01 : 730 : 201 : 03 **Fall 2019**

Introduction to Logic

Meeting time and place

Tuesdays and Thursdays at 6:10 PM – 7:30 PM
Room A2 in Hardenbergh Hall

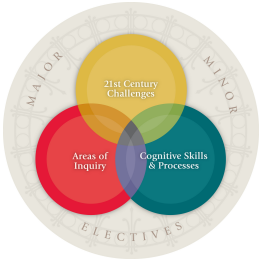
Instructor

Name:	Alexander Skiles ('Alex'; 'Professor Skiles')
Office:	Room 546, Gateway Transit Village (106 Somerset St., 5th floor)
Office hours:	Mondays and Thursdays at 1:30 PM – 2:30 PM
Email:	alexander.skiles@rutgers.edu

Course description and learning goals

This course will introduce you to the foundations of modern formal logic, emphasizing results and techniques useful for further study in the subject, and useful in the numerous academic disciplines that draw upon it (e.g. mathematics, computer science, and linguistics). Topics to be covered include: the validity and soundness of deductive arguments; basic truth-functional connectives; translations into and from a formal language; the syntax, semantics, and basic metatheory of sentential logic and first-order logic; how to construct formal proofs using trees and sequents; mathematical induction; and rudimentary set theory. Time permitting, we will also examine some ways in which modern formal logic can be used to analyze classic puzzles and positions in philosophy (e.g. the Sorites paradox, the paradoxes of material implication, and the problem of negative existentials).

SAS Core Curriculum



This course is certified as satisfying the SAS Core Curriculum requirement *Cognitive Skills and Processes: Quantitative and Formal Reasoning* [QR], as it has the learning goal of 'applying effective and efficient mathematical or other formal processes to reason and to solve problems'.

Course prerequisites

None, although credit will not be given for both this course and 01:730:02.

Course texts

Greg Restall, *Logic* (2006, McGill-Queen's University Press). Rented, new, and used copies, as well as print-outs of a PDF, are all fine for use in the course.

Course assessments

- Weekly problem sets (ungraded, but a serious attempt must be made and they must be brought to sessions to discuss) **10%**
- Four in-class midterms **4 x 15%**
- An in-class cumulative final exam **30%**

Course schedule (open to revision)

INTRODUCTION

5 Sept. What is this course about?

UNIT #1 SENTENTIAL LOGIC

9 Sept. "Propositions and arguments", pp. 9-13

12 Sept. "Connectives and argument forms", pp. 13-16

16 Sept. "Propositional connectives", pp. 20-27

19 Sept. "Propositional connectives", pp. 27-32

23 Sept. "Truth tables", pp. 36-50

26 Sept. **MIDTERM #1**

30 Sept. "Trees", pp. 55-68

3 Oct. "Trees", pp. 55-68 /// "Natural deduction", pp. 102-109

7 Oct. "Natural deduction", pp. 102-109

10 Oct. Lecture notes on mathematical induction and some basic metatheory

14 Oct. "Trees", pp. 68-74 (i.e. the section "Why the tree method works")

17 Oct. "Vagueness and bivalence", pp. 77-85

21 Oct. **MIDTERM #2**

24 Oct. "Conditionality", pp. 88-99

UNIT #2 FIRST-ORDER LOGIC

28 Oct. "Names, predicates, quantifiers, and variables", pp. 113-123

31 Oct.	"What is a predicate?", pp. 205-210
4 Nov.	"Models for predicate logic", pp. 128-139
7 Nov.	"Models for predicate logic", pp. 139-145
11 Nov.	**MIDTERM #3**
14 Nov.	"Trees for predicate logic", pp. 149-164
18 Nov.	"Trees for predicate logic", pp. 149-164 /// Handout on natural deduction in FOL
21 Nov.	Handout on natural deduction in FOL
25 Nov.	"Trees for predicate logic", pp. 161-164 (i.e. the section "Why the tree method works")
2 Dec.	"Identity and functions", pp. 168-172 /// "Definite descriptions", pp. 183-190
5 Dec.	**MIDTERM #4**
9 Dec.	"Definite descriptions", pp. 183-190 /// "Some things do not exist", pp. 192-203
17 Dec.	**FINAL EXAM at 8:00 PM – 11:00 PM**

Electronics policy

Unless provided with a Letter of Accommodations by the Office of Disability Services (see below), all laptops, cell phones, tablets, personal gaming systems, digital pets, drones, … must remain stored away and silent during sessions.

Attendance policy

Although there is no formal attendance requirement, there *is* a requirement that you submit the weekly problem sets—which of course you cannot do on days that you do not attend. If you must be absent due to a University-approved reason, and wish to receive credit for the that week's problem set, you must formally report your absence on the Self-Reporting Absence Application (https://sims.rutgers/edu/ssra), as well send me the problem set by email.

Academic integrity policy

Cheating, plagiarism, and other forms of academic malfeasance come in many forms—if you haven't already, I would recommend familiarizing yourself with the Academic Integrity Policy (http://academicintegrity.rutgers.edu/academic-integrity-policy) for a longer list of examples.

Any suspected violation—and I am quite talented at detecting these—will be automatically referred to the Office of Judicial Affairs, and can carry penalties up to and including a failing grade in the course or expulsion from the university. Note: ignorance about what counts as academic malfeasance, or carelessness in acting in accordance with this policy, is *not* a defense. Thus, if you have any questions about whether you are toeing the line, please do not hesitate to consult with me *before* you submit your work.

University disability statement

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation. For more info, visit https://ods.rutgers.edu/students/documentation-guidelines. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please register at https://webapps.rutgers.edu/student-ods/forms/registration.