

PHIL 2500: Logic

Semester: Fall 2019

Location: online

Meeting Time: asynchronous – no set meeting times

Instructor: Clint Johnson, Ph.D.

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Office Hours: Tuesdays 7-9PM

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Course Communication – For questions about the course, I am always available by email at djohn151@kennesaw.edu. Please use this email address instead of the D2L client as I can check it more frequently. You may also contact me via Skype (look me up by my email address: djohn151@kennesaw.edu) to chat during office hours or outside of office hours if we make arrangements to do so by email.

Electronic Communications. The University provides all KSU students with an “official” email account with the address “students.kennesaw.edu.” As a result of federal laws protecting educational information and other data, **this is the sole email account you should use to communicate with your instructor or other University officials.**

Course Description (from the course catalog):

Prerequisites: ENGL 1102 and MATH 1101 (or equivalent).

The course is an introduction to deductive logic with focus on the theoretical and practical aspects of categorical propositions and syllogisms, truth function logic, the method of natural deduction, and predicate logic.

Learning Objectives:

After completing this course, students will be familiar with the syntax, structure and derivations for sentential logic and predicate logic. You will be able to convert natural language English sentences to logical form, know the symbolism for and be able to perform logical manipulations to find consequent and equivalent expressions. While reminiscent of proofs in geometry, the derivations in this class will provide a foundation for future courses that involve theorem proving in mathematics and logic.

Required text:

Bergmann, Moor, and Nelson. The Logic Book. 6th edition. New York: McGraw Hill, 2014. ISBN: 0078038413

Attendance Policy:

Students are solely responsible for managing their enrollment status in a class; nonattendance does not constitute a withdrawal. If you do not complete a graded assignment, you will be assigned a grade of NA (Never attended).

Since this is an asynchronous, fully online course, we have no fixed meeting times. However, you are still responsible for following the syllabus, doing the homework for each module and submitting assignments to the course assignment drop boxes *on time*.

Each week will feature readings from the textbook, a lecture with slides and voice narration, and homework from the end of each section in the text. Prior to each test, we will review the material and strategies for effectively studying for the tests will be discussed.

Electronic Devices Policy:

Aside from the computer that you use to access the course, no other electronic devices are allowed while you take the exams. The only online material you should have open during an exam is the exam on the course website. This corresponds with the general policy that no electronic devices are allowed during the exams for the traditional version of this course.

Technological Proficiency:

Since this is an entirely online course, the minimum for computer proficiency is naturally somewhat higher than it might be for a traditional course. I expect that you will have consistent access to an internet connection with a computer and browser capable of displaying the course website for this class. You will also need software that is capable of playing the video lectures in MP4 format (e.g., Windows Media Player).

Technological Support:

If you are having technical difficulties with the course, please let me know. I will help with any issues you have if possible. For technical issues with D2L itself, please refer to the Kennesaw State Help Desk at <http://learnonline.kennesaw.edu/resources/tech.php>. When students tell me that they are having trouble loading the videos, MP3 audio files or other course content, my first recommendation is always to try a different web browser and then a different computer.

Course Assessments/Assignments:

	Value	Date
Homework	25%	Each Friday August 30 - December 9
Test 1: Sentential Logic	25%	Open from Sep 23-27
Test 2: Predicate Logic	25%	Open from Oct 21-25
Test 3: <u>Derivations</u>	25%	<u>Open from Dec 10-12 (finals)</u>
Total	100%	

Altogether, the three homework assignments are worth 25% of the course grade. The tests are **not** cumulative. Test 3 will be given as the final during final exam week. Each of the three collections of submissions for homework are worth one third of the total homework grade for the course.

HOMEWORK:

You will be assigned homework problems for each section that we cover. Since each module on the course website contains all of the material and assignments for one week, it should be easy to tell what material you are expected to go through each week. **Homework assignments are due**

every week that we do not have a test. See the course schedule at the end of this syllabus for dates for each assignment. Homework will be accepted late with a penalty of 20% off per week that it is late up until the Friday before the test. At that time, you will be given access to the student solutions manual for the chapters that the test covers. Note: If you do not keep up with the assignments when we cover the material, it will be very difficult to do well on the exams. Be advised that the homework takes a considerable amount of time.

TESTS:

The tests will be administered online through the course website. For each test, you may take it at any time during the week that it is open. Once you begin the exam, you will have one hour to complete it – it cannot be paused, suspended or postponed. So be sure that you have the full hour set aside to take the exam before you begin.

The Final Exam

The final exam in this course is split into two pieces. There will be a short, traditional test with T/F and multiple choice questions that is worth half of the final exam's value. This portion will be like the other tests and intended to test definitions, concepts and short proofs/derivations. For the other half of the grade, you will also submit a written set of derivations at the same time. You have access to these questions from the beginning and they may be done and submitted at any time.

Grading Scale

Students are evaluated on the following scale:

- A – greater than or equal to 90
- B – greater than or equal to 80 and less than 90
- C – greater than or equal to 70 and less than 80
- D – greater than or equal to 60 and less than 70
- F – less than 60

I—Indicates an incomplete grade for the course, and will be awarded only when the student has done satisfactory work up to the last two weeks of the semester, but for nonacademic reasons beyond his/her control is unable to meet the full requirements of the course.

Incomplete grades are only valid after submission of the Incomplete Grade form (signed by both the instructor and student) to the Department Chair's office.

Makeup Exams and Late Assignments: If your homework assignments are late, several bad things happen: 1) you still have to turn them in after the test, 2) you lose 20% per week that they are late, 3) you miss the benefit of doing the homework to prepare for the test.

Grading:

Grade Calculations

The total homework grade is worth 25% of your course grade, divided evenly among the eleven homework assignments. Each of the three tests is also worth 25% of your course grade. Note that

the final exam is split into two pieces, each worth half of the exam's value (so, each is worth 12.5% of your course grade).

Grading Scale

Students are evaluated on the following scale:

A - (90-100%)

B - (80-89%)

C - (70-79%)

D - (60-69%)

F – (below 60%)

I - Indicates an incomplete grade for the course, and will be awarded only when the student has done satisfactory work up to the last two weeks of the semester, but for nonacademic reasons beyond his/her control is unable to meet the full requirements of the course.

Incomplete grades are only valid after submission of the Incomplete Grade form (signed by both the instructor and student) to the Department Chair's office.

Academic Integrity Statement: Every KSU student is responsible for upholding the provisions of the Student Code of Conduct, as published in the Undergraduate and Graduate Catalogs. Section 5. C of the Student Code of Conduct addresses the university's policy on academic honesty, including provisions regarding plagiarism and cheating, unauthorized access to university materials, misrepresentation/falsification of university records or academic work, malicious removal, retention, or destruction of library materials, malicious/intentional misuse of computer facilities and/or services, and misuse of student identification cards. Incidents of alleged academic misconduct will be handled through the established procedures of the Department of Student Conduct and Academic Integrity (SCAI), which includes either an "informal" resolution by a faculty member, resulting in a grade adjustment, or a formal hearing procedure, which may subject a student to the Code of Conduct's minimum one semester suspension requirement. See also <https://web.kennesaw.edu/scai/content/ksu-student-code-conduct>.

Tracking your progress in the course

You will have access to your grades for homework and the tests. If you are comfortable doing the homework problems, you should do well on the exams. This course is very much like a mathematics course in that regard.

Privacy Policies of Technology used in the course

D2L Brightspace: <http://www.brightspace.com/legal/privacy/>

Student Support Services

For information on the writing lab, tutoring and other student support services at Kennesaw State, please visit: http://learnonline.kennesaw.edu/resources/tutoring_academic_support.php

Student Disabilities Services

For more information on disability services available at Kennesaw State, please visit:

<http://sds.kennesaw.edu/>

Schedule of Events

	Section	Chapter	Topic	Homework assignment	Homework due	Week #
1	Sentential Logic	1	Introduction to the course,			1
2		1	1.1-1.3, Basic Concepts	§1.2: 1acefh, 2abekl, §1.3: 1ac,2acd		
3		2	2.1	§2.1: 1acgj,2acikn,3aef §2.2: 1aeh,		2
4		2	2.2	2af	Friday, August 30	
5		2	2.3			3
6		2	2.4	§2.3: 1acd, 2ah, 6acd §2.4: 1ag, 2a	Friday, September 6	
7		3	3.1	§3.1: 1ac, 2acih, 3ach §3.2: 1aqcj,		4
8		3	3.2, 3.3	2af, 3a, 4e, 5af §3.3: 1ej, 2e, 3abe	Friday, September 13	
9		3	3.4, 3.5			5
10		3	3.6	§3.4: 1aej, 3abe §3.5: 1a, 2b, 3ad	Friday, September 20	
11		1,2,3	Review			6
12	X	Test 1: Sentential Logic				
13	Predicate Logic	7	7.1	§7.1: 1acde §7.2: 1acegh, 2aeio,		7
14		7	7.2	3ace, 4e	Friday, October 4	
15		7	7.3	§7.3: 1acef, 2abce, 3aceg, 4acegh	<i>Oct 9: last day to drop without academic penalty</i>	8
16		7	7.3 cont'd		Friday, October 11	
17		7	7.4	§7.4: 1ace, 4acdem, 5abiqr §7.5:		9
18		7	7.5	1aei, 2aceg, 3aeio, 4aei, 5achkq	Friday, October 18	
19	7	Review			10	
20	X	Test 2: Predicate Logic				
21	Derivations	5	5.1	§5.1.1: 1ach, 2aceg §5.1.2: 1ag,		11
22		5	5.2	2acegi §5.1.3: 1acg	Friday, November 1	
23		5	5.3	§5.3: 1acqr, 2aim, 3amn, 4e, 5ai, 6dg,		12
24		5	5.3 cont'd	7aij, 8e, 9gmn, 10ae, 11a, 12d	Friday, November 8	
25		5	5.4	§5.4: 1ae, 2ac, 3aef, 4a, 5acd, 6ch, 7a		13
26		10	10.1	§10.1: 1acg, 2bc	Friday, November 15	
27	10	10.2	§10.2: 1c, 2c, 3e, 4c, 5c, 6a, 7g, 8c, 9i		14	
28	10	10.3, 10.4	§10.3: 1c, 2c, 3a, 4a, 5e §10.4: 1ac, 2ae, 4a, 5df	Friday, November 22		
29						15
30						
31		5,10	Review			16
32						
	Test 3 (Finals)	X	Test 3: Derivations		Tuesday, December 10 -	17
					Monday, December 12	17

Learning Objectives:

Since it is not as easy to simply raise your hand and ask a question in an online course, the learning objectives are here to clearly lay out the expectations for what you will get out of each element of the course, what the purpose is in each assignment and what the overall goals of the course are. This detail can be very useful to you in preparing for the exams and doing the other assignments in the course. I recommend wrapping up your course activities each week by going through the learning objectives to ensure that you've accomplished the goals set out for that week.

Relationship between the instructional materials and the learning objectives:

The learning objectives center around the topics broken out into different sections of the textbook. The text will provide detailed explanations, examples and problems and will form the basis for the class lectures, homework and tests. This course functions like a mathematics course in that you will internalize the material only through doing homework problems found in the text.

Relationship between learning objectives and course activities:

The lectures will provide slides with explanations of the terminology, symbology and types of problems you will be doing in the homework and on the exams.

Relationship between module learning objectives and course learning objectives:

Each module covers one section of the textbook. The learning objectives for each module correspond to the topics that we will cover each class in the text. With only a few exceptions in chapters 3 and 7, we will cover one textbook section per class.

Course level learning objectives:

- Understand what the discipline of logic is, where it came from historically and what its utility is in the analysis of arguments.
- Understand the terminology and symbology of sentential logic.
- Be able to construct symbolic representations of English sentences in sentential logic and predicate logic
- Be able to construct a truth table for a given set of English claims in logical form
- Be able to perform derivations with sentential logic and identify problems in example derivations.
- Understand the terminology and symbology of first order predicate logic.
- Be able to perform derivations with first order predicate logic and identify problems in example derivations.

Module-level learning objectives:

- 1) Introduction to the study of logic
 - a. Describe what logic is and what philosophers have historically hoped to do with it.
 - b. Describe the benefits of converting arguments into symbolic form where possible.
- 2) 1.1-1.3, Basic concepts
 - a. Define **truth values, arguments, logical consistency, logical equivalence, logical soundness**
 - b. Apply those concepts to describe sentences and arguments
- 3) 2.1
 - a. Describe the syntax and symbolization of sentential logic
 - b. Define the **sentential connectives**
 - c. Define and identify **atomic sentences**
 - d. Define the **components: negations, conjunctions, disjunctions, material conditionals, biconditionals**
 - e. Describe the use of **parentheses** in logic
- 4) 2.2
 - a. Write a **truth table** for the **components** from 2.1
 - b. Find errors in example **truth tables** of individual **components**
- 5) 2.3
 - a. Write a truth table for the combinations of **components** in more complex sentences from 2.1
 - b. Find errors in example **truth tables** of combinations of **components**
 - c. Describe the common **connectives** that appear in English and their equivalents in the syntax of sentential logic
- 6) 2.4
 - a. Describe the **non-truth functional use of connectives** in English

- b. Identify common **non-truth functional connectives**
- 7) 3.1
 - a. Write **truth tables** for logical sentences
 - b. Find errors in example truth tables of logical sentences
- 8) 3.2 and 3.3
 - a. Describe the difference between **truth functional truth, falsity and indeterminacy**
 - b. Define **truth functional equivalence**
 - c. Identify instances of **truth functional equivalence**
- 9) 3.4 and 3.5
 - a. Define **truth-functional consistency**
 - b. Identify and apply **truth-functional consistency** to truth tables of sentences
 - c. Define **truth-functional entailment**
 - d. Identify and apply **truth-functional entailment** to truth tables of sentences
- 10) 3.6
 - a. List the **truth functional properties**
 - b. Define **truth functional consistency**
- 11) 7.1
 - a. Describe the purpose of and need for predicate logic
 - b. Define what a **predicate** is
- 12) 7.2
 - a. Describe the syntax and symbolization of predicate logic
 - b. Define what a **universal quantifier** is
 - c. Define what an **existential quantifier** is
 - d. Describe the logical operators of predicate logic
 - e. Describe the difference between **free** and **bound** variables
- 13) 7.3
 - a. Define a **universe of discourse** and its relation to arguments in predicate logic
 - b. Identify the components of an English sentence to convert to predicate logic symbols
- 14) 7.4
 - a. Describe common mistakes that are made when converting English sentences to predicate logic
 - b. Describe the reasons why the entries on the **table of equivalent sentence forms** on page 302 of §7.4 are logically equivalent
- 15) 7.5
 - a. Describe what **predicate logic extended** is
 - b. Define what an **identity predicate** is
 - c. Describe what a **definite description** is
- 16) 5.1

- a. Define what is **derivable** in **SD (sentential deduction)**
- b. Define what is **valid** in SD
- c. Define what a **theorem** is in SD
- d. Define what **equivalent** means in SD
- e. Perform basic **derivations** in SD using **introduction** and **elimination** rules:
 - i. **Conjunction elimination**
 - ii. **Disjunction elimination**
 - iii. **Conditional elimination**
 - iv. **Biconditional elimination**
 - v. **Negation introduction**
 - vi. **Negation elimination**
 - vii.
- f. Define what a **subderivation** is and how to use it in a derivation
- g. Define **discharged**, **open** and **closed** with respect to subderivations
- h. Define **accessibility** for sentences of subderivations

17) 5.2

- a. Describe the symbols for **derivable from** and **not derivable from** for SD
- b. Describe the relationship between **truth-functional** x and x in SD where x is: consistency, theorem, equivalence, valid and derivability.

18) 5.3

- a. Describe several strategies for finding derivations in SD
- b. Describe the role of **subgoals** in finding derivations in SD

19) 5.4

- a. Describe the difference between derivation systems SD and SD+
- b. Define **modus tollens** and describe how to use it in an SD+ derivation
- c. Define **hypothetical syllogism** and describe how to use it in an SD+ derivation
- d. Define **disjunctive syllogism** and describe how to use it in an SD+ derivation
- e. Define **double negation** and describe how to use it in an SD+ derivation
- f. Define and describe how to use the following rules of **replacement** in SD+:
 - i. Commutation
 - ii. Association
 - iii. Implication
 - iv. Double negation
 - v. De Morgan
 - vi. Idempotence
 - vii. Transposition
 - viii. Exportation
 - ix. Distribution
 - x. Equivalence

20) 10.1

- a. Define **universal elimination** in **predicate derivations (PD)**
 - b. Define **existential introduction** in PD
 - c. Define **universal introduction** in PD
 - d. Perform basic derivations in PD
- 21) 10.2
- a. Define what an **argument** is in PD
 - b. Define what an **theorem** is in PD
 - c. Define what an **equivalence** is in PD
 - d. Define what an **inconsistency** is in PD
 - e. Apply the above concepts in derivations in PD
- 22) 10.3
- a. Describe the difference between PD and PD+
 - b. Define **quantifier negation** for PD+
 - c. Describe how to use quantifier negation in derivations in PD
- 23) 10.4
- a. Describe how the extended form of predicate logic (PDE) extends PD to become an extended predicate derivation (PDE) system
 - b. Define **instantiating term** and describe how it is used in PDE
 - c. Define **instantiating constant** and describe how it is used in PDE
 - d. Define what an **argument** is in PDE
 - e. Define what an **theorem** is in PDE
 - f. Define what an **inconsistency** is in PDE