

Symbolic Logic

Fall 2020

MWF 1pm – 1:50pm

Syllabus

Instructor

Chad Vance
cvance@wm.edu

Office Hours: WF 11am-noon
(and by appointment)

What Is This Class About?

This is a logic course, designed to give you a basic understanding of how to properly formalize and easily recognize good (and bad) inferences. To achieve this result, we will be translating English statements into mathematical symbolizations in order to better understand the nature and structure of proper reasoning. The ultimate goal of this is to give you the tools required to more carefully investigate the claims and inferences of others (philosophical or otherwise) in the most rigorous way possible. The course is divided into three units:

Unit One: Arguments: We will begin by examining the basic structure of arguments and proper reasoning, while also gaining some understanding of language and its connection to truth.

Unit Two: Propositional Logic: We will then investigate the nature of logical connectives; for instance, those connectives found in propositions such as <Harry, Mark, and John were at the party>, <I prefer vanilla or chocolate>, and <If it is raining, then the ground is wet>.

Unit Three: Predicate Logic: In the final unit, we will investigate the nature of logical quantifiers; for instance, those quantifiers found in propositions such as <Some birds are ravens> and <All ravens are black>.

Required Text

Nelson P. Lande. *Classical Logic and Its Rabbit-Holes*. Hackett Publishing, 2013; ISBN: 9781603849487

A few of the required readings will be provided as pdf files, which you can access under "Assigned Readings" on our course website, found here:

<http://rintintin.colorado.edu/~vancecd/phil301/phil301.html>

Course Requirements

1. *Exams (75%)*. You will take three unit exams (25% each).
2. *Homework (25%)*. You will complete 10 homework assignments, due on Mondays by the beginning of class. (2.5% each)

Course Policies

Frequently Asked Questions

Answers to frequently asked questions can be found here: <http://rintintin.colorado.edu/~vancecd/faq.pdf>
Two notes: (1) You are responsible for reading the FAQ by the end of the first week of class. (2) Please consult this syllabus and the FAQ first, whenever you have a question about the course.

Academic Integrity

All students of the College of William & Mary are responsible for knowing and adhering to the academic integrity honor code policy of this institution. Violations of this policy include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, and stealing. All incidents of academic misconduct shall be reported to the Honor Council. More information about the honor code can be found at: wm.edu/offices/deanofstudents/services/studentconduct/studenthandbook/honor_system/index.php

NOTE: *Students who are found to be in violation of the honor code will be subject to both academic sanctions from the faculty member (i.e., you will automatically receive an F for the course) as well as non-academic sanctions (which include academic probation, suspension, or expulsion).*

Student Conduct

Students and faculty each have a responsibility for maintaining an appropriate learning environment. Those who fail to adhere to the code of conduct may be subject to discipline. More information at: wm.edu/offices/deanofstudents/services/studentconduct/studenthandbook/student_code_of_conduct/index.php

Disability & Accessibility Services

If you qualify for accommodations because of a disability or any issue affecting accessibility, please submit to me a letter from Accessibility Services in a timely manner so that your needs may be addressed. More info can be found in the Campus Center (room 109), 757-221-2510, or at: wm.edu/offices/deanofstudents/services/studentaccessibilityservices/.

Religious Observances

Campus policy regarding religious observances requires that faculty make every effort to reasonably and fairly deal with all students who, because of religious obligations, have conflicts with scheduled exams, assignments, or required attendance. Please let me know by the end of the drop/add period about any such conflicts, so that we can resolve them. More information at: wm.edu/about/administration/provost/forfacstaff/holidays/religiousguidelines/index.php.

Discrimination and Harassment

The College of William & Mary policies on Discrimination and Sexual Harassment apply to all students, staff, and faculty. Any student, staff, or faculty member who believes s/he has been the subject of sexual harassment and/or discrimination based upon race, sex, gender, national origin, sexual orientation, religious belief, political belief, disability, veteran status, age, or any other category protected by the Commonwealth or by federal law should contact the Office of Compliance and Equity on the first floor of James Blair Hall. More information about discrimination and harassment can be found at: wm.edu/offices/compliance/policies/student_discim_policies/index.php

Course Schedule

Below is a schedule of the topics that we will cover, along with list of the reading(s) which you should complete before each class meeting. Please note the **exam dates** in bold.¹

Unit One	Arguments	
Week 1		
Wed 8/19	Introduction to Arguments	§1.1 – 1.3
Fri 8/21	The Counterexample Method	“Argument Forms: Proving Invalidity” (pdf)
Week 2		
Mon 8/24	Logical Connectives	§§1.4 & 2.2
Wed 8/26	Truth Tables of Connectives	§§1.5 – 1.8, 1.10, & 2.6
Fri 8/28	No new topics	No new readings
Week 3		
Mon 8/31	Truth Tables for Propositions	§2.5
Wed 9/2	Truth Tables for Arguments	§1.9, “Comparing Statements” (pdf), & §2.4 (stop on pg. 67 at section 2.4.B: The Short Method)
Fri 9/4	No new topics	No new readings
Week 4		
Mon 9/7	On Choosing Connectives	§§2.1, 2.7 – 2.8
Wed 9/9	Review: Unit One Exam	No new readings
Fri 9/11	UNIT ONE EXAM	No new readings
Unit Two	Propositional Logic	
Week 5		
Mon 9/14	Derivation Rules	§§3.1 – 3.2
Wed 9/16	Derivations	§§3.3 – 3.7
Fri 9/18	No new topics	No new readings
Week 6		
Mon 9/21	More Derivation Rules	§§3.8 – 3.9
Wed 9/23	More Derivations	No new readings
Fri 9/25	No new topics	No new readings
Week 7		
Mon 9/28	Proving Theorems	§4.1 – 4.2
Wed 9/30	Theorem/Sequent Introduction	§§4.3 – 4.4, & 4.6 – 4.7
Fri 10/2	No new topics	No new readings
Week 8		
Mon 10/5	The Reductio Assumption	§§4.5 & 4.9
Wed 10/7	Review: Unit Two Exam	No new readings
Fri 10/9	UNIT TWO EXAM	No new readings

¹ Due to the condensed semester, 150 minutes’ worth of class time will occur outside of regular class hours, as follows:

- (1) Several short, pre-recorded videos offering additional clarification, to be watched on your own time. Likely topics include: typing logical operators, translating ‘unless’, and the $\exists E$ and $\forall E$ rules.
- (2) Monday, 11/16 (11am): Final Exam Review Session (to be held live on Zoom, but recorded and posted on Blackboard for those who cannot attend).

Unit Three		Predicate Logic
Week 9		
Mon 10/12	Logical Quantifiers	§§5.1 – 5.4
Wed 10/14	Quantifier Scope	§5.6
Fri 10/16	The Finite Universe Method	§6.7 (stop at part B on pg. 338)
Week 10		
Mon 10/19	Derivation Rules for \forall and \exists	§§7.1 – 7.5
Wed 10/21	Derivations	§§6.6 & 7.6
Fri 10/23	No new topics	No new readings
Week 11		
Mon 10/26	Relational Predicates & Overlapping Quantifiers	§§6.1 & 6.7.B Further reading: §§7.7 – 7.11 (optional)
Wed 10/28	More Derivations	§8.1
Fri 10/30	No new topics	No new readings
Week 12		
Mon 11/2	Identity	§6.3 (stop at part C on pg. 317) §§8.2 – 8.3 (skip section 8.2.C, pgs. 432-434)
Wed 11/4	Theorem/Sequent Introduction	§§6.9 & 8.4
Fri 11/6	No new topics	No new readings
Week 13		
Mon 11/9	Definite Descriptions & Identity	Dupré, "The King of France is Bald" (pdf) §§6.3.C & 8.2.C
Wed 11/11	A Brief Summary of Logic Beyond PHIL 301	Dupré, "The Barber Paradox" and "The Sorites Paradox" (pdf)
Fri 11/13	Review: Unit Three Exam	No new readings
Tue 11/17	UNIT THREE EXAM (2pm – 5pm)	No new readings