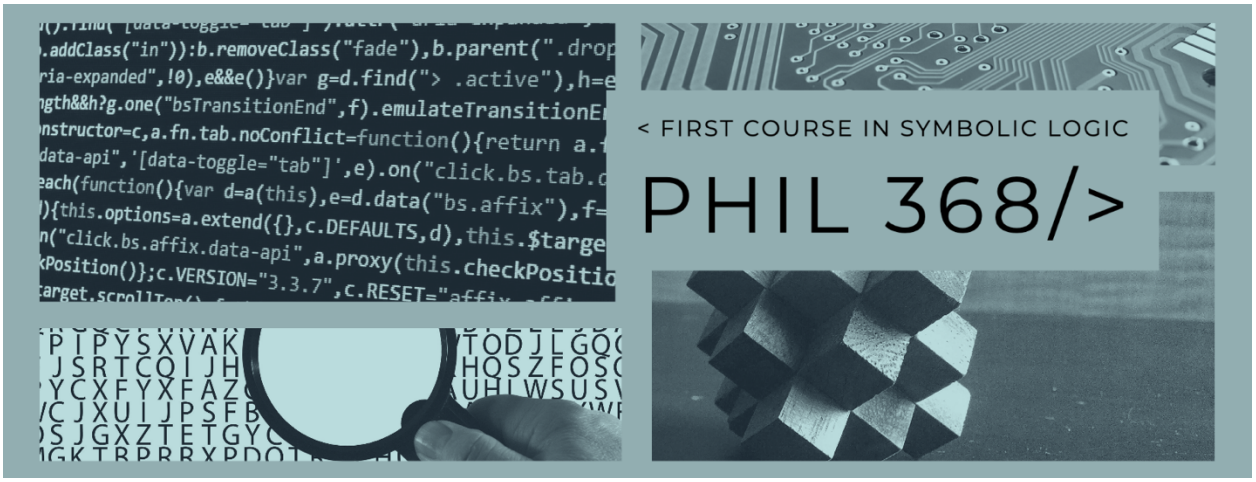


Instructor: Professor Josh DiPaolo
Office Hours: Tu/Th 1-2 & By Appointment
Office: Humanities (H) 311-C
Tech Support: Student Help Desk (657) 278-8888 or StudentITHelpDesk@fullerton.edu

Fall 2021
Email: jdipaolo@fullerton.edu
Class: Tu/Th 11:30-12:45/2:30-3:45 MH 657

Description
Logic is the study of reasoning. Symbolic logic (AKA "formal" logic) uses symbols to improve the study of reasoning by studying the *form* of natural language. This course introduces you to symbolic logic. We will examine two formal systems: propositional logic and predicate logic.

We will start from scratch. No background in logic will be assumed. At the beginning, the course may be *very* challenging. The course will remain challenging throughout the semester: it is fast paced and every week we will be pushing the limits of your abilities. But your skills will grow *remarkably quickly* if you work hard. By the end of the semester, you will be able to look back at what challenged you early in the class and think: "Oh my gosh, I can't believe I struggled with that!" But don't be fooled: *all* of this material is difficult. The only reason the early material will *appear* easy is because you will have ***learned so much*** by the end of the semester!

Learning Goals: By the end of this semester, you should be able to:

1. Translate complex English sentences into propositional and predicate logical notation
2. Evaluate logical properties and relations of sets of sentences using truth-tables
3. Identify the limitations of propositional logic and understand the need for more complex logics
4. Evaluate logical properties and relations of sets of sentences using natural deduction

Course Website: Canvas

Texts & Resources: All texts & resources (videos, etc.) will be freely available on Canvas. Expect to devote 5-6 hours each week to this class.

Tech Requirement: You will need to upload images of your completed work. Please make sure you have access to a smart phone with a camera or a scanner.

Tip for Success: This class is cumulative. It builds on itself. To understand any given week's material, you need to understand everything that came before. **If you find yourself falling behind, please reach out to get help.**

Flipped Learning

This class will use the "flipped learning" style of education.

Brief Explanation: In "traditional learning" classrooms, you first encounter material *in class*, then process that material via homework *outside* of class. This means you do *your most challenging work* without the guidance of the professor. Flipped learning classrooms "flip" this structure: you will first encounter our course material and *begin* processing it via practice problems *outside* of class. Then you will come into class where you will do *most* of your challenging active learning under my guidance.

Benefits: There are many benefits to flipped learning. (1) In a flipped class, students do their most cognitively demanding tasks in the presence of other students and the professor. (2) Rather than wasting time on lecture and note-taking, our class periods are devoted to the activities that best serve students' needs. (3) Students can process their first encounter with material at their own pace, rather than frantically note-taking in class and not really processing what the professor says. (4) Flipped learning helps students become self-regulated learners: *you* decide if you need to replay the lecture video; *you* decide which part of the lecture you want to ask about the next day in class. (5) More class time can be devoted to clearing up student confusion and misconception, rather than spending it on delivering the easier parts of lecture. We'll discuss flipped learning more throughout the semester!

REAL TALK: To Acquire These Benefits… you MUST do the assigned work *before coming to class!* Class will include *some* review, but mostly it will be devoted to helping you *practice* and *develop* your logical skills. You will be *lost* if you do not work through the assigned videos and practice problems *before coming to class!*

Day to Day: What Will I Do in This Class?

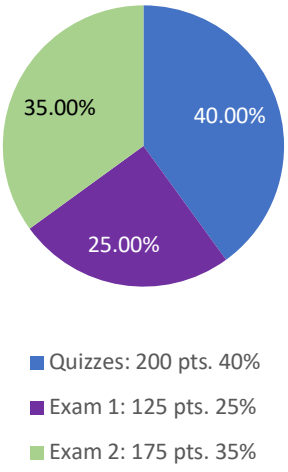
After Introduction Week, **most weeks you will do FIVE things**…

1. **Log On:** Log onto Canvas and see what needs to be completed that week
2. **Content:** Study and take notes on assigned readings and videos
3. **Practice (Inside & Outside of Class):** Complete practice problems: logic is like math, you learn it by *doing* it
4. **Quiz Part 1:** Complete quiz problems on paper by **Friday** at 1pm
5. **Quiz Part 2:** Submit Online quiz answers by **Friday** at 1pm

General Education (GE) Requirements and Learning Goals

GE Requirement	This course meets the requirement for GE category B.5 – Implications and Explorations in Mathematics and Natural Science.
Grade	A grade of D or higher is required to meet this GE requirement.
GE Learning Goals	a. Integrate themes in science, mathematics and/or quantitative reasoning from cross-disciplinary perspectives. b. Solve complex problems that require science, mathematics and/or quantitative reasoning. c. Relate science, mathematics and/or quantitative reasoning to significant social problems or to other related disciplines. d. When deemed appropriate, apply disciplinary concepts from mathematics and the natural sciences in a variety of settings, such as community-based learning sites and activities.

Grading Policy



A+	98-100%	490-500 Points
A	92-97%	460-489 Points
A-	90-91%	450-459 Points
B+	88-89%	440-449 Points
B	82-87%	410-439 Points
B-	80-81%	400-409 Points
C+	78-79%	390-399 Points
C	72-77%	360-389 Points
C-	70-71%	350-359 Points
D+	68-69%	340-349 Points
D	62-67%	310-339 Points
D-	60-61%	300-309 Points
F	0-59%	0-299 Points

Please ask questions about these policies if you do not understand them.

Attendance

Since we're still living in the time of COVID-19, I am (nervously!) making attendance for this course **optional**, while **strongly recommending regular attendance.** During class, we will:

- Discuss, clarify, and expand on course ideas
- Practice problems
- Discuss coursework
- Answer logistical questions about the course
- NOTE: Complete the assigned readings, videos, and practice problems before class meetings

Word of Warning: Because of how difficult this course is, most students will *need* to attend class to pass the class. Trust me.

- Some students will feel lost immediately: don't worry I can help!
- Some students will feel like the first few weeks of the class are easy: these are the students I worry about most because you may be tempted to think *the rest of the course* will be easy. It's not. Don't fall into this trap.

No matter what: my door and this class are always open! Even if you have fallen into this trap, don't think you now have to stay in it. *The sooner you try to get out of this trap the more I can help!*

Weekly Quizzes

20 Points Each. To help you keep up with course content and to ensure you are understanding the material, weekly quizzes are assigned. Only your 10 highest quiz scores will count towards your grade. The other one will be dropped. The quizzes have two parts. **This may be confusing at first. You'll get the hang of it.**

Part 1: You will be given a printable version of the quiz to complete during the week. You must complete and upload to Canvas a photo or scan of your completed printed version by Friday at 1pm.

Part 2: By Friday at 1pm, you must complete an Online version of the quiz on Canvas. It will be the exact same quiz. So, you will only need to select the answers you've already filled in on the printable version.

You **must** submit both parts: the photos of the printed quiz that you completed and the Online quiz. The printed quiz will "show your work." The Online quiz will be automatically graded. This will allow me to spend my time providing individualized help to students who need it rather than spending that time on grading.

One more twist: Each quiz question will have several choices, including the option: "I don't know; I don't see my answer." Choosing this answer will give you **half credit** for that question.

Why would you ever choose to receive half credit? The quizzes are meant to give you practice you need to succeed on the exams. The exams will **not** be multiple choice. They will be completely based on "showing your work." If you just guess your way through the quizzes, you will fail the exams and the course. It's important for me to know who truly understands what *before* the exam. Giving you half credit for "I don't know; I don't see my answer" does four things:

1. It rewards you for your honesty, rather than for your ability to guess or cheat
2. It provides you with a preferable alternative to merely guessing if you don't know
3. It shows *me* what you need help with
4. It shows *you* what you need help with

If you often find yourself answering "I don't know; I don't see my answer," please seek out my help. I will do my best to provide individualized feedback and instruction whenever I can.

Exam 1

125 Points. Exam 1 will evaluate how well you have learned skills associated with propositional logic: argument identification, validity/soundness, translations, truth-tables, and derivations in propositional logic.

Exam 2

175 Points. Exam 2 will evaluate how well you have learned skills associated with predicate logic: translations and derivations in predicate logic.

Exam 3 & Exam 4

These are **Optional** exams. Logic takes time to learn. Some students pick it up more quickly than others. I don't care when you learn it only *that* you learn it by the end of the semester. Anyone unsatisfied with their Exam 1 score may take Exam 3 during finals week. Exam 3 will test the same material Exam 1 did. I will use the higher score to calculate your final grade. The same goes for Exam 4 and Exam 2.

You may take Exam 3 or Exam 4 only if you completed both Exam 1 and Exam 2. In other words, you may **not** skip Exam 1 or 2, and then take Exam 3 or 4.

Communication

Office Hours

I will have Office Hours Tu/Th 1-2pm and by appointment in H-311C. You can just drop in to my scheduled office hours. If those times don't work, you should ABSOLUTELY feel free to set an appointment with me. **I want to help you succeed!** Just email me. If it helps, you can use this script:

> *"Hi Josh,*
> *I'm in your [CLASS NAME & TIME]. I'd like to schedule an appointment with you outside of your scheduled office hours. Do any of these times work for you [LIST THREE DIFFERENT TIMES YOU CAN MEET]?*
> *Thanks,*
> *[NAME]"*

Virtual Office Hours

By appointment, we can setup virtual office hours. Click the "Virtual Office Hours" button on Canvas to enter my Zoom office hours. Note: my office hours will be IN PERSON unless we decide to meet on Zoom.

Contact

Outside of office hours, you can reach me at my email address. I will usually respond within 24 hours. Feel free to get back in touch if I don't. **If you have a question about the course, please check the syllabus before emailing.**

You

I expect you to regularly check your email and Canvas for announcements.

Ask a Question Boards

On Canvas, there will be two "Ask a Question" discussion boards: (1) "Ask Josh a Question" and (2) "Ask Peers a Question." I will regularly check (1) and rarely check (2). You should check both often. Questions on these boards should be general. Think: "Could someone else benefit from knowing the answer to this question?" If Yes, post; if No, maybe just email me. **If you have a question about the course, please check these boards before emailing**.

Accommodations

I will do my very best to help students with disabilities, special needs, or learning challenges succeed in this course. Students with disabilities who need accommodations, access to technology, or information about emergency building/campus evacuation processes should contact Disability Support Services. Services are available to students with a wide range of disabilities and conditions.
Phone: (657) 278-3112 Website: www.fullerton.edu/dss

Make a Good Impression

Education is a **professional environment**. One day you may want a letter of recommendation from me. You may want your peers to recommend you for some professional position. Behave accordingly.

Academic Integrity & Plagiarism

Statement

Please only submit work that is your own. Doing otherwise is one of the worst mistakes you can make in your academic career. When students plagiarize in my classes, they receive a score of 0 points on the assignment and I refer them to the Dean of Students' office.

Plagiarism

The university defines 'plagiarism' as "the unacknowledged and inappropriate use of the ideas or wording of another writer" and instructs me to include the following info on my syllabus:

If plagiarism is found in your work, you will be subject to prosecution to the fullest extent of university code, which will result in a failure of the assignment and will probably result in your failure of the course. Confirmation of plagiarism precludes you from being eligible to repeat the course under the university's course repeat and grade forgiveness policy. For complete details regarding the university's policies about plagiarism and other forms of cheating, see

http://www.fullerton.edu/integrity/student/AcademicIntegrityResources.asp
http://www.fullerton.edu/senate/publications_policies_resolutions/ups/UPS%20300/UPS%20300.021.pdf

Emergencies
To be prepared for classroom emergencies, please visit: http://prepare.fullerton.edu

COVID-19 Protocols
Follow all the rules: be vaccinated when you're supposed to; wear a mask when you're supposed to; stay home when you're supposed to. If we have to go virtual this semester, we'll keep roughly the same class structure: we'll just do it on Zoom; a Zoom link will be posted on Canvas.

Weekly Checklist

Week 1	☐ Viewed Josh's Introduction Video ☐ Viewed Why Logic Video	
Week 2	☐ Took Notes on all Readings and Videos ☐ Completed all assigned practice problems	☐ Completed Online Quiz ☐ Submitted Scan or Picture of Printed Quiz
Week 3	☐ Took Notes on all Readings and Videos ☐ Completed all assigned practice problems	☐ Completed Online Quiz ☐ Submitted Scan or Picture of Printed Quiz
Week 4	☐ Took Notes on all Readings and Videos ☐ Completed all assigned practice problems	☐ Completed Online Quiz ☐ Submitted Scan or Picture of Printed Quiz
Week 5	☐ Took Notes on all Readings and Videos ☐ Completed all assigned practice problems	☐ Completed Online Quiz ☐ Submitted Scan or Picture of Printed Quiz
Week 6	☐ Took Notes on all Readings and Videos ☐ Completed all assigned practice problems	☐ Completed Online Quiz ☐ Submitted Scan or Picture of Printed Quiz
Week 7	☐ Took Notes on all Readings and Videos ☐ Completed all assigned practice problems	☐ Completed Online Quiz ☐ Submitted Scan or Picture of Printed Quiz
Week 8	☐ Took Notes on all Readings and Videos ☐ Completed all assigned practice problems	☐ Completed Online Quiz ☐ Submitted Scan or Picture of Printed Quiz
Week 9	☐ Reviewed	☐ Exam 1
Week 10	☐ Took Notes on all Readings and Videos ☐ Completed all assigned practice problems	☐ Completed Online Quiz ☐ Submitted Scan or Picture of Printed Quiz
Week 11	☐ Took Notes on all Readings and Videos ☐ Completed all assigned practice problems	☐ Completed Online Quiz ☐ Submitted Scan or Picture of Printed Quiz
Week 12	☐ Took Notes on all Readings and Videos ☐ Completed all assigned practice problems	☐ Completed Online Quiz ☐ Submitted Scan or Picture of Printed Quiz
Week 13	☐ Took Notes on all Readings and Videos ☐ Completed all assigned practice problems	☐ Completed Online Quiz ☐ Submitted Scan or Picture of Printed Quiz
Week 14	☐ Ate Pie	☐ Relaxed
Week 15	☐ Reviewed	☐ Exam 2
Week 16	☐ Reviewed	☐ Reviewed
Week 17		☐ Exam 3 if unsatisfied with Exam 1 ☐ Exam 4 if unsatisfied with Exam 2

Tentative Schedule

Date	Topic	Resources (R = Reading, V = Video)	Learning Outcomes & Assignments (A = Assignment)
Week 1 8/24-8/26	Introduction Week	Tuesday • Why Logic? (V) • Instructor Introduction (V) Thursday • No New Materials	1. Become familiar with course 2. Get to know each other
Week 2 8/31-9/2	Background Arguments: validity & soundness	Tuesday • Logic Lecture (R) • Argument Basics 1 (V) • Argument Basics 2 (V) Thursday • No New Materials	1. Understand what an argument is 2. Understand difference between validity & soundness ☐ Quiz (A)
Unit 1: Propositional Logic: Translations, Truth-Tables, & Derivations			
Week 3 9/7-9/9	Logical Operators Basic Translations Compound Statements	Tuesday • Baronett Section A (R) • Propositional Logic Videos 1.1-1.4 Thursday • Baronett Section B (R) • Propositional Logic Videos 1.5-1.8	1. Learn the 5 propositional connectives 2. Translate simple and compound sentences from English into propositional logic ☐ Quiz (A)
Week 4 9/14-9/16	Truth-Tables Truth-Tables for Propositions Truth-Tables for Logical Properties	Tuesday • Baronett Section C-D (R) • Propositional Logic Videos 2.1-2.5 Thursday • Baronett Section E-F (R) • Propositional Logic Videos 2.6-2.8	1. Learn truth-tables for connectives 2. Learn how to use truth-tables to prove logical properties of sets of statements ☐ Quiz (A)
Week 5 9/21-9/23	Truth-Tables for Arguments Indirect Truth-Tables	Tuesday • Baronett Section G (R) • Propositional Logic Videos 3.1-3.2 Thursday • Baronett Section H (R) • Propositional Logic Videos 3.3-3.5	1. Learn how to use truth-tables to prove logical properties of arguments 2. Learn how to use indirect "shortened" truth-tables ☐ Quiz (A)
Week 6 9/28-9/30	Limitations of Truth-Tables Derivations Conjunction Rules Conditional Rules	Tuesday • Martin Conjunction Rules (R) • Martin Conditional Elimination Rule (R) • Propositional Logic Videos 4.1-4.4 Thursday • Martin Conditional Introduction Rule (R) • Propositional Logic Videos 4.5-4.7	1. Understand some limitations of truth-tables 2. Learn how to use conjunction derivation rules 3. Learn how to use conditional derivation rules 4. Learn how to use subderivation rules ☐ Quiz (A)

Week 7 10/5-10/7	Disjunction Rules Negation Rules Biconditional Rules Reiteration Rule **Maybe Hardest Week of Semester**	Tuesday • Martin Disjunction & Negation Rules (R) • Propositional Logic Videos 5.1-5.4 Thursday • Martin Biconditional Rules (R) • Propositional Logic Videos 5.5-5.7	1. Learn how to use disjunction derivation rules 2. Learn how to use negation derivation rules 3. Learn how to use biconditional derivation rules 4. Learn how to use reiteration rule ☐ Quiz (A)
Week 8 10/12-10/14	Derivations and Logical Properties	Tuesday • Martin What Derivations Prove (pp. 98-100) • Propositional Logic Videos 6.1-6.2 (Optional) • Propositional Logic Videos 6.3-6.4 Thursday • No New Material	1. Learn how to use derivations to prove theorems, equivalence, and inconsistency 2. Review ☐ Quiz (A)
Week 9 10/19-10/21	Review Exam 1	Tuesday • Review Session Thursday • Exam 1	☐ Exam 1 (A) Th 10/21
Unit 2: Predicate Logic: Translations & Derivations			
Week 10 10/26-10/28	Limitations of Propositional Logic Predicates Singular Terms Quantifiers	Tuesday • Bergmann 7.1-7.3 (R) (Optional) • Predicate Logic Videos 1.1-1.5 Thursday • Predicate Logic Videos 1.6-1.8	1. Understand the limitations of propositional logic 2. Learn the syntax of predicate logic 3. Learn how to translate singular terms and predicates into predicate logic 4. Learn how to translate quantified expressions into predicate logic ☐ Quiz (A)
Week 11 11/2-11/4	Grammar More complex translations	Tuesday • Predicate Logic Videos 2.1-2.5 Thursday • Predicate Logic Videos 2.6-2.8	1. Learn predicate logic grammar 2. Learn and practice complex translations into predicate logic ☐ Quiz (A)
Week 12 11/9-11/11	Predicate Logic Derivations Universal Elimination Existential Introduction	Tuesday • Bergmann 10.1 (R) (Optional) • Predicate Logic Videos 3.1-3.3 Thursday NO CLASS 11/11 VETERAN'S DAY	1. Learn how to use universal elimination derivation rule 2. Learn how to use existential introduction derivation rule ☐ Quiz (A)
Week 13 11/16-11/18	Universal Introduction Existential Elimination	Tuesday • Predicate Logic Videos 3.4-3.8 Thursday • Predicate Logic Video 3.9	1. Learn how to use universal introduction derivation rule 2. Learn how to use existential elimination derivation rule ☐ Quiz (A)
Week 14	**FALL BREAK: NO SCHOOL**		
Week 15 11/30-12/2	Review Exam 2	Tuesday • Review Session Thursday • Exam 2	☐ Exam 2 (A) 12/2
Week 16	Review	• Wrap-Up and Review	1. Wrap-Up/Review
Week 17	**FINALS WEEK: Optional Exam 3 and Exam 4 Due**		