

# Introduction to Symbolic Logic

Instructor: Bell Bixin Guo

Tue. & Thur. 1:20-02:50 or 3:00-04:30 PM

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HUM 314

Drop-in Hours: Tue. & Thur. 4:30-5:30PM

Old Main 113

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Course website: <https://bixinguo.github.io/logic.html>

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Course Description	1
Learning Objectives	2
Recommended Textbooks	2
Requirements and Assessments	2
Grading breakdown	3
Office Hours and Email Guide	4
Classroom Policy	5
Topics (subject to revision)	5
Academic Integrity	5
Other Resources and Policy Statements	6

## Course Description

This is an introductory course to logic, especially symbolic logic. It introduces tools and formal methods for understanding and evaluating arguments in academic as well as everyday contexts. No previous acquaintance with logic is required. Nonetheless, a willingness to learn technicalities and to work at a certain level of abstraction is desirable. An *Introduction to Symbolic Logic* course is offered every year.

## Learning Objectives

The immediate goal of this course is to (i) provide students tools and formal methods for analyzing and evaluating arguments, (ii) get a glimpse of how reasoning works, (iii) develop the ability to think abstractly about formal systems, (iv) get a sense of the relation between formal systems and ordinary discourse, and, more specifically, (v) learn how to translate sentences into the language of symbolic logic and to use the rules of manipulating those sentences to see what they entail. The general aim behind this course is to provide students a foundation through which they can improve their reading, writing, and reasoning abilities.

## Recommended Textbooks

Irving M. Copi, Carl Cohen, and Kenneth McMahon, *Introduction to Logic*.

E. J. Lemmon, *Beginning Logic*.

*Supplementary texts:* Hans Halvorson, *How Logic Works: A User's Guide*.

Greg Restall, *Logic: An introduction*.

*The role of lectures and textbooks:* No introductory logic text suits all readers. This course does not strictly follow any textbook. Due to the limitations of time, we won't be able to cover every topic or every detail in class. The purpose of lectures instead is to introduce the key ideas, provide general structures and guidance through the subject, and address questions and confusions. These suggested textbooks can be used as resources to supplement lectures. The scope of assignments and the final exam is set by lectures, instead of any specific textbook.

## Requirements and Assessments

Learning logic is like learning math or physics. It takes practice through time. It is very difficult to grasp everything in a short period of time (say, right before the exams). The following requirements are thus designed to motivate you to make gradual progress and help you stay on track throughout the semester.

### **1. Participation**

One of the most important aspects of this course is your participation: asking and answering questions in class as well as engaging in group discussions. This is a way for you to actively engage with the class, instead of being merely recipients of information. It helps to develop your ability to think critically, to reflect and obtain a better understanding of the issues on hand, and to receive interactive guidance on

your learning. To motivate and encourage your participation, you can earn 0.5 points for participation in each session, up to a maximum of 8 points.

## ***2. Weekly Assignments***

In a course like this it is essential to do lots of problems (even if you feel like you understand the material on the basis of the lectures and readings). There will be 10 assignments: one for each week starting from Week 2, except for those weeks when there are in-class exercises. Each assignment is worth 5 points. You should work on these questions independently. You can discuss the assignments with other people, but you should NOT just get the answers. Since these exercises are part of your final grade, they are subject to cheating and plagiarism rules. Also, doing your own assignments is how you learn and prepare for exams.

## ***3. Weekly Study Groups***

In addition to participating in class, you are also expected to attend weekly study groups, where you can discuss class materials and assignments with preceptors and other students. This provides an opportunity for you to get help from others, especially if you don't feel comfortable asking me directly. If you don't think you need any help, it is also valuable to learn how to explain things to others (this is one of the best ways to learn things and to test if one really understands).

*Alternative plan:* If study groups really aren't your thing, you can choose in the beginning of the semester to give a presentation at some point in class. It will be graded (that is, credits are NOT assigned on mere completion). It is also crucial that we communicate about expectations for this alternative plan. I invite you to discuss with me whether this alternative is a good fit for you.

## ***4. In-class Exercises and Final Exam***

To prepare you for the final exams, there will be two in-class exercises. They will be closed book, with one page of notes allowed. They are meant to be a way for you to check how well you're doing in class.

## ***Grading breakdown***

Participation in class		$0.5 \times 16 = 8$
Weekly Assignments	Posted by Fridays; due on Mondays	$5 \times 10 = 50$
Study Groups		$0.5 \times 12 = 6$
In-class Exercise 1	October 15	6
In-class Exercise 2	November 14	10

Final Exam	December 10	20
Total		100

### ***Grading Scale***

	A: 93	A-: 90
B+: 87	B: 83	B-: 80
C+: 77	C: 73	C-: 70
D+: 67	D: 63	D-: 60

\*Numeric grades like 92.5 will be rounded up to A if and only if students show either excellent participation or significant improvements through the term.

### ***Late Policy***

Logic is cumulative so falling behind impedes your comprehension. Submitting homework late can also be difficult for your preceptor. We appreciate your consideration regarding this. Usually late work is worth 10% fewer points for every day it is late from the time it was due, unless you have a compelling reason for turning it in late (for instance, you were sick, had to work late, or had to take care of someone else). In order to give you full credit for your late work, please contact me or your preceptor as soon as possible.

### **Office Hours and Email Guide**

Please feel free to drop in any time during regular office hours (Tuesdays and Thursdays 4:30-5:30PM). If you'd like to notify me earlier, you can also make an appointment (or see if other people have made an appointment during that time) here: <https://calendar.app.google/1WyPwFyV17H4oFwh9>. It is very difficult to discuss logic or other philosophical topics by email, it's recommended to ask them in office hours, during or after class. If you have a logistical question about the course, the best way is to post it on Moodle (under 'Discussion' \_ 'Logistic Questions'). In the case of something urgent you'd like me to address, please include "urgent" in the email subject. If you don't hear from me in a week, please feel free to send a reminder.

## Classroom Policy

You are strongly encouraged to take notes in the old-fashioned way, on pen and paper. Electronic devices are not allowed in class for purposes other than taking notes.

To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.

## Topics (*subject to revision*)

- Introduction
- Arguments: premises and conclusion
- Truth, Validity, and Soundness
- Deduction vs Induction
- Fallacies
- Conjunction and Disjunction
- Negation
- Truth tables
- Logical equivalence
- Conditionals and Biconditionals
- Sentential logic vs Predicate logic
- Syntax vs Semantics
- Universal quantifier and Existential quantifier
- Probability

## Academic Integrity

Students in this course will be expected to comply with the [Macalester's Policy on Academic Integrity](#). Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, and Students found guilty are subject to disciplinary action, as outlined in the

guidelines on Academic Integrity. Furthermore, no student may bring any unauthorized materials to an exam. To learn more about Academic Integrity, visit the [Academic Integrity Guide](#) for an overview of the topic.

## Other Resources and Policy Statements

### Disability Resources and Services

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and [Center for Disability Resources](#), (651)-696-6748, [disabilityresources@macalester.edu](mailto:disabilityresources@macalester.edu), as early as possible in the term. The center will verify and determine reasonable accommodations for this course.

### Diversity and Inclusion

Macalester College is committed to creating an accessible and inclusive environment that supports and serves our community members, and does not discriminate based on factors as stated in the Title IX policy. For more information about policies, procedures, and practices, see: <https://www.macalester.edu/title-ix/sexualmisconductpolicy/>.

The assignments and exams will be graded anonymously to ensure fairness and to avoid biases. The reason to grade anonymously is to eliminate the possible effects of implicit biases. For an introduction to implicit bias, take Project Implicit's "Implicit Association Test" (<https://implicit.harvard.edu/implicit>) or read the Stanford Encyclopedia of Philosophy's article on Implicit Bias (<https://plato.stanford.edu/entries/implicit-bias/>).

### Health Resources and Policy

Your health is a priority. Please take care of yourself by staying hydrated, eating well, exercising, getting enough sleep, and taking time to relax. There are many other wonderful people at Macalester and in our broader community who can also help with specific aspects of your mental and physical health. Some of them are listed here: <https://docs.google.com/document/d/1IhoiGs6iUgX-htD64jf60CqbfVE1lp9JhVNlnm6iNsA/preview?pli=1>.

An important part of the college experience is learning how to ask for help. Take the time to learn about all that's available and take advantage of it. Ask for support sooner rather than later—this always helps. If you or anyone you know experiences any academic stress, difficult life events, or difficult feelings like anxiety or depression, we strongly encourage you to seek support. Consider reaching out to a friend, faculty or family member you trust for assistance connecting to the support that can help.