PHIL 2500: Logic  
Semester: Fall 2019  
Location: online  
Meeting Time: asynchronous – no set meeting times

Instructor: Clint Johnson, Ph.D.  
Office: Social Science Building #4005  
Office Hours: Tuesdays 7-9PM  
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Email: djohn151@kennesaw.edu

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:  

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:

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

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:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>(90-100%)</td>
</tr>
<tr>
<td>B</td>
<td>(80-89%)</td>
</tr>
<tr>
<td>C</td>
<td>(70-79%)</td>
</tr>
<tr>
<td>D</td>
<td>(60-69%)</td>
</tr>
<tr>
<td>F</td>
<td>(below 60%)</td>
</tr>
</tbody>
</table>

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](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**

**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](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**

<table>
<thead>
<tr>
<th>Section</th>
<th>Chapter</th>
<th>Topic</th>
<th>Homework assignment</th>
<th>Homework due</th>
<th>Week #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.1-1.3</td>
<td>Introduction to the course,</td>
<td>§1.2: 1acfel, 2abekl, §1.3: 1ac, 2acd</td>
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<tr>
<td>2</td>
<td>2.1</td>
<td>§2.1: 1acgl, 2acikl, 3aef §2.2: 1aeh,</td>
<td>2af</td>
<td>Friday, August 30</td>
<td>2</td>
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<td>2</td>
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<td>2af</td>
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<td>2</td>
<td>2.3</td>
<td>§2.3: 1acd, 2ah, 6acd §2.4: 1ag, 2a</td>
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<td>3</td>
<td>3.1</td>
<td>§3.1: 1ac, 2acil, 3acj §3.2: 1aqc,</td>
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<td>3</td>
<td>3.2, 3.3</td>
<td>2af, 3a, 4e, 5af §3.3: 1ej, 2e, 3abe</td>
<td>Friday, September 13</td>
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<td>3</td>
<td>3.4, 3.5</td>
<td>§3.4: 1aej, 3abe §3.5: 1a, 2b, 3ad</td>
<td>Friday, September 20</td>
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<tr>
<td>1, 2, 3</td>
<td>Review</td>
<td>X Test 1: Sentential Logic</td>
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<tr>
<td>7</td>
<td>7.1</td>
<td>§7.1: 1acde §7.2: 1acegh, 2aeio,</td>
<td>3ace, 4e</td>
<td>Friday, October 4</td>
<td>7</td>
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<tr>
<td>7</td>
<td>7.2</td>
<td>§7.2</td>
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<tr>
<td>7</td>
<td>7.3</td>
<td>§7.3: 1acef, 2abce, 3aceg, 4acegh</td>
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<td>Oct 9: last day to drop without academic penalty</td>
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<td>7.3 cont’d</td>
<td>§7.3: 1acef, 2abce, 3aceg, 4acegh</td>
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<td>7.4</td>
<td>§7.4: 1ace, 4acde, 5abiqr §7.5:</td>
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<td>7</td>
<td>7.5</td>
<td>1aei, 2aceg, 3aeio, 4aei, 5achkgq</td>
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<tr>
<td>7</td>
<td>Review</td>
<td>X Test 2: Predicate Logic</td>
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<td>10</td>
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<tr>
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<td>5.1</td>
<td>§5.1.1: 1ach, 2aceg §5.1.2: 1ag,</td>
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<td>5.2</td>
<td>2aceg §5.1.3: 1acg</td>
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<td>§5.3: 1acqr, 2aim, 3amn, 4e, 5ai, 6dg,</td>
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<tr>
<td>5</td>
<td>5.3 cont’d</td>
<td>7aij, 8e, 9ge, 10ae, 11a, 12d</td>
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<td>5</td>
<td>5.4</td>
<td>§5.4: 1ae, 2ac, 3aef, 4a, 5acd, 6ch, 7a</td>
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<td>13</td>
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<tr>
<td>10</td>
<td>10.1</td>
<td>§10.1: 1acg, 2bc</td>
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</tr>
<tr>
<td>10</td>
<td>10.2</td>
<td>§10.2: 1c, 2c, 3e, 4c, 5c, 6a, 7g, 8c, 9l</td>
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<td></td>
<td>14</td>
</tr>
<tr>
<td>10</td>
<td>10.3, 10.4</td>
<td>§10.3: 1c, 2c, 3a, 4a, 5e §10.4: 1ac,</td>
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<td></td>
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<td></td>
<td></td>
<td>2ae, 4a, 5df</td>
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</tr>
<tr>
<td>5, 10</td>
<td>Review</td>
<td>X Test 3: Derivations</td>
<td></td>
<td></td>
<td>16</td>
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<tr>
<td>Test 3 (Finals)</td>
<td>X</td>
<td>Test 3: Derivations</td>
<td></td>
<td>Tuesday, December 10</td>
<td>17</td>
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<td>Monday, December 12</td>
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</table>
**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