

Philosophy 103

Logic

TF 1:30-2:45; Denny 110

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East College 211, X1226

Spring, 2016

### **Purpose and Goals of this Course**

Logic focuses on the distinction between correct and incorrect reasoning. Correct reasoning yields valid arguments. What makes arguments valid is their form (how they are structured) rather than their content (what they are about). To better understand the formal features of arguments, logicians work with artificial languages (we will call them sentential logic and quantificational logic) which make use of symbols. From this, we get the name 'symbolic logic'.

In this course, you will learn languages of symbolic logic, both sentential logic and quantificational logic. You will learn how to translate sentences from English into their symbolic forms and examine the conditions which would make them true or false, and you will explore the relation of truth conditions to equivalence. You will learn how methods of truth tables and natural deduction to prove validity and invalidity in arguments.

The concepts of symbolic logic also hold for reasoning in English, the study of which we call 'critical reasoning'. You will learn how to apply them to real life arguments, understand their limitations and examine additional concepts involving the structures, strengths and weaknesses of arguments, including non-deductive arguments. In this way, you will learn how to evaluate, improve, critique and construct arguments.

At the end of this course, you will understand important logical concepts, be able to apply these concepts using truth tables and proof methods to determine the logical status of sentences and arguments, and be able to translate sentences and arguments from English into symbolic form and back. You will be able to identify and construct arguments, both deductive and non-deductive, in ordinary English and evaluate them for correctness. Through this understanding, you will achieve the course goals: recognizing bad reasoning, learning how to correct it, and seeing why striving for good reasoning is worth the effort.

### TEXTS:

Richard Epstein: **The Pocket Guide to Critical Thinking** (4th edition, 2011) ISBN 9780981550770 (CT)

William Gustason & Dolph Ulrich, **Elementary Symbolic Logic** (2nd edition, 1989) ISBN 0881334128 (ESL)

*SCHEDULE: You learn to do logic by doing it; consequently, doing the homework, usually the problem sets in the text book as each section is completed, is essential. If you don't do the homework, you won't be able to master the concepts and techniques.*

*Expect to spend a fair amount of time this semester on logic homework. Many students find that they come to enjoy it, even if they don't experience it as enjoyable at first.*

*Assignments for this course will be updated on Moodle. Be sure to check the site before*

*each class. Dates for assignments, and for exams and quizzes, may be changed with notice to the class.*

*Before each class meeting, you will be assigned a section of the textbook, including the associated problem set, as homework, unless otherwise noted, and I expect that you will have worked on the assigned reading and problems by the time you come to class. We will review that section, including some of the problems in class, so be prepared to discuss the problems and raise questions in class. Make sure you clear up what you find confusing during class meetings, or during office hours. Assignments will be posted on Moodle before each class, so check Moodle regularly.*

### **Fundamentals**

Jan. 26: What is an argument?: ESL, 1.1, CT 3,4

Jan. 29: 'And', 'Or', 'Not': ESL 1.2, 1.3 (to p. 22)

Feb. 2: Symbolizing Sentences: ESL 1.3 (pp.22-28)

Feb. 5: Material Conditionals and Biconditionals: ESL 1.4

#### **Feb. 9: Quiz 1**

### **Semantic Methods for Sentential Logic---Truth tables**

Feb. 9: Truth Tables for truth functional connectives: ESL 2.1

Feb. 12: Constructing and Using Truth Tables: ESL 2.2

#### **Feb. 16: Quiz 2**

Feb. 16: Testing arguments for validity: ESL 2.3

Feb. 19: Short Cut Method: ESL 2.4

#### **Feb. 23: EXAM I**

### **Sentential Logic--- Deductive Methods**

Feb. 26: Demonstrating Validity by Deduction: ESL 3.1 (to page 93)

March 1: Deductions involving the conditional and biconditional: ESL 3.2

#### **March 4: Quiz 3**

March 4: Conditional Proof: ESL 3.3

March 8: Indirect Proof: ESL 3.4

March 11: Review

#### **March 22: Exam II**

### **Quantificational Logic**

March 25: Quantifiers and Quantified Sentences: ESL 5.1

March 29: Multiple Quantification and Relations: ESL 5.2, to p. 169

#### **April 1: Quiz 4**

### **Quantification Logic---Deductive Methods**

April 1: Quantification Rules EI, EG: ESL 7.1 to p. 220

April 5: Quantification Rules UI, UG, QN: ESL 7.1 pp. 220-232

#### **April 8: Quiz 5**

April 8: Stratagems: ESL 7.2 to p. 241

April 12: Stratagems: ESL 7.2 pp. 241-243

## **April 15: EXAM III**

### **Critical Thinking**

April 19: Evaluating Arguments in Natural Language: CT secs. 1-5

April 22: Critical response to arguments: CT secs. 6-9

### **April 26: Quiz 6**

April 26: Prescriptive claims: CT sec.12

April 29: Analogies in Reasoning: CT sec. 15,

May 3: Reasoning with Generalizations: CT sec. 16

May 6: Review

**FINAL EXAM: Monday, May 16, 9 am**

### **REQUIREMENTS:**

You must be willing to make logic your life. Accordingly, you should attend class faithfully, do the homework assigned for each class, and be prepared to share your answers, questions, insights and confusions in class.

During the semester, there will be **three exams**, each counting 20% of the final grade, and quizzes, collectively worth 15 %. (The syllabus indicates dates for **6 quizzes** but the dates for, and number of quizzes may be changed during the semester, with notice to the class). The **cumulative final exam** will be worth 25%. No logical person would miss a quiz or an exam. Homework and class performance can raise or lower the student grade.

### **Accommodations for Disabilities**

Dickinson College makes reasonable academic accommodations for students with documented disabilities, and I am available to discuss their implementation or other concerns you may have. Students requesting accommodations must make their request and provide appropriate documentation to the Office of Disability Services (ODS) in 106 Dana Hall. Because classes change every semester, eligible students must obtain a new accommodation letter from Director Marni Jones every semester and review this letter with their professors so the accommodations can be implemented. The Director of ODS is available by appointment to answer questions and discuss any implementation issues you may have. ODS proctoring is managed by Susan Frommer at 717-245-1734 or [proctoring@dickinson.edu](mailto:proctoring@dickinson.edu). Address general inquiries to Stephanie Anderberg at 717-245-1734 or e-mail [disabilityservices@dickinson.edu](mailto:disabilityservices@dickinson.edu). For more information, see [http://www.dickinson.edu/homepage/71/disability\\_services](http://www.dickinson.edu/homepage/71/disability_services).

Questions? Come see me.

**Academic Honesty:** *I subscribe to the college policies on academic honesty. Please be honest.*