PHI 221—Symbolic Logic
Wake Forest University
Spring 2021

Prof. Jonathan Barker
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Course Description

This course is an introduction to sentential logic and first-order predicate logic. We will learn to translate ordinary language into logical notation, construct proofs, and use models to demonstrate consistency or inconsistency for propositions, and validity or invalidity for arguments. Occasionally, we will also pause to reflect upon both the uses and inherent limitations of formal logical systems.

Text

An Exposition of Symbolic Logic, by Terrance Parsons (PDF available on Canvas)

Carnap Program

Weekly exercises will be assigned and submitted on *Carnap*, an open software framework for teaching and learning symbolic logic. I will post a tutorial video about the Carnap system sometime during the first week or two of class. Here is the URL: https://carnap.io

Course Format

Zoom Meeting Information
Link: https://wakeforest-university.zoom.us/j/94344465196?pwd=TXhEaGdHam12M0FkSUpBQUdIWnV3QT09
ID: 943 4446 5196
Password: logic

Weekly Schedule

	Monday	Wednesday
Modality	Synchronous	Synchronous
Activity	Zoom Meeting Lecture + discussion	Zoom Meeting Review of exercises
Time	2pm—3:15pm EST	2pm—3:15pm EST
Homework Due	Reading	Exercises

Assessment

<u>Participation (10%)</u>
High-volume and/or high-quality participation may result in a small boost in your final course grade, especially if your average is borderline between two letter grades (ex. an average of 89.45 is on the line between a B+ and an A-). Conversely, low volume or particularly low-effort participation may slightly hurt your final course grade, especially in borderline cases.

<u>Weekly Homework (15% total)</u>
Weekly homework exercises should be completed before class each Wednesday. Be prepared to share your answers with the rest of the class. On starred Wednesdays (i.e. days marked with $*$), please submit your answers on Carnap before the beginning of class. There is a total of nine starred Wednesdays. You can miss *one* submission without a penalty, but every missed submission thereafter will be entered as a grade of zero. In other words, you should plan to submit your homework exercises on no fewer than **eight** out of the nine starred Wednesdays. At the end of the semester, your homework scores will be averaged together. The resulting grade will be worth 15% of your final course grade.

<u>3 Exams (25% each)</u>
Three exams, administered synchronously via Zoom during regular class time.

Course Policies

<u>Attendance</u>
No more than *two* unexcused absences. Every unexcused absence thereafter will negatively impact your final grade in the following way: the third unexcused absence will result in a deduction of one-third of a letter grade (ex. a final grade of A becomes A), the fourth unexcused absence will result in a deduction of two-thirds of a letter grade (ex. a final grade of A becomes B+), and so on.

<u>Disabilities</u>
I am committed to providing accommodations to students with disabilities. If you are eligible for accommodations, please contact me and/or the Learning Assistance Center & Disability Services (phone: 336.758.5929, email: <u>lacds@wfu.edu</u>).

<u>Office Hours</u>
Time:
  (1) Mondays 3:30pm – 4:30pm EST
  (2) Fridays 1pm—2pm EST
Link: <u>https://wakeforest-university.zoom.us/j/98405077153?pwd=Yk1YZ0J4WHQrWEo1V2htUDRuWkxwZz09</u>
ID: 984 0507 7153
Password: officehour

$*$ submit exercises via Carnap before class begins.

Schedule
Week 1: Introduction

	Monday 1/25	Wednesday 1/27
Topic	N/A	Course Overview
Method	N/A	Online
Homework	N/A	N/A
Activity	N/A	Zoom Meeting 2:00pm—3:15pm
Platform	N/A	Zoom

Week 2: Validity & Soundness

	Monday 2/1	Wednesday 2/3
Topic	Validity & Soundness	Validity & Soundness
Homework	**Reading** Introduction §1 Deductive Reasoning §2 Truth & Validity §3 Logical Form §4 Symbolic Notation §5 Idealizations	**Exercises** Introduction §2 Truth & Validity • #1—6 §3 Logical Form • #3 a—d only
Activity	Zoom Meeting 2:00pm—3:15pm	Zoom Meeting 2:00pm—3:15pm
Platform	Zoom	Zoom

Week 3: Sentential Logic I

	Monday 2/8	Wednesday 2/10
Topic	SL I—Notation & Translations: ~ , →	SL I—Notation & Translations: ~ , →
Method	**Reading** Chapter 1 §1 Symbolic Notation §2 Meanings of Symbolic Notation §3 Symbolization: Translating Complex Sentences into Symbolic Notation	**Exercises** Chapter 1 §1 Symbolic Notation • #1 §2 Meanings of Symbolic Notation • #1 & #2
Homework	Zoom Meeting 2:00pm—3:15pm	Zoom Meeting 2:00pm—3:15pm
Activity	Zoom	Zoom

* submit exercises via Carnap before class begins.

Week 4: Sentential Logic I

	Monday 2/15	Wednesday 2/17*
Topic	SL I—Rules & Direct Derivations	SL I—Rules & Direct Derivations

Method	**Reading**
	Chapter 1
	§4 Rules
	§5 Direct Derivations
		Exercises
		Chapter 1
		§4 Rules
		   • #1 & #2
		§5 Direct Derivations
		   • #2

Homework	Zoom Meeting 2:00pm—3:15pm	Zoom Meeting 2:00pm—3:15pm
Activity	Zoom	Zoom

Week 5: Sentential Logic I

	Monday 2/22	Wednesday 2/24*
Topic	SL I—Direct & Conditional Derivations	SL I—Conditional Derivations
Homework	**Exercises** Direct Derivation Exercise Set (on Carnap) **Reading** Chapter 1 §6 Conditional Derivations	**Exercises** Chapter 1 §6 Conditional Derivations • #2 OR "Additional CD Exercises" (on Carnap)
Activity	Zoom Meeting 2:00pm—3:15pm	Zoom Meeting 2:00pm—3:15pm
Platform	Zoom	Zoom

Week 6: Sentential Logic I

	Monday 3/1	Wednesday 3/3*
Topic	SL I—Indirect & Subderivations	SL I—Indirect & Subderivations
Homework	**Reading** Chapter 1 §7 Indirect Derivations §8 Subderivations §10 Strategies (optional)	**Exercises** Indirect Derivation Exercise Set (on Carnap)
Activity	Zoom Meeting 2:00pm—3:15pm	Zoom Meeting 2:00pm—3:15pm
Platform	Zoom	Zoom

* submit exercises via Carnap before class begins.

Week 7: Sentential Logic I

	Monday 3/8	Wednesday 3/10
Topic	SL I—Review Session	Exam #1
Homework	**Reading** Study Guide (on Canvas)	N/A
Activity	Zoom Meeting 2:00pm—3:15pm	Zoom Meeting 2:00pm—3:15pm
Platform	Zoom	Zoom

Week 8: Sentential Logic II

	Monday 3/15	Wednesday 3/17
Topic	SL II—Notation & Translations: ∧ , ∨ , ↔	SL II— Intro to Theorems
Homework	**Reading** Chapter 2 §1 Symbolic Notation §2 English Equivalent §3 Complex Sentences	**Reading** Chapter 2 §3 Complex Sentences Chapter 1 §11 Theorems §12 Using Theorems in Derivations
Activity	Zoom Meeting 2:00pm—3:15pm	Zoom Meeting 2:00pm—3:15pm
Platform	Zoom	Zoom

Week 8: Sentential Logic II

	Monday 3/22	Wednesday 3/24*
Topic	SL II—Derivations	SL II—Derivations

Homework	**Reading**
	Chapter 2
	§4 Rules
	§5 Derivations Using S, ADJ, CB
		Exercises
		Chapter 2
		 §3 Complex Sentences
		   • #3
		   • #5 (optional)
		 §4 Rules
		   • #1
		
		On Carnap
		 "Derivations—Rules S, ADJ, ADD, CB, BC"

* submit exercises via Carnap before class begins.

Activity	Zoom Meeting 2:00pm—3:15pm	Zoom Meeting 2:00pm—3:15pm
Platform	Zoom	Zoom

Week 9: Sentential Logic II

	Monday 3/29	Wednesday 3/31*
Topic	SL II—Derived Rules	SL II—Derived Rules
Homework	**Readings** Chapter 2 §5 Derivations Using S, ADJ, CB §7 Theorems as Rules §8 Derived Rules	**Exercises** Carnap: Derived Rules Set I
Activity	Zoom Meeting 2:00pm—3:15pm	Zoom Meeting 2:00pm—3:15pm
Platform	Zoom	Zoom

Week 10: Sentential Logic II

	Monday 4/5	No Class
Topic	SL II—Review	No Class
Homework	N/A	No Class
Activity	Zoom Meeting 2:00pm—3:15pm	No Class
Platform	Zoom	No Class

* submit exercises via Carnap before class begins.

Week 11: Predicate Logic

	Monday 4/12	Wednesday 4/14
Topic	Exam #2	PL—Notation
Homework	N/A	**Readings** Chapter 3 §1 Name Letters and Predicates §2 Quantifiers, Variables, and Formulas §3 Scope and Binding
Activity	Zoom Meeting 2:00pm—3:15pm	Zoom Meeting 2:00pm—3:15pm
Platform	Zoom	Zoom

Week 12: Predicate Logic

	Monday 4/19	Wednesday 4/21*
Topic	PL—Translations	PL—Translations
Homework	**Readings** Chapter 3 §1 Name Letters and Predicates §2 Quantifiers, Variables, and Formulas §3 Scope and Binding	**Readings** Chapter 3 §4 Meanings of the Quantifiers §5 Symbolizing Sentences **Exercises** Chapter 3 §5 Symbolizing Sentences • #6
Activity	Zoom Meeting 2:00pm—3:15pm	Zoom Meeting 2:00pm—3:15pm
Platform	Zoom	Zoom

* submit exercises via Carnap before class begins.

Week 13: Predicate Logic

	Monday 4/26	Wednesday 4/28*
Topic	PL—Derivations with Quantifiers	PL—Derivations with Quantifiers
Homework	**Readings** Chapter 3 §6 Derivations with Quantifiers	**Exercises** Chapter 3 §6 Derivations with Quantifiers #3
Activity	Zoom Meeting 2:00pm—3:15pm	Zoom Meeting 2:00pm—3:15pm
Platform	Zoom	Zoom

Week 14: Predicate Logic

	Monday 5/3	Wednesday 5/5*
Topic	PL—Universal Derivations	PL—Universal Derivations
Homework	**Readings** Chapter 3 §7 Universal Derivations	**Exercises** Chapter 3 §7 Universal Derivations #1
Activity	Zoom Meeting 2:00pm—3:15pm	Zoom Meeting 2:00pm—3:15pm
Platform	Zoom	Zoom

Finals Week

	Monday 5/10	Wednesday 5/12	Saturday 15/15
Topic	N/A	N/A	Exam #3
Modality	N/A	N/A	Synchronous
Reading	N/A	N/A	N/A
Activity	N/A	N/A	Zoom Exam 2pm EST
Platform	N/A	N/A	Zoom

* submit exercises via Carnap before class begins.