Phil 0180 Introduction to Modern Logic
Syllabus Fall 2023

Credits: 1 | Distribution: DED | Prerequisites: None

Instructor
Dr./Prof. Tim Juvshik (he/him/his)
Office: Twilight 303A
Office Hours: Tuesday 2:30-4:00 &
Wednesday 10:00-11:30 and by appointment
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Course Details
Lecture Time: T-Th-F 11:15-12:05
Room: AXT 201
Discussion Sections: Th Room AXT 201
Z Section 2:15-3:05 & Y Section 3:20-4:10
Zoom ID: 751 213 9023

Course Description

This course is an introduction to formal symbolic logic. The course aims to furnish you with a strong grasp of basic deductive reasoning skills. To that end, the course is divided in two: the first half looks at sentential logic and the second half looks at first-order predicate logic; we will end with a brief discussion of syllogistic logic. This course focuses on formal reasoning and thus is akin in many ways to mathematics, computer science and formal linguistics, although background in none of these areas is assumed. While this is also a philosophy course, no background in philosophy is required. Our focus will be on the logical form of deductive arguments, translating natural English sentences into our formal language, and testing for validity of these argument forms using proofs and other methods. The course is cumulative over the semester and thereby slowly captures more and more of natural language in our formal language. Students will be introduced to the central concepts and methods in formal logic and will have extensive practice at formalizing natural language and manipulating those formalizations. While in everyday life you are unlikely to bother translating people's arguments into a formal symbolic language, learning how to do this can help you better understand the underlying logical structure of natural languages like English, as well as strengthening your general deductive reasoning skills.

Note: This course satisfies the deductive reasoning (DED) distribution requirement but does not satisfy the philosophy (PHL) distribution requirement.

Course Goals

This course is an introduction to formal logic. The main goal is for students to become familiar with formal first-order logic. Students will be able to:

- Express natural language sentences using formal logical expressions.
- Evaluate arguments using formal methods, while abstracting away from content.
- Understand and express the logical relations between different bits of natural language.
- Complete proofs using formal systems and deduction methods.
- Develop competence with deductive reasoning skills and their applications.
- Gain a basic understanding of the theory of logic, i.e. metalogic.

Reading Materials
Students require a copy of *Logic and Philosophy: A Modern Introduction* (13th Edition), Hausman, Boardman, and Kahane, Hackett Publishing (2020). *Note*: The text, especially the e-copy, is relatively inexpensive. Used copies are fine, so long as they are of the 13th edition.

Note: It is crucial that you get the textbook immediately; if you fall behind it is very difficult to catch up in this course. I will post a PDF of the first chapter on Canvas to help mitigate this possibility.

Grading
Final grades will be based on the following:

Homework Problem Sets (x8)	20%
Quizzes (x5)	45%
Final Exam	30%
Participation	5%

The standard Middlebury College grade scale (letter/4.0 equivalents) will be used:

A = 4.00 = 93%-100%	A- = 3.67 = 90%-92.99%	B+ = 3.33 = 87%-89.99%
B = 3.00 = 83%-86.99%	B- = 2.67 = 80%-82.99%	C+ = 2.33 = 77%-79.99%
C = 2.00 = 73%-76.99%	C- = 1.67 = 70%-72.99%	D = 1.00 = 60%-69.99%
F = 0 = 0%-59.99%	INC	P/F

Assignments

Homework Exercises/Problem Sets
There are eight (8) homework exercises/problem sets throughout the term, collectively worth 20% of the final grade (2.5% each). These will cover the material from the previous week or so that we cover in lecture and are crucial to ensuring you have a proper grasp of the methods and concepts of the course prior to the quizzes/exam. These are to be handed in in hard copy (unless you have accommodations) by the due date and will be taken from the odd-numbered exercises in the textbook.

Quizzes
There are five (5) quizzes throughout the semester collectively worth 45% (9% each) of the final grade. The quizzes cover roughly half of the material each from our main two units, though note that the course material is cumulative (e.g. you will need to understand the material from Quiz 1 in order to do well on Quiz 2, etc.). The homework exercises are crucial practice to doing well on the quizzes. Quizzes will normally be held during our Friday lecture, though this may change as we adjust our pace and schedule as needed.

Final Exam
There is a final exam for the course which is worth 30% of the final grade and will be scheduled during the exam period after classes have finished. The exam will cover all of the material we learned over the course of the semester. Thus, it's crucial that students do keep abreast of the homework exercises and quizzes since they ultimately serve as preparation for the final exam. Date and time to be announced later in the semester.

Participation
There is also a participation grade worth 5% of the final grade. Your showing up and being attentive and engaged in lecture will be reflected in your participation grade, as will your willingness to build our intellectual community in discussion sections. This grade can be negatively affected by excessive unexcused absences from lecture or discussion section or disruptive or disrespectful behaviour, including using electronics for non-course purposes, regularly coming in late, wearing headphones, doing work for other classes, etc.

Practice Questions
The even-numbered exercises in the textbook have answer keys in the back of the book. It's a good idea to do these practice exercises in order to ensure that you have a good grasp of the material, especially in advance of the quizzes/exam. We will occasionally do some of these practice exercises together in class and specific questions may be assigned (though not to be turned in).

A Note on Collaboration
Students are welcome to work together on the homework exercises, but this does not mean copying each other's answers. You can collaborate, especially on difficult problems, but you must turn in your own unique work. This is especially important for you to be able to do well on the quizzes/exam. A substantial portion of discussion sections will involve small group work, so you will have ample opportunity to get to know your peers.

A Note on Learning Logic
Learning formal logic takes a lot of practice. It will initially seem very unfamiliar and weird to many of you. Some students catch on very quick while some find it very difficult. It is imperative that you do the practice questions, keep up on the homework and do the readings and come to class. If the concepts, methods or problems start to confuse or overwhelm you, seek assistance immediately. There is no substitute for just pushing through until you get it. Students often display a very steep ***learning curve*** in formal logic because it's unfamiliar – it's akin to learning math or a foreign language – and sometimes they'll panic. Give yourself a chance to learn and become acquainted with it and keep working at it if you have difficulties, eventually you'll get there. Some students will catch on quickly, but don't get complacent if you find the beginning of the semester easy – the material near the end of the course will be much more difficult, so don't plan on coasting.

Note: If you struggle at the beginning but show clear improvement over the semester, I will take this into account by dropping your lowest homework assignment or quiz.

Class Expectations

- **Office Hours:** I will have office hours this semester on Tuesdays, 2:30-4:00 and Wednesdays 10:00-11:30 in Twilight 303A. These are in person, but can also be done over Zoom, if necessary. I'm also available at other times by appointment, both in person and via Zoom (email me to set up a meeting).

- **Communication:** My main method of communication with you will be via your Middlebury College email, so be sure to check this regularly. I will also occasionally post class-wide announcements on Canvas as well as send out emails to the entire class. The best way to contact me is via my Middlebury College email. While some brief clarification questions can

be answered via email, it is for the most part too clunky to address logic problems. You can let me know via email if you have questions and I'll take them up at the beginning of the next class or in discussion section.

- **Course Readings:** Students should do the assigned readings *before* the class in which they're discussed. All readings are from the course textbook and we'll work through it mostly consecutively with some exceptions which I'll note in class.

- **Attendance:** Attendance in class and discussion section is expected. Attendance is also necessary to get full participation marks. Things do come up and absences are sometimes necessary, I just ask that you try to keep them to a minimum and let me know if it's important or on-going.

- **Electronics Policy:** Cellphones and smartwatches are not to be used during class. Many of you will have an e-copy of the textbook and may use your laptops or tablets to consult it. However, it is expected that you will not use these devices for any non-course related activities. Using electronics is distracting to both yourself and others, and studies have shown that it lowers grades of the user and those around them. If I suspect that you are engaging in such distractions I may ask you to leave.

- **Late Work Policy:** Late homework exercises will be penalized 5% per day late up to three days or before the homework answers are posted or the following quiz is due, whichever is first, at which point they won't be accepted. It is up to you to keep up with the work and it is crucial to do the homework on time to be prepared for the quizzes. If you must miss a quiz, you need to notify me in advance and must take it within one week.

- **Classroom Etiquette:** Students are expected to respect each other and myself, allow others the chance to speak, and be attentive in class. Disrespectful or disruptive behaviour will not be tolerated and may affect your grade.

- **Syllabus:** The schedule is subject to change, which will certainly happen as we adjust to our required pace in response to the material, especially later in the semester. Any changes will be announced in class and on the course webpage.

Academic Honesty

As a student at Middlebury, you are responsible for understanding and following the norms of academic honesty and integrity in the preparation and submission of your work. Details of our Academic Honesty, Honor Code, and Related Disciplinary Policies are available in Middlebury's handbook. Additionally, the Philosophy Department Statement on Academic Integrity can be a helpful resource. If you have any questions about what constitutes academic dishonesty or need tips on how to avoid plagiarism or what constitutes authorized vs. unauthorized aid, do not hesitate to contact me to have a discussion.

Accessibility

I am committed to making this class accessible and welcoming for all students. Student needs vary for what will allow them to do their best in academic courses. If you are having difficulties with any aspect

of this course – whether that be the material itself or the structure/delivery mechanisms of the course – please do not hesitate to contact me so that we can explore how to improve the situation for you.

Students who have Letters of Accommodation in this class are encouraged to contact me as early in the semester as possible to ensure that such accommodations are implemented in a timely fashion. For those without Letters of Accommodation, assistance is available to eligible students through the Disability Resource Center (DRC). Please contact ADA Coordinators Jodi Litchfield, Peter Ploegman, and Deirdre Kelly of the DRC at ada@middlebury.edu for more information. All discussions will remain confidential.

Campus Resources

The Center for Teaching, Learning, and Research (CTLR) provides academic support for students in many specific content areas and in writing across the curriculum through both professional tutors and peer tutors. The Center is also the place where students can find assistance in time-management and study skills. These services are free to all students. For information on how to access support, go to http://www.middlebury.edu/academics/resources/ctlr/students.

A Note on Tutors: This semester there are two tutors associated with this course. You can schedule appointments with them directly through CTLR but I ask that you please let me know if you're using their services so I can accommodate student needs accordingly.

Provisional Course Schedule

**** The schedule – both readings and homework and quiz due dates – will change as we adjust to the pace we need and anything else that arises; I will notify you of any changes ****

Dates	Topic	Reading	Notes	Assignments
Week 1 September 12/14/15	Class Intro Ch 1: Arguments	Ch 1 by Thursday Start Ch 2 by Friday		
Week 2 September 19/21/22	Ch 2: Symbolization	Ch 2 by Tuesday		Homework 1 Due Friday
Week 3 September 26/28/29	Ch 3: Truth Tables	Ch 3 by Tuesday		Homework 2 Due Friday
Week 4 October 3/5/6	Ch 4: Proofs	Ch 4 by Tuesday		Quiz 1 Friday
Week 5 October 10/12	Ch 5: Conditional and Indirect Proofs	Ch 5 by Tuesday		Homework 3 Due Friday
Week 6 October 17/19/20	Conditional and Indirect Proofs cont.	Continue with Ch 5		Homework 4 Due Thursday

Week 7 October 24/26/27	Class Cancelled 24/26	Start Ch 7 Friday		Quiz 2 Thursday
Week 8 October- November 31/2/3	Ch 7: Predicate Logic Symbolization	Finish Ch 7 by Tuesday		Homework 5 Due Friday
Week 9 November 7/9/10	Ch 8: Predicate Logic Semantics	Ch 8 by Tuesday		Quiz 3 Friday
Week 10 November 14/16/17	Ch 9: Predicate Logic Proofs	Ch 9 by Tuesday		Homework 6 Due Friday
Week 11 November Thanksgiving Break	No class			
Week 12 November- December 28/30/1	Ch 10: Relational Predicate Logic	Ch 10 by Tuesday		Homework 7 Due Tuesday Quiz 4 Friday
Week 13 December 5/7/8	Ch 16: Syllogistic Logic	Ch 16 by Tuesday		Quiz 5 Friday
Week 14 December 11	Recap and Exam Prep			Homework 8 Due Monday
Final Exams December 13-18	Final Exam Date TBD			