress by reigning in our ambitions somewhat. Rather than trying to capture all of the logically relevant features of a language at one go, we can instead carve off increasingly more complex fragments of a language and try to understand their logical characteristics. The result will be a series of increasingly sophisticated and powerful logical systems (logics) which capture increasingly larger aspects of natural languages. This is an on-going process. Logic, far from being a settled system of principles of correct reasoning, is a philosophically rich and productive area of research.

In this course, we will focus primarily on what is known as classical logic. Specifically, we will develop two logical systems in detail: sentential logic and quantificational logic. These logical systems are extremely well-understood and form the backbone for understanding more advanced issues in philosophy, mathematics, linguistics, and computer science. Time permitting; we will also look at more advanced issues concerning modal logic and the logic of counterfactuals.

Goals:

To achieve a detailed understanding of classic predicate logic.
To achieve a working understanding of extensions of predicate logic.
To understand some of the *philosophical* framework surrounding logic.

Evaluation:
Four In-class Exams [25% each]

Course Schedule:

Week	Topic	Readings
M 6/08	Introductory Concepts	Ch. 1.1-1.5
	Truth Tables. Logical constants (¬, &, v, →, ↔)	Ch. 2.1-2.2
	SL: THE LANGUAGE OF SENTENTIAL LOGIC	
T 6/09	Syntax and Semantics for SL.	Ch. 2.1-2.5
	TRUTH TABLES	
	Decidability. Truth tables for formulas.	Ch. 2.6-2.9
	TRUTH TREES	
W 6/10	Rules for ¬. Rules for & and v.	Ch. 3.1-3.3
R 6/11	Catch-up. Review**. First Exam [Chs. 1 & 2]**	
F 6/12	Rules for → and ↔. Evaluating formulas and argument forms.	Ch. 3.4
	NATURAL DEDUCTION	
M 6/15	Natural deduction. Rules for ¬, &, →, ↔, and v.	Ch. 4.1-4.4
T 6/16	Derivable rules. Catch up.	Ch. 4.5
W 6/17	**Second Exam**	
	Q: THE LANGUAGE OF PREDICATE LOGIC	
R 6/18	Constants. Quantifiers (∀, ∃). Categorical sentence forms. Polyadicity.	Ch. 5.1-5.3
F 6/19	Syntax of Q. Translation.	Ch. 5.4-5.5
	TRUTH TABLES	
M 6/22	Rules for ∀ and ∃. Strategies	Ch. 6.1-6.2
	MODEL THEORY	
T 6/23	Interpretations.	Ch. 6.3-6.4
W 6/24	Catch-up. Review.	
R 6/25	**Third Exam**	
	NATURAL DEDUCTION	
F 6/26	Rules for ∀ and ∃. Universal Proof. Derived Rules	Ch. 7.1-7.3
	Q^+: PREDICATE LOGIC WITH IDENTITY	
M 6/29	Q^+ (Q w/identity). Truth tree rules for =.	Ch. 8.1-8.2
T 6/30	Deduction rules for =. Catch up. Review	Ch. 8.3
W 7/01	Catch-up. Review.	
	INTRO TO MODAL LOGIC	
R 7/02	Modal Connectives. Semantics. Interpretation.	Ch. 9.1-9.3
R 7/02	**FOURTH EXAMS**	