Term Information

Effective Term   Autumn 2022

Course Change Information

What change is being proposed? (If more than one, what changes are being proposed?)

To add the option of teaching this course online.

What is the rationale for the proposed change(s)?

Over the past year, the Department has learned of student demand for online learning opportunities, and our faculty are now experienced enough to be able to

deliver courses online. After a review of our curriculum, we have identified a few courses that are particularly well-suited for online delivery. PHILOS 2500 is

such a course.

What are the programmatic implications of the proposed change(s)?

(e.g. program requirements to be added or removed, changes to be made in available resources, effect on other programs that use the course)?

We anticipate no programmatic implications as a result of this change.

Is approval of the request contingent upon the approval of other course or curricular program request? No

Is this a request to withdraw the course? No

General Information

Course Bulletin Listing/Subject Area	Philosophy
Fiscal Unit/Academic Org	Philosophy - D0575
College/Academic Group	Arts and Sciences
Level/Career	Undergraduate
Course Number/Catalog	2500
Course Title	Symbolic Logic
Transcript Abbreviation	Symbolic Logic
Course Description	A formal presentation of the elements of modern deductive logic; decision and proof procedures in sentential logic and functional logic.
Semester Credit Hours/Units	Fixed: 3

Offering Information

Length Of Course	14 Week, 12 Week, 8 Week, 7 Week, 6 Week, 4 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	Yes
Is any section of the course offered	100% at a distance
Previous Value	*No*
Grading Basis	Letter Grade
Repeatable	No
Course Components	Lecture, Recitation
Grade Roster Component	Lecture
Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus, Lima, Mansfield, Marion, Newark, Wooster

Previous Value   *Columbus, Lima, Mansfield, Marion, Newark*

Prerequisites and Exclusions

Prerequisites/Corequisites   Prereq: Math 1075 or equiv, or an ACT Math subscore of 22 or higher that is less than 2 years old.
Exclusions
Previous Value   Not open to students with credit for 250.
Electronically Enforced   No

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code   38.0102
Subsidy Level   Baccalaureate Course
Intended Rank   Freshman, Sophomore, Junior

Requirement/Elective Designation

Required for this unit's degrees, majors, and/or minors
General Education course:
     Mathematical or Logical Analysis; Mathematical and Quantitative Reasoning (or Data Analysis)

Course Details

Course goals or learning   • A thorough grounding in the techniques of formal logic: translating sentences of English or into formal logical
objectives/outcomes
                                        notation; analyzing arguments for validity; providing formal proofs for valid arguments; and constructing

                                        counterexamples.
Previous Value

Content Topic List   • Sentential logic

                                      • Predicate logic

                                      • Derivation, proof, entailment
Sought Concurrence   No
Previous Value

Attachments   • PHILOS 2500 asc_distance_approval_cover_sheet as of 9.2.2021.docx: ASC Tech Cover Sheet

                                        (Other Supporting Documentation. Owner: Shuster,Amy Lynne)

                                      • PHILOS 2500 in ASC DL syllabus_template.docx: DL syllabus

                                        (Syllabus. Owner: Shuster,Amy Lynne)

                                      • syll2500 Spring 2020.pdf: In Person syllabus

                                        (Syllabus. Owner: Shuster,Amy Lynne)

Comments

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Shuster,Amy Lynne	09/02/2021 02:22 PM	Submitted for Approval
Approved	Downing,Lisa J	09/02/2021 04:25 PM	Unit Approval
Approved	Vankeerbergen,Bernadette Chantal	09/14/2021 11:56 AM	College Approval
Pending Approval	Cody,Emily Kathryn Jenkins,Mary Ellen Bigler Hanlin,Deborah Kay Hilty,Michael Vankeerbergen,Bernadette Chantal Steele,Rachel Lea	09/14/2021 11:56 AM	ASCCAO Approval

THE OHIO STATE UNIVERSITY

SYLLABUS
PHILOS/2500

Introduction to Symbolic Logic
Autumn 2020 (full term)
3 credit hours
Distance learning with synchronous class meetings Tuesdays and
Thursdays 2:20-3:40pm on Zoom

COURSE OVERVIEW

Instructor

Instructor: Neil Tennant
Email address: tennant.9@osu.edu (preferred contact method)
Website: u.osu.edu/tennant9/
Office hours: Wednesdays and Fridays, 11:00 a.m. to 12:00 p.m.

Teaching Assistant

Instructor: **TBA**
Email address: TBA
Office hours: Tuesdays and Thursdays, 1:30 p.m. to 2:30 p.m.

Prerequisites

Math 1075 or equivalent, or an ACT Math subscore of 22 or higher that is less than 2 years old.
Not open to students with credit for 250.

Course description

In this course we will present a symbolic deductive system to model correct reasoning. It will be shown what kinds of arguments in ordinary language and in math can be "translated" into this system, where proofs can be checked for formal correctness. Important logical concepts, like consistency, consequence, validity are presented via the system, and the techniques of mathematical logic are illustrated with it.

The course is designed to shed light on what it is to reason deductively, and what it is to do so correctly. We examine the role that symbols play in reasoning.

Course learning outcomes

We aim to give the student a thorough grounding in the techniques of formal logic: translating sentences of English or "mathematicians' English" into formal logical notation; analyzing arguments for validity; providing formal proofs for valid arguments; and constructing counterexamples to invalid ones.

We shall focus on the usual connectives of propositional logic ('not', 'and', 'or', and 'if . . . then . . .'), and shall also explain the workings of the usual quantifiers of first-order logic ('some' and 'all'). This is not just a technical exercise, but involves philosophical consideration of issues such as reference, predication, quantification, identity, descriptions, truth and meaning.

We shall explain the basic concepts of metalogic, which is the study of logical systems themselves. The most important properties to be studied are the soundness and completeness of systems of proof with respect to a chosen formal semantics.

Our systems of proof will be those of natural deduction, with their characteristic introduction and elimination rules for the connectives and the quantifiers. This affords a unified approach to the study of classical logic and its most important subsystems.

General education goals and expected learning outcomes

As part of the Mathematical or Logical Analysis subcategory under the Quantitative and Logical Skills requirement of the General Education curriculum, this course is designed to prepare students to be able to do the following:
- Students develop skills in quantitative literacy and logical reasoning, including the ability to identify valid arguments, and use mathematical models.
    1. Students comprehend mathematical concepts and methods adequate to construct valid arguments.
    2. Students comprehend mathematical concepts and methods adequate to understand inductive and deductive reasoning
    3. Students comprehend mathematical concepts and methods adequate to increase their general problem solving skills.

Through direct instruction, regular quizzes and homework, exams and an open-ended discussion forum, students' abilities to engage in symbolic logic will be reflected upon, practiced, and directly assessed. The ability to engage in symbolic logic includes these skills:
> (i) translating between English and formal language;
> (ii) evaluating formal sentences as true or false under particular interpretations;
> (iii) constructing proofs of valid arguments;
> (iv) describing counterexamples to invalid argument; and
> (v) determining, of a given argument, whether it is valid—and, if so, providing a proof of it, otherwise describing a counterexample to it.

HOW THIS ONLINE COURSE WORKS

Mode of delivery: This course is 100% online. You will find a sequence of materials and activities each week in Carmen, and we will meet for a weekly Zoom session during our scheduled class meeting time.

Pace of online activities: This course is divided into **weekly modules** that are released one week ahead of time. You may schedule your efforts freely throughout the week as you keep pace with due dates.

Credit hours and work expectations: This is a **3-credit-hour course**. According to Ohio State policy (go.osu.edu/credithours), students should expect around 3 hours per week of time spent on direct instruction (instructor content and Carmen activities, for example) in addition to 6 hours of homework (reading and assignment preparation, for example) to receive a grade of (C) average.

Attendance and participation requirements: Research shows regular participation is one of the highest predictors of success. With that in mind, I have the following expectations for everyone's participation:

- **Participating in online activities**: **AT LEAST ONCE PER WEEK**
  You are expected to log in to the course in Carmen every week. (During most weeks you will probably log in many times.)
- **Twice Weekly Zoom sessions: STRONGLY RECOMMENDED.** Students should plan to attend all synchronous class sessions for the course. Recordings of synchronous class sessions will be made available on Carmen for students who miss class.
- **Zoom instructor office hours: OPTIONAL.**
  You are encouraged to note my office hours in your weekly schedule and attend as you have questions, but these sessions are optional.
- **Participating in discussion forums**: **OPTIONAL**
  A Course Q&A discussion forum will be available on Carmen to ask direct questions about the course material and assignments asynchronously.

COURSE MATERIALS AND TECHNOLOGIES

Textbooks

Required

- Neil Tennant, *Natural Logic*, Edinburgh University Press, 2nd edition, 1990. A PDF will be made available for free on Carmen

Course technology

Technology support

For help with your password, university email, Carmen, or any other technology issues, questions, or requests, contact the Ohio State IT Service Desk. Standard support hours are available at ocio.osu.edu/help/hours, and support for urgent issues is available 24/7.

- **Self-Service and Chat support:** ocio.osu.edu/help
- **Phone:** 614-688-4357(HELP)
- **Email:** servicedesk@osu.edu
- **TDD:** 614-688-8743

Technology skills needed for this course

- Basic computer and web-browsing skills
- Navigating Carmen (go.osu.edu/canvasstudent)
- CarmenZoom virtual meetings (go.osu.edu/zoom-meetings)
- You are welcome to use the free, Ohio State-themed virtual backgrounds (go.osu.edu/zoom-backgrounds) during CarmenZoom meetings.

Digital Flagship

Digital Flagship is a student success initiative aimed at helping you build digital skills for both college and career. This includes offering an engaging collection of digital tools and supportive learning experiences, university-wide opportunities to learn to code, and a Design Lab to explore digital design and app development. Digital Flagship resources available to help Ohio State students include on-demand tutorials, The Digital Flagship Handbook (your guide for all things tech-related), workshops and events, one-on-one tech consultations with a peer or Digital Flagship staff member, and more. To learn more about how Digital Flagship can help you use technology in your courses and grow your digital skills, visit go.osu.edu/dfresources.

Required equipment

- **Computer**: current Mac (MacOs) or PC (Windows 10) with high-speed internet connection
- **Webcam**: built-in or external webcam, fully installed and tested
- **Microphone**: built-in laptop or tablet mic or external microphone
- **Other**: a mobile device (smartphone or tablet) to use for BuckeyePass authentication

If you do not have access to the technology you need to succeed in this class, review options for technology and internet access at go.osu.edu/student-tech-access.

Required software

- **Microsoft Office 365**: All Ohio State students are now eligible for free Microsoft Office 365. Visit the installing Office 365 (go.osu.edu/office365help) help article for full instructions.

Carmen access

You will need to use BuckeyePass (buckeyepass.osu.edu) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you do each of the following:

- Register multiple devices in case something happens to your primary device. Visit the BuckeyePass - Adding a Device help article for step-by-step instructions (go.osu.edu/add-device).
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes good for 365 days that can each be used once.
- Install the Duo Mobile application (go.osu.edu/install-duo) on all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357(HELP) and IT support staff will work out a solution with you.

GRADING AND FACULTY RESPONSE

How your grade is calculated

ASSIGNMENT CATEGORY	POINTS
Quizzes	**50**
Mid-semester Exam	**20**
Final Exam	**30**
Zoom attendance and participation	extra credit opportunity
Total	**100**

See course schedule below for due dates.

Descriptions of major course assignments

Quizzes

Description: There will be five relatively low stakes Quizzes administered through Carmen over the course of the semester. Each Quiz will require that you demonstrate a skill covered by the time the Quiz in question is taken. You will receive feedback on your efforts designed to help you more successfully exhibit the skill in exams.
Academic integrity and collaboration: You are not permitted to collaborate with others on these quizzes, nor refer to course materials. The work that you turn in must be entirely your own.

Mid-Semester and Final Exams

Description: These exams will require that you demonstrate understanding of core concepts and the skills covered in each section of the course.

Academic integrity and collaboration: You are not permitted to collaborate with others on these quizzes, nor refer to course materials. The work that you turn in must be entirely your own.

Late assignments

Late submissions will not be accepted. Please refer to the Course Schedule for due dates. Due dates are set to help you stay on pace and to allow timely feedback that will help you complete subsequent assignments.

Grading scale

93–100:	A
90–92.9:	A-
87–89.9:	B+
83–86.9:	B
80–82.9:	B-
77–79.9:	C+
73–76.9:	C
70–72.9:	C-
67–69.9:	D+
60–66.9:	D
Below 60:	E

Instructor feedback and response time

I am providing the following list to give you an idea of my intended availability throughout the course. (Remember that you can call **614-688-4357(HELP)** at any time if you have a technical problem.)

- Preferred contact method: If you have a question, please contact me first through my Ohio State email address. I will reply to emails within 24 hours on days when class is in session at the university.
- Class announcements: I will send all important class-wide messages through the Announcements tool in CarmenCanvas. Please check your notification preferences (go.osu.edu/canvas-notifications) to ensure you receive these messages.
- Discussion board: I will check and reply to messages in the Course Q&A discussion board once mid-week and once at the end of the week.
- Grading and feedback: Students will receive their scores on quizzes and exams within seven days of submission, and students will receive feedback on informal assignments that ask them to practice their skills.

OTHER COURSE POLICIES

Discussion and communication guidelines

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.
- **Backing up your work**: Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Carmen discussion.
- **Synchronous sessions**: During our Zoom sessions I ask you to use your real name and a clear photo of your face in your Carmen profile. During our full-group lecture time, you may turn your camera off if you choose. When in breakout rooms or other small-group discussions, having cameras and mics on as often as possible will help you get the most out of activities. You are always welcome to use the free, Ohio State-themed virtual backgrounds (go.osu.edu/zoom-backgrounds). Remember that Zoom and the Zoom chat are our classroom space where respectful interactions are expected.

Academic integrity policy

See **Descriptions of major course assignments**, above, for my specific guidelines about collaboration and academic integrity in the context of this online class.

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the university's Code of Student Conduct (studentconduct.osu.edu), and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the university's Code of Student Conduct and this syllabus may constitute "Academic Misconduct."

The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the university or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the university's Code of Student Conduct is never considered an excuse for academic misconduct, so I recommend that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by university rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the university's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the university.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:
- Committee on Academic Misconduct web page (go.osu.edu/coam)
- Ten Suggestions for Preserving Academic Integrity (go.osu.edu/ten-suggestions)
- Eight Cardinal Rules of Academic Integrity (go.osu.edu/cardinal-rules)

Student Services and Advising

University Student Services can be accessed through BuckeyeLink. More information is available here: https://contactbuckeyelink.osu.edu/

Advising resources for students are available here: http://advising.osu.edu

Copyright for instructional materials

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Office of Institutional Equity:

1. Online reporting form at equity.osu.edu,
2. Call 614-247-5838 or TTY 614-688-8605,
3. Or email equity@osu.edu

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Office of Institutional Equity to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.
- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member.

Commitment to a diverse and inclusive learning environment

The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

Land Acknowledgement

We would like to acknowledge the land that The Ohio State University occupies is the ancestral and contemporary territory of the Shawnee, Potawatomi, Delaware, Miami, Peoria, Seneca, Wyandotte, Ojibwe and Cherokee peoples. Specifically, the university resides on land ceded in the 1795 Treaty of Greeneville and the forced removal of tribes through the Indian Removal Act of 1830. I/We want to honor the resiliency of these tribal nations and recognize the historical contexts that has and continues to affect the Indigenous peoples of this land.

More information on OSU's land acknowledgement can be found here: https://mcc.osu.edu/about-us/land-acknowledgement

Your mental health

As a student you may experience a range of issues that can cause barriers to learn, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. No matter where you are engaged in distance learning, The Ohio State University's Student Life Counseling and Consultation Service (CCS) is here to support you. If you find yourself feeling isolated, anxious or overwhelmed, on-

demand resources are available at go.osu.edu/ccsondemand. You can reach an on-call counselor when CCS is closed at 614- 292-5766, and 24-hour emergency help is also available through the 24/7 National Prevention Hotline at 1-800-273-TALK or at suicidepreventionlifeline.org. The Ohio State Wellness app is also a great resource available at go.osu.edu/wellnessapp.

ACCESSIBILITY ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Requesting accommodations

The university strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability including mental health, chronic or temporary medical conditions, please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's request process, managed by Student Life Disability Services.

Disability Services Contact Information

- Phone: 614-292-3307
- Website: slds.osu.edu
- Email: slds@osu.edu
- In person: Baker Hall 098, 113 W. 12th Avenue

Accessibility of course technology

This online course requires use of CarmenCanvas (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations with your instructor.
- Canvas accessibility (go.osu.edu/canvas-accessibility)
- Streaming audio and video
- CarmenZoom accessibility (go.osu.edu/zoom-accessibility)
- Collaborative course tools

- You are welcome to use the free, Ohio State-themed virtual backgrounds (go.osu.edu/zoom-backgrounds) during CarmenZoom meetings.

COURSE SCHEDULE

Refer to the Carmen course for up-to-date assignment due dates.

Week	Dates	Topics, Readings, Assignments, Deadlines
1	Jan 11 and 13	Formal languages v. natural languages. Deductive logic as the study of validity of arguments. Applications of deductive logic, in both mathematics and empirical science. The philosophical importance of logic for the study of language and rationality. Read: Chapter 1
2	Jan 18 and 20	Eliminating syntactic ambiguity. Categorizing linguistic expressions: names, function signs, predicates, connectives, quantifiers, variable-binding term-forming operators. Formal grammars as involving precise inductive definitions of term and of well-formed formula. Read: Chapter 2
3	Jan 25 and 27	Interpretation of the connectives by means of truth-tables. Calculating the truth-value of a sentence of propositional logic under an assignment of truth-values to its constituent atoms. Showing that any sentence with no repetitions of atoms is contingent. Read: Section 3.2
4	Feb 1 and 3	Determining the truth-value of a complex first-order sentence under an interpretation/model. Evaluating a first-order sentence as true (or as false) in A finite model, using the `model-relative' rules for introducing the universal quantifier and eliminating the existential quantifier. Categorically describing finite models. Read: Sections 3.3 to 3.5 Quiz 1
5	Feb 8 and 10	Validity of argument. Logical consequence and logical truth (`tautologous-ness'). Compactness of logical consequence. Counterexamples to invalid arguments. Read: Sections 3.6, 3.8.

Week	Dates	Topics, Readings, Assignments, Deadlines
6	Feb 15 and 17	The primitive Introduction and Elimination Rules of inference for the connectives ¬ (not), ^ (and), ∨ (or), → (if. . . then__); the quantifiers ∃ (some) and ∀ (all); and the identity predicate = (with particular attention paid to restrictions on parameters, and to possibilities of discharge of assumptions in subordinate proofs). The Absurdity Rule for the absurdity symbol ⊥. Explaining why it is necessary to obey the *restrictions on parameters* in applications of the rules of existential elimination and universal introduction. Read: Chapter 4 Quiz 2
7	Feb 22 and 24	*Translating* sentences of English into logical notation (`assigning logical forms'), paying particular attention to (i) the quantifying expressions `everyone', `someone', `anyone' (in context), and `no one'; (ii) anaphoric and reflexive pronouns that are rendered as bound variables or as repetitions of terms; and (ii) words and phrases such as `unless' and `only if', which need to be translated with care into logical complexes. Read: selections posted to Carmen.
8	Mar 1 and 3	Classical negation rules. *Discharging assumptions* in the course of an argument. The notion of a *formal proof* of a conclusion from a set of undischarged assumptions. *Deducibility* and *theoremhood* in a particular logical system. Interderivability of logical operators in the classical case. Interderivability of rules of inference. What rules make up the systems of Minimal, Intuitionistic and Classical logic. Using the rules of inference of Intuitionistic Logic to mimic the left-right readings of the rows of the truth-tables for the connectives. Deriving any of the four classical negation rules from any other such rule, within Intuitionistic Logic. Read: Chapter 4, again. Quiz 3
9	Mar 8 and 10	*Proof-construction strategies*: Finding a proof (of no more than around nine or ten primitive steps) of a valid formal argument with two or three premises. Read: selections posted to Carmen. Mid-term Exam in class
	Mar 14-18	*Spring Break*

Week	Dates	Topics, Readings, Assignments, Deadlines
10	Mar 22 and 24	Finding a counterexample (with no more than, say, four individuals in the finite case) to an invalid formal argument with two or three premises. Axioms of Infinity. Read: selections posted to Carmen. Quiz 4
11	Mar 29 and 31	Translating an English argument into logical notation, and proving it, if it is valid, or finding a counterexample to it, if it is invalid. The *Maxim of Shallow Analysis*. Read: selections posted to Carmen.
12	Apr 5 and 7	Truth sets. Disjunctive normal forms. Matching logical consequence to logical deducibility; logical truth to logical theoremhood; and logical falsity to logical refutability. The *consistency* or *inconsistency* of a set of sentences. Read: Sections 4.6, 5.3. Pp. 98-9. Quiz 5
13	Apr 12 and 14	Soundness and completeness of classical propositional logic. Understanding why every argument has either a proof or a counterexample. Read: Sections 4.11, 5.3.
14	Apr 19 and 21	Review and SEIs
Finals Week	Registrar scheduled time	Final Exam

SYLLABUS
Philosophy 2500
Spring 2020

Instructor: Stewart Shapiro (shapiro.4@osu.edu)
Office: University Hall 350E
Hours: MW 11:00-12:00, or by appointment

TA: Damon Stanley
Office: University Hall 337D
Hours: Friday 11:30-1:30, or by appointment

Textbook: *The logic book* (sixth edition), by Merrie Bergmann, James Moor, and Jack Nelson

Course Description

In this course we will present a symbolic deductive system to model correct reasoning. It will be shown how many arguments in ordinary language can be "translated" into this system, where they can be checked for validity. Important logical concepts, like consistency, consequence, validity are presented via the system, and the techniques of mathematical logic are illustrated with it. The course is designed to shed light on what it is to reason, and what it is to reason correctly. We examine the role that symbols play in reasoning.

GE Information

Philosophy 2500 satisfies GE requirement 1.B.2, i.e., the Mathematical and Logical Analysis category under the Quantitative and Logical Skills requirement. The University's stated expected learning outcomes for this requirement are as follows.

> ### 1. Skills: B. Quantitative and Logical Skills
> **Goals:**
> Students develop skills in quantitative literacy and logical reasoning, including the ability to identify valid arguments, use mathematical models, and draw conclusions and critically evaluate results based on data.
>
> **Expected Learning Outcomes:**
> 1. Basic Computational Skills: Students demonstrate computational skills and familiarity with algebra and geometry, and apply these skills to practical problems.
> 2. Mathematical and Logical Analysis: Students comprehend mathematical concepts and methods adequate to construct valid arguments, understand inductive and deductive reasoning, and increase their general problem solving skills.
> 3. Data Analysis: Students understand basic concepts of statistics and probability, comprehend methods needed to analyze and critically evaluate statistical arguments, and recognize the importance of statistical ideas.

TENTATIVE SCHEDULE

I.   The nature of formal logic, the sentential language
              Chapters 1-2
              1-2 weeks

II.   Semantics for the sentential language
              Chapter 3
              2-3 weeks

III.   Natural Deduction for the sentential language
              Chapter 5
              2 weeks

IV.   A Richer system — first-order logic with identity
              Chapter 7

V.   Semantics for the first-order language
              Chapter 8

VI.   Natural Deduction for the first-order language
              Chapter 10

VII.   A peek ahead: extensions and alternatives
              Chapters 9-11

EVALUATION

Like any other skill, there is no substitute for practice in learning to reason well, and in the study of correct reasoning. In this class, the practice takes the form of homework. There will be a number of exercises assigned each week, and you will have a chance to ask questions about them. You do not have to turn in the homework, but either I or your TA will be glad to discuss your work with you, either in class or outside. There will be *quizzes* most weeks, during recitation, which will usually be taken directly from the homework. Normally, makeup quizzes will not be scheduled. You may miss one quiz without penalty, and if you do not miss any, your lowest score will be dropped. You may "make up" one additional quiz by turning in *all* of the exercises assigned for that quiz.

There will be one midterm examination and a final examination, on dates to be announced.

Approximate Weights

quizzes	30%
midterm	30%
final examination	30%
intangibles*:	10%

(*this includes class participation, enthusiasm, getting help when needed, etc.)

Statement on accommodation: "Students with disabilities (including mental health, chronic or temporary medical conditions) that have been certified by the Office of Student Life Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office of Student Life Disability Services is located in 098 Baker Hall, 113 W. 12th Avenue; telephone 614-292-3307, slds@osu.edu; slds.osu.edu"

Academic Misconduct

The University understands academic misconduct to include "any activity which tends to compromise the academic integrity of the institution, subvert the educational process" ("Procedures of the Committee on Academic Misconduct", Sept. 1989). With respect to this course, examples include, but are not limited to, such actions as cheating on exams and submitting a term paper written by another. No one should be unclear about whether these are wrong, but students are sometimes not clear about what constitutes plagiarism. "Plagiarism" is defined by the University to be "the representation of another's works or ideas as one's own; it includes the unacknowledged word for word use and/or paraphrase of another person's work, and/or the inappropriate unacknowledged use of another person's ideas". There should be no misunderstanding about word for word transcriptions or simple paraphrases—these must be acknowledged through proper citations. It is sometimes not clear, though, when simply using the ideas of another requires citation. This is especially true in the context of a course, in which one is, presumably acquiring fundamental ideas of a subject matter from the text or the instructor. It is helpful to remember that what is at issue is whether the failure to acknowledge a source would tend to misrepresent the idea as your own. The failure to acknowledge your source for a distinction between civil disobedience and rebellion, for example, would not tend to misrepresent the distinction as your own since it is a distinction that anyone working in the field will draw in some way or other. To offer a specific account of this distinction that is offered by another without citing the source could easily tend to misrepresent the account as your own. It is clearly better to err on the side of over-acknowledgment in cases in which one is in doubt.

I view academic misconduct of any sort as a very serious violation of University requirements. University rules provide for extremely serious sanctions for academic misconduct, and I will, as I am required to do, forward any cases of suspected misconduct to the Committee on Academic Misconduct.

Distance Approval Cover Sheet

For Permanent DL/DH Approval | College of Arts and Sciences

> **Course Number and Title:** PHILOS 2500: Introduction to Symbolic Logic

Carmen Use

Please consider using ASC's distance learning course template. For more on use of Carmen:
https://teaching.resources.osu.edu/teaching-topics/carmen-common-sense-best-practices

> A Carmen site will be created for the course, including a syllabus and gradebook at minimum. Yes

Syllabus

> Proposed syllabus uses the ASC distance learning syllabus template, includes boilerplate language where required, as well as a clear description of the technical and academic support services offered, and how learners can obtain them. Yes
>
> Syllabus is consistent and is easy to understand from the student perspective. Yes
>
> Syllabus includes a schedule with dates and/or a description of what constitutes the beginning and end of a week or module. Yes
>
> If there are required synchronous sessions, the syllabus clearly states when they will happen and how to access them. Yes
>
> Additional comments (optional):

Instructor Presence

For more on instructor presence: https://teaching.resources.osu.edu/teaching-topics/online-instructor-presence

> Students should have opportunities for regular and substantive academic interactions with the course instructor. Some ways to achieve this objective:
>
> ☒ Regular instructor communications with the class via announcements or weekly check-ins
>
> ☒ Instructional content, such as video, audio, or interactive lessons, that is visibly created or mediated by the instructor
>
> ☒ Regular participation in class discussion, such as in Carmen discussions or synchronous sessions
>
> ☒ Regular opportunities for students to receive personal instructor feedback on assignments

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Please comment on this dimension of the proposed course (or select/explain methods above):
Students will have the opportunity to meet with the instructor twice a week during a synchronous class session over CarmenZoom, and to set up one-on-one appointments over CarmenZoom with the course instructor.

Delivery Well-Suited to DL/DH Environment

Technology questions adapted from the Quality Matters rubric. For information about Ohio State learning technologies: https://teaching.resources.osu.edu/toolsets

The tools used in the course support the learning outcomes and competencies. Yes

Course tools promote learner engagement and active learning. Yes

Technologies required in the course are current and readily obtainable. Yes

Links are provided to privacy policies for all external tools required in the course. Not applicable

Additional technology comments:
This course relies upon standard OSU technology, including computers, Carmen, CarmenZoom and Microsoft365 suite (especially Word). Instructor uses a Wacom tablet to write and draw within a Word document which is shared in real time when lecturing on CarmenZoom. This has proved to be an effective substitute for writing on a blackboard or whiteboard when teaching an in-person course.

Which components of this course are planned for synchronous delivery and which for asynchronous delivery? (For DH, address what is planned for in-person meetings as well.)
Class meetings and office hours will occur synchronously. Recordings of class meetings will be posted for asynchronous review and viewing. Feedback on assignments supplied asynchronously.

If you believe further explanation would be helpful, please comment on how course activities have been adjusted for distance learning:
Quizzes and Exams have been set up in Carmen with many questions that autograde and return feedback to students after the due date for submission has passed. Instructor offers individualized feedback through comments section of Quizzes. Correct/Incorrect answers for exam questions are reviewable by students after due date has passed.

Workload Estimation

For more information about calculating online instruction time: ODEE Credit Hour Estimation

Course credit hours align with estimated average weekly time to complete the course successfully. Yes

Course includes direct (equivalent of "in-class") and indirect (equivalent of "out-of-class") instruction at a ratio of about 1:2. Yes

Provide a brief outline of a typical course week, categorizing course activities and estimating the approximate time to complete them or participate:
Students meet with instructor for 3 hours of class meetings and students complete assigned readings and practice problems over 6 hours on their own.

In the case of course delivery change requests, the course demonstrates comparable rigor in meeting course learning outcomes. Yes

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Accessibility

For more information or a further conversation, contact the [accessibility coordinator](#) for the College of Arts and Sciences. For tools and training on accessibility: [Digital Accessibility Services](#)

Instructor(s) teaching the course will have taken Digital Accessibility training (starting in 2022) and will ensure all course materials and activities meet requirements for diverse learners, including alternate means of accessing course materials when appropriate. Yes

Information is provided about the accessibility of all technologies required in the course. All third-party tools (tools without campus-wide license agreements) have their accessibility statements included. Yes

Description of any anticipated accommodation requests and how they have been/will be addressed. Instructor will share the Zoom meeting details directly with students, including the link, meeting ID, password, and telephone access options. The instructor will enable Zoom's Live Transcription service and alert students to its availability at the beginning of each class period. The instructor will enable NameCoach in Carmen and direct students to record the pronunciation of their name in the first week of classes. Included in the syllabus is the availability of Zoom backgrounds and Digital Flagship resources. The main course reading is supplied as an OCR readable PDF, which students who need to use a screen reader for the readings can use.

Additional comments:
If the instructor receives a letter of accommodation for a student, then the instructor will review accessibility options at https://teaching.resources.osu.edu/toolsets/carmenzoom/guides/accessibility-carmenzoom

Academic Integrity

For more information: https://go.osu.edu/teaching-resources-academic-integrity

The course syllabus includes online-specific policies about academic integrity, including specific parameters for each major assignment: Yes

Assignments are designed to deter cheating and plagiarism and/or course technologies such as online proctoring or plagiarism check or other strategies are in place to deter cheating: Yes

Additional comments:
The synchronous nature of quizzes and exams that are only accessible through Carmen, which requires students to login with their BuckID, deters cheating.

Frequent, Varied Assignments/Assessments

For more information: https://teaching.resources.osu.edu/teaching-topics/designing-assessments-student

Student success in online courses is maximized when there are frequent, varied learning activities. Possible approaches:

☒ Opportunities for students to receive course information through a variety of different sources, including indirect sources, such as textbooks and lectures, and direct sources, such as scholarly resources and field observation

☒ Variety of assignment formats to provide students with multiple means of demonstrating learning

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☐ Opportunities for students to apply course knowledge and skills to authentic, real-world tasks in assignments

Comment briefly on the frequency and variety of assignment types and assessment approaches used in this course (or select methods above):
Students are offered the opportunity to receive information through assigned course readings and class sessions that include lecture and discussion. Practice problems are offered in class and as informal homework. Quizzes offer the opportunity to practice skills in a low-stakes way, before higher-stakes exams.

Community Building

For more information: https://teaching.resources.osu.edu/teaching-topics/student-interaction-online

Students engage more fully in courses when they have an opportunity to interact with their peers and feel they are part of a community of learners. Possible approaches:

☒ Opportunities for students to interact academically with classmates through regular class discussion or group assignments

☐ Opportunities for students to interact socially with classmates, such as through video conference sessions or a course Q&A forum

☒ Attention is paid to other ways to minimize transactional distance (psychological and communicative gaps between students and their peers, instructor, course content, and institution)

Please comment on this dimension of the proposed course (or select methods above):
Instructor will engage directly with students during synchronous class time and plentiful office hours. Students will be asked to work in groups on sample problems through Zoom breakouts. Instructor will log into Zoom five minutes in advance of synchronous class time and encourage students to do so as well to permit informal conversation among course participants. Instructor will check in with students outside of class meeting times to receive feedback on their experience of the course. In light of this feedback, instructor will consider options for meeting the expressed needs of students after consulting this page: https://teaching.resources.osu.edu/teaching-topics/creating-inclusive-environment

Transparency and Metacognitive Explanations

For more information: https://teaching.resources.osu.edu/teaching-topics/supporting-student-learning-your

Students have successful, meaningful experiences when they understand how the components of a course connect together, when they have guidance on how to study, and when they are encouraged to take ownership of their learning. Possible approaches:

☒ Instructor explanations about the learning goals and overall design or organization of the course

☒ Context or rationale to explain the purpose and relevance of major tasks and assignments

☐ Guidance or resources for ancillary skills necessary to complete assignments, such as conducting library research or using technology tools

☐ Opportunities for students to take ownership or leadership in their learning, such as by choosing topics of interest for an assignment or leading a group discussion or meeting

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⊠ Opportunities for students to reflect on their learning process, including their goals, study strategies, and progress

⊠ Opportunities for students to provide feedback on the course

Please comment on this dimension of the proposed course (or select methods above):
Instructor explains the overall organization of the course content on the first day of class, and makes connections throughout the semester. During class, instructor will discuss with students their goals and how course content can help them pursue them. During office hours, instructor will invite students to reflect on their learning process, both what is working in it and what may be a barrier. Instructor will informally speak with students outside of regular class times to solicit their feedback on the course, and an SEI will be administered at the end of the semester.

Additional Considerations

The course syllabus is clear and contains all required syllabus elements. However, the course does not appear to require student-to-student interaction or facilitate a community of learners. The structure of the course, with graded work limited to quizzes and exams, discussion forums described as optional, and live zoom sessions merely recommended, does not incentivize engagement with peers. It is recommended that the course instructor consider adjustments to the course to better address peer interaction and community building.

Syllabus and cover sheet reviewed by Jeremie Smith on 9/2/2021

Additional resources and examples can be found on ASC's Office of Distance Education website.

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