

Introduction to Formal Logic

PHIL/MATH 205 (3 CH)

Asynchronous Online
Spring 2026 Syllabus

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Office Hours / Logic Lab

The Professor will be available DAY & TIME TBD in Faner 3327 or via MS Teams to work with students individually in groups on logic problems.

Course Description

This course is an introduction to formal logic. Formal logic is the formal study of the structures of language, reasoning, inference, and proof. This course will focus on deductive logic, including formal analysis of statements and arguments, logical connectives, sentential and quantified logics, identity, formal semantics and models, and logical proofs.

Core Learning Outcomes (CLOs)

1. Quantitative Literacy
2. Knowledge of the Physical, Natural, and Cultural Worlds
3. Inquiry and Analysis
4. Critical Thinking

Student Learning Objectives (SLOs)

Upon successful completion of this course, students will:

1. Understand basic concepts in logic, such as truth functionality, validity, soundness, counter-examples, tautology, self-contradiction, logical equivalence, logical contradictoriness, and logical consistency. (CLOs 1, 2)
2. Determine the logical structure of English arguments by identifying premises and conclusions. (CLOs 2, 3, 4)

3. Translate English statements to and from (a) Sentential Logic (SL) and Quantified Logic (QL). (CLOs 1, 3)
4. Semantically evaluate statements and the validity of arguments (a) in SL using truth tables and (b) in QL using models. (CLOs 1, 2, 4)
5. Make derivations of valid symbolic logical arguments using natural deduction (a) in SL and (b) in QL. (CLOs 1, 4)

Course Materials

Required Textbook

P.D. Magnus, *forall x: An Introduction to Formal Logic* (Order Print on Demand) (Download for Free)

Carnap

You need to sign up for the class in Carnap via the link **provided on D2L**. Practice Exercises and some exam questions will be provided via Carnap.

Schedule of Readings and Assignments

This course is self-paced and mastery-based rather than organized according to a weekly schedule. You are required to work through the material in order, by Unit. Once you watch the lectures and complete at least one practice exercise in each unit, the exam in that unit will unlock. Exams are mastery-based; satisfactory score on each exam is required before moving on to the next unit. (“Satisfactory” criteria will be specified for each exam. For most exams, it is 80% correct or better.)

If you do not achieve mastery on your first try on the exam, you will have to wait 48 hours and complete additional practice exercises to unlock re-takes.

Unit 0: Course Introduction (Learn how this class works)

Read the Syllabus

Watch Lecture 0: Welcome and Introduction

Log in to Carnap

Practice Exam

Unit 1: Basic Concepts in Logic (SLOs 1, 2)

Read Chapter 1

Lecture 1: Basic Concepts

Practice Exercises 1.A-D

Exam 1: Basic Concepts

Unit 2: Sentential Logic: Syntax and Symbolization (SLO 3a)

Read Chapter 2, §§1-2

Lecture 2: Sentence Letters & Connectives

Practice Exercises 2.A-C

Read Chapter 2, §3

Lecture 3: SL Symbolization

Practice Exercises 2.D-F

Read Chapter 2, §4

Lecture 4: Well-Formed Formulae of SL

Practice Exercises 2.G-H

Exam 2: Sentential Logic - Symbolization

Unit 3: Truth Tables: Semantics of Sentential Logic (SLO 4a)

Read Chapter 3

Lecture 5: Truth Tables

Practice Exercises 3.A-D

Lecture 6: Truth Tables 2

Practice Exercises 3.D-F

Exam 3: Sentential Logic - Truth Tables

Unit 4: Proofs in Sentential Logic (SLO 5a)

Lecture 7: The Concept of Proof, SL Basic Rules, Direct Proof

Read Chapter 6, §1

Lecture 8: SL Basic Rules, Indirect Proof

Practice Exercises 6.A

Read Chapter 6, §§2-3

Lecture 9: Derived Rules, Replacement

Practice Exercises 6.B-C

Read Chapter 6, §§6-7

Lecture 10: Proof strategy

Practice Exercises 6.D-G

Exam 4: Sentential Logic - Proofs

Unit 5: Quantified Logic: Syntax and Symbolization (SLO 3b)

Available starting March 18

Read Chapter 4, §§1-4

Lecture 11: Building Blocks of Quantified Logic

Practice Exercises 4.A-B

Lecture 12: Translation to QL

Practice Exercises 4.C-D

Read Chapter 4, §5

Lecture 13: Well-Formed Formulae of QL

Practice Exercises 4.E-G

Read Chapter 4, §6

Lecture 14: Identity in QL

Practice Exercises 4.H-K

Exam 5: Quantified Logic - Symbolization

Unit 6: Formal Semantics (SLO 4b)

Available starting April 1

Read Chapter 5, §§1-2

Lecture 15: Formal Semantics in SL and QL

Practice Exercises 5.A-C

Read Chapter 5, §§3-5

Lecture 16: Formal Semantics using Models

Practice Exercises 5.D-J

Exam 6: Formal Semantics & Models

Unit 7: Proofs in Quantified Logic (SLO 6b)

Available starting April 15

Read Chapter 6, §4

Lecture 17: Proofs in Quantified Logic

Practice Exercises 6.H-I

Lecture 18: Translations and Proofs

Practice Exercises 6.J-M

Read Chapter 6, §§8-9

Lecture 19: Proofs & Semantics

Practice Exercises 6.N-V

Exam 7: Quantified Logic - Proofs

Assignment Details and Grades

Assignment Types

1. Practice Exercises
2. Exams (one for each unit)

Self-Paced Approach

Your progress through the course depends reaching a level of mastery in each unit. Your grade in the course will depend on how many units you reach this level at, as specified below. Practice exercises are based on completion only. They do not figure in your final grade; rather, completing practice exercises unlocks exam attempts (see above under Schedule). You choose the pace of your work, but it is recommended that you start early and stay on top of the material. You can continue working on a unit and retaking its exam until you master that material, but because there is a busy human in the loop of grading and releasing grades, there will always be a waiting period between completing material and unlocking exams.

Grading Policy

Grades will be determined as follows:

- A:** Satisfactory Grade on all 7 Exams
- A-:** Satisfactory Grade on Exams 1-6
- B+:** Satisfactory Grade on Exams 1-5
Completion of at least one attempt on Exam 6
- B:** Satisfactory Grade on Exams 1-5
- B-:** Satisfactory Grade on Exams 1-4
Completion of at least one attempt on Exam 5
- C+:** Satisfactory Grade on Exams 1-4
- C:** Satisfactory Grade on Exams 1-3
Completion of at least one attempt on Exam 4
- C-:** Satisfactory Grade on Exams 1-3
- D:** Satisfactory Grade on Exams 1-2
- F:** Failure to satisfy the criteria for grades A-D.

- “Satisfactory” depends on assignment, but is typically 80% correctness.
- “Completion” of an assignment means making reasonable effort
- See above for the SLOs associated with each grade level.

Course and Instructor Policies

Contacting the Instructor

I strongly encourage you to contact me if you have any questions that are not answered by the materials on D2L or if you find any errors in the online course materials. However, I expect that you will look carefully at the syllabus and at the materials on D2L before reaching out with a question. During my weekly office hours, I will be available to answer questions promptly by email, phone, and Teams as well as in person. I encourage you to come in or call on Teams to work problems together during those times. I will try to respond within one business day to any contact outside of those hours, but you should feel welcome to send a reminder after that, in case your message has slipped through the cracks.

Cheating and Plagiarism

Cheating consists of turning in someone else’s work as your own or collaborating on work that is meant to be individual. What counts as cheating depends on the type of assignment in question:

- You *are* permitted to discuss and work together on Practice Exercise problems with the instructor, other students, or a tutor, though it is to your advantage to make sure you understand how to do that work.
- You are *not* under *any* circumstances to discuss the content of exams with other students or to work together on any exams. You are not permitted to have someone take the exam on your behalf, to use solutions provided to you by someone else, or to use any form of AI/LLM or computer assistant not provided to you in the exam itself.

The sanction for any form of cheating in this course will be a failing grade for the course and a referral for academic misconduct.

Syllabus Attachment

Spring 2026

MISSION STATEMENT FOR SOUTHERN ILLINOIS UNIVERSITY CARBONDALE

SIU embraces a unique tradition of access and opportunity, inclusive excellence, innovation in research and creativity, and outstanding teaching focused on nurturing student success. As a nationally ranked public research university and regional economic catalyst, we create and exchange knowledge to shape future leaders, improve our communities, and transform lives.

IMPORTANT DATES:

Semester Classes Begin:01/12/2026
Last day to add full-term course (without Dean's signature):01/16/2026
Last day to withdraw from the University with a full refund:01/23/2026
Last day to drop a full-term course for a credit/refund:01/23/2026
Last day to drop a full-term course (W grade, no refund):.....03/27/2026
Final examinations:05/04/2026–05/08/2026

Note: Please verify the above dates with the Registrar calendar and find more detailed information on deadlines at <http://registrar.siu.edu/calendars>. For add/drop dates that apply to shorter-than-full-term courses, please look at the Schedule of Classes search results at <http://registrar.siu.edu/schedclass/index.php>

SPRING SEMESTER HOLIDAYS:

Martin Luther King, Jr.'s Birthday 01/19/2026
Spring Break 03/07/26 - 03/15/26

DIVERSITY: Southern Illinois University Carbondale's goal is to provide a welcoming campus where all of our students, faculty and staff can study and work in a respectful, positive environment free from racism and intimidation. For more information visit: <http://diversity.siu.edu>.

OFFICE FOR ACCESS AND ACCOMMODATIONS: SIU Carbondale is committed to providing an inclusive and accessible experience for all students with disabilities. Office for Access and Accommodations coordinates the implementation of accommodations. If you think you may be eligible for accommodations but have not yet obtained approval please contact OAA immediately at (618) 453-5738 or <https://access.siu.edu>. You may request accommodations at any time, but timely requests help to ensure accommodations are in place when needed. Accommodations and services are determined through an interactive process with students and may involve consideration of specific course design and learning objectives in consultation with faculty.

MILITARY COMMUNITY: There are complexities of being a member of the military community and also a student, and military and veteran related developments can complicate academic life. If you are a member of the military community and in need of accommodations please visit Veterans Services at <http://veterans.siu.edu/>.

STUDENT MULTICULTURAL RESOURCE CENTER: The Student Multicultural Resource Center serves as a catalyst for inclusion, diversity and innovation. As the Center continues its work, we are here to ensure that you think, grow and succeed. We encourage you to stop by the Center, located in the Student Services Building Room 140, to see the resources available and discover ways you can get involved on the campus. Visit us at <https://smrc.siu.edu/>.

SALUKI CARES: The purpose of Saluki Cares is to develop, facilitate and coordinate a university-wide program of care and support for students in any type of distress—physical, emotional, financial, or personal. By working closely with faculty, staff, students and their families, SIUC will continue to display a culture of care and demonstrate to our students and their families that they are an important part of the community. For information on Saluki Cares: Call (618) 453-2461, email siucares@siu.edu, or <http://salukicares.siu.edu/>.

SAFETY AWARENESS FACTS AND EDUCATION: Title IX makes it clear that violence and harassment based on sex and gender is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here: <http://safe.siu.edu>.

PREGNANCY: Title IX makes it clear that students who are pregnant or have a related condition may contact the Title IX Coordinator to request accommodations or to report any allegations of discrimination. The Title IX Coordinator may be contacted at: Nick Wortman, Associate Vice Chancellor for Human Resources, Southern Illinois University Carbondale, 0135 Woody Hall, 900 S. Normal Avenue, Mail Code 6520, Carbondale, IL 62901, (618) 453-6667, equity@siu.edu.

SIU COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS): Mental health counseling services are available by calling [CAPS](http://caps.siu.edu) at (618) 453-5371. CAPS offers confidential same-day services and ongoing counseling. For after hours crisis care, students are encouraged to call 988, 911, or present to their nearest emergency room.

WITHDRAWAL POLICY (Undergraduate Only): Students who officially register for a session must officially withdraw from that registration in a timely manner to avoid being charged as well as receiving a failing grade for those classes. An official withdrawal must be initiated by the student, or on behalf of the student through the academic unit, and be processed by the Registrar's office. For the proper procedures to follow when dropping courses and when withdrawing from SIUC visit: <https://registrar.siu.edu/students/withdraw.php>.

SIUC'S EARLY WARNING INTERVENTION PROGRAM (EWIP): Students enrolled in courses participating in SIUC's Early Warning Intervention Program might be contacted by University staff during a semester. More information can be found at the University Core Curriculum's Overview webpage: <https://corecurriculum.siu.edu/for-faculty/>.

EMERGENCY PROCEDURES: We ask that you become familiar with Emergency Preparedness at SIU. Emergency response information is available on posters in buildings on campus, on the Emergency Preparedness at SIU website, and through text and email alerts. To register for alerts visit: <http://emergency.siu.edu/>.

CATALOGS:

catalog.siu.edu
gradcatalog.siu.edu - Graduate policies often vary from Undergraduate policies. To view the applicable policies for graduate students, please refer to the graduate catalog.

CENTER FOR LEARNING AND SUPPORT SERVICES:

Tutoring: <https://class.siu.edu/>
Math Labs: <http://math.siu.edu/courses/course-help.php>

WRITING CENTER: <http://write.siu.edu/>

PLAGIARISM: See the Student Conduct Code: <http://srr.siu.edu/student-conduct-code/>

INCOMPLETE POLICY (Undergraduate Only): <http://registrar.siu.edu/grades/incomplete.php>

REPEAT POLICY: <http://registrar.siu.edu/students/repeatclasses.php>

MORRIS LIBRARY HOURS: <https://libcal.lib.siu.edu/hours/>

ADVISEMENT: <http://advisement.siu.edu/>

SIU ONLINE: <https://online.siu.edu/>