Syllabus

1.   The Basics

Period:	MW7 6:10pm – 7:30pm
Room:	HH-B5 College Avenue Campus
Instructor:	Zee R Perry
Contact:	zee.perry@rutgers.edu
Office:	106 Somerset Street, 5th Floor, Philosophy Department PTL Office.
Office Hours:	Wednesdays 3-4:30pm, other times TBD, and by appointment

2.   Course Description

Logic is the formalized study of reasoning and arguments. This course is an introduction to the field, and will cover the core concepts sentential logic, first-order logic, their proof theories, and the basics of their semantics. We will begin by understanding arguments in a simple way, expressing them in coarse-grained formal language. This more precise notation will enable us to evaluate the validity and soundness of various inferences, and to construct inference ourselves, using the Natural Deduction system.

We will then go back through these questions with a finer-toothed comb, and break sentences down into their component parts. First-order logic, or "Predicate logic", relies on a formalism that breaks sentences down into subjects and predicates, and introduces tools that allow us to represent concepts like "something", "everything", and "nothing" and evaluate inferences involving these terms.

During the course, we will learn to construct true tables to break down complex inferences and determine their truth conditions, and we will learn to construct proofs using the tools of first-order logic. Students who complete the course will have gained a greater ability to understand the structure of statements in formal as well as ordinary languages, and to evaluate and construct inferences involving them. These abilities will translate well to more advanced logic courses (whether philosophical or mathematical) as well as advance courses in analytic philosophy, as well as other fields like computer science, mathematics, and linguistics.

3.   Course Resources and Readings
Book:

- *forall x: Calgary Remix*—An Introduction to Formal Logic (the Spring 2020 edition), By P. D. Magnus and Tim Button; with additions by J. Robert Loftis; remixed and revised by Aaron Thomas-Bolduc and Richard Zach

    The textbook is free and open source. I will provide PDFs of the book (in whole and divided into parts) on Canvas. In addition, you can find it for download at forallx.openlogicproject.org and other places. However, if you try to download it from somewhere other than Canvas: Be Careful!! There are multiple different versions and editions (written and/or modified by different authors).
    If you'd prefer a physical copy, one can be had for relatively cheap ($9.50) on Amazon (among other places): https://www.amazon.com/dp/1077319851

4.   Course Requirements and Grading
a.   Requirements

Attendance Quizlets and Participation:		12%
Homeworks and Problem Sets:		15%
Midterm Unit Exams:	3 x 16% =	48%
Final Exam:		25%

b. **Attendance Quizlets and Participation**
Attendance and participation in this course are mandatory. Participation requires attendance. In addition, skipping too many class meetings will be *directly* detrimental to your grade, unless your absence is legitimate or excused. If you have a legitimate or excused absence, you will receive half-credit for your attendance that day.

Attendance will be checked via a system I call the "Attendance Quizlet". At one or more points during class, there will be a question about the material that you must answer, or a problem you must solve. You will answer this question on a piece of paper, signed with your name and the date. At the end of class, you will turn this paper in as evidence of your attendance. Sometimes, the attendance quizlet will be peer-checked for correctness.

An absence can only be excused by prior approval by me or if there's some serious stuff going on (which could be a medical emergency, crisis in the family, car won't start, cat ran away, you're feeling really depressed, you're super hungover). You DO NOT have to justify or provide documentation or "proof" that serious stuff is going on. You're an adult, and I trust your judgment about your own life situation.

Philosophical logic is a discipline best understood through practice and in-depth discussion. Participation during class will be graded on the following rubric:

Level	Criteria
C	▪ Present, not disruptive. ▪ Tries to respond when called on but does not offer much. ▪ Demonstrates sporadic involvement in discussion.
B	▪ Demonstrates adequate preparation. ▪ Offers straightforward information (e.g., straight from the reading). ▪ Regularly contributes to discussion
A	▪ Demonstrates good preparation ▪ Offers interpretations and analysis ▪ Contributes well to discussion in an ongoing way: responds to other students' points, thinks through own points, questions others in a constructive way, offers and supports suggestions that may be counter to the majority opinion. ▪ Demonstrates consistent ongoing involvement.
A+	▪ Demonstrates excellent preparation. ▪ Contributes in a very significant way to ongoing discussion: keeps analysis focused, responds very thoughtfully to other students' comments, contributes to the cooperative argument-building, suggests alternative ways of approaching material and helps class analyze which approaches are appropriate, etc. ▪ Demonstrates ongoing very active involvement.

c. **Homeworks**
Most weeks (with a couple exceptions) there will be a series of questions distributed during Thursday's class having to do with the material covered that week. These questions will be due in-class on the following Tuesday.

d. **Four Midterm Exams**
There will be four closed-book in-class midterm exams, which will come at the end of four of the class units. Some of the questions on the midterm will be taken from past homeworks, but most will be new. You will have the opportunity to prepare a one-page "cheat sheet" in advance of class, which can contain any information you think might be helpful to you during the exam.

e. **Final Exam**
There will be a final exam that will occur during our class's regularly-scheduled exam period.

Schedule

Part 1: Basic Logical Concepts; Translation, Truth Tables, and Arguments

Jan 22   Admin and syllabus. Introduction: what is logic?

Jan 27   Logical notions: validity and consequence. First steps towards symbolization.
         Readings: Chapter 1-4

Jan 29   The meaning of 'and'; Logical Connectives
         Readings: Chapters 1-5, focusing on Chapter 5

Feb 3   Translations into Truth-Functional Logic.
         Readings: Chapter 6 and 7

Feb 5   Truth tables and Truth Functionality
         Readings: Chapters 8-10

Feb 10   Truth tables and semantic concepts
         Readings: Chapters 11 and 12 (*Optional:* Chapter 13)

Feb 12   Midterm Exam 1
         Covering: Chapters 1-12

Part 2: Natural Deduction in Truth-Functional Logic

Feb 17   Foundations of Natural deduction proof systems. Conjunction Rules
         Readings: Chapter 14, Beginning of Chapter 15 up to the end of 15.2

Feb 19   Conditional Rules and Subproofs
         Readings: Chapter 15.3 and 15.4

Feb 24   NO CLASS (Zee's out of town)

Feb 26   Biconditional, disjunction, and negation rules
         Readings: Rest of Chapter 15

Mar 2   Additional rules for Truth-Functional Logic, and basic Proof Theory.
         Readings: Chapter 16

Mar 4   Proof Theory and Proof Strategies.
         Readings: Chapters 17 and 18.

Mar 9   Soundness and Completeness of Truth-Functional Logic.
         Readings: Chapters 19 and 20

Mar 11   Midterm Exam 2
         Covering: Chapter 14-19

Part 3: First-order Logic ("FOL")

Mar 23 Building blocks of FOL: Subjects and Predicates
Readings: Chapter 21

Mar 25   Introduction to Quantifiers
Readings: Chapter 22

Mar 30 The full power of First-Order Logic
Readings: Chapter 23 and 24

Apr 1   Definite descriptions and the concept of a sentence
Readings: Chapters 25 and 26

Apr 6   Predicates and Interpretations
Readings: Chapters 27-29

Apr 8   Midterm Exam 3
Covering: Chapters 21 to 29

Part 4: Natural Deduction for FOL

Apr 13 Reasoning about Interpretations
Readings: Chapters 30 and 31.

Apr 15 Basic rules of Natural Deduction in First-Order Logic
Readings: Chapter 32

Apr 20 Using and Manipulating Quantifiers in Proofs
Readings: Chapters 33 and 34

Apr 22 More proof theory for FOL, identity and derived rules
Readings: Chapters 35 to 37

Apr 27 More proofs in FOL, connecting semantic and proof-theoretic notions
Readings: Re-read 32-37

Apr 29 Make-up day

Final Exam:

During our class's normally-scheduled finals time, which is: [[TBA]]