Philosophy 4310/Phil 4000/Math 4000
Advanced Logic

INSTRUCTOR	OFFICE	E-MAIL	OFFICE HOURS
Joel Velasco	Eng/Phil 251C	joel.velasco@ttu.edu	T, W, Th 11-12

Course meets Mon, Wed in HUMA 259 from 11:00am - 12:20pm

Course description: The goal of this course is for students in math and philosophy to achieve "logic literacy". We will study i) the basic techniques of logic, including syntax, semantics, proof theory, metalogic, and a bit of philosophy of logic, and ii) a number of extensions of standard logic that are important in philosophy (for example, modal logic and counterfactuals). Connections to philosophical issues will be made, though the focus will be on logic itself. The course will be more broad than deep: we will examine many different systems but will not spend a lot of time proving difficult metalogical results about these systems (except for completeness in propositional logic and modal propositional logic.)

Course website: Any information about this course will be posted on the course website: https://joelvelasco.net/teaching/4310/index.htm

Homeworks will be submitted and grades recorded in the Canvas website.

Texts:
Draft of the second edition of Ted Sider's *Logic for Philosophy* (distributed on Canvas). Any additional readings or texts will be posted on Canvas and the course website.

Course Learning Outcomes

By the end of this course, students will be able to:

1. **Formalize philosophical arguments** in first-order and higher-order logical languages, including identity, relations, and quantifiers.
2. **Evaluate validity** of arguments using formal proof systems, semantic methods, and countermodels.
3. **Construct and assess formal proofs** in natural deduction and related systems.
4. **Apply model-theoretic semantics** to determine truth, satisfaction, and logical consequence.
5. **Explain and analyze metatheoretic results** such as soundness and completeness of a logical system.
6. **Use logical tools to analyze philosophical problems**, including issues in metaphysics, philosophy of language, and epistemology.

7. **Distinguish logical from non-logical vocabulary** and explain the philosophical significance of this distinction.
8. **Critically assess the expressive power and limitations of formal systems** used in philosophical analysis.

Method of Assessment

There are a variety of students with different backgrounds, interests, and goals in this class. Assessment methods are somewhat flexible. But as a default that is available to everyone:

- There will be (roughly) 6 homework problem sets consisting of a combination of problems and short answers/essays throughout the course.

  - **Rough Grading Scale:**
  - 92—100% → A
  - 90—91% → A-
  - 88—89% → B+
  - 82—87% → B
  - 80—81% → B-
  - 78—79% → C+
  - 70—77% → C
  - 65—69% → C-
  - 50—64% → D
  - 0—49% → F

Required syllabus statements concerning ADA, Religious Holidays, Academic Integrity and Pregnancy Accommodation:
https://www.depts.ttu.edu/tlpdc/RequiredSyllabusStatements.php

Note that Generative AI use is <u>NOT</u> permitted in this course:
https://www.depts.ttu.edu/tlpdc/Resources/Syllabus/ai-use-not-permitted.pdf

Rough Schedule: (schedule is flexible)

Week 1		Introduction, LFP chapter 1
Week 2-4	Propositional logic, induction, metatheory	LFP chapter 2
Week 5	Non-standard logic	LFP chapter 3

Week 6-8	Modal logic	LFP chapter 4
Week 9-10	Indicative Conditionals	
Week 11-12	Counterfactuals	LFP 6
Week 13-15	Predicate Logic	LFP 7