LOGIC AND REASONING

FALL 2010

KALAMAZOO COLLEGE

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Kalamazoo College
Humphrey House #201
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Offices Hours:
  · Monday: 1:00 - 2:30
  · Tuesday: 10:30 - 11:30
  · Thursday: 10:30 - 11:30
  · By Appointment.

COURSE GOALS:

The goal of this course is to develop students’ ability to identify and analyze arguments, both their own and those of others. Widely understood, logic is the evaluative study of argumentative reasoning. An argument is understood to be a complex claim that one set of statements, called “premises,” provide reason for believing another, called the “conclusion.” As critical endeavors, both formal and informal logic analyze the relationship between premises and conclusion. Informal logic is the critical analysis of arguments as these are articulated in natural languages. Formal logic, in contrast, analyzes the forms of arguments by developing specialized languages in which the basic structural relation between premises and conclusion is precisely symbolized and evaluated. Propositional logic studies the use of various connectives and operators – such as “and,” “or,” “if . . . then . . .” & “It’s not the case that . . . “ – in arguments constructed from simple statements. Predicate logic, in contrast, studies the use of various so-called “quantifiers” – such as “some,” “none,” and “all” – in arguments that talk about things and what can be said about them. By providing resources for evaluating arguments, logic promises to be a tool for exposing views that cannot be held “for good reasons.” If students make the effort to examine their views by articulating their reasons for holding them, then logic may well enhance their critical reasoning abilities. Logic is not, then, an empirical study of how we do think but, instead, a normative study of how we should reason.

EVALUATION:

Students will be evaluated on the basis of midterm examinations and a comprehensive examination weighted in the following fashion.

<table>
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<tr>
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<th>Weight</th>
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<tr>
<td>Midterm examinations</td>
<td>5 @ 15% each = 75%</td>
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<tr>
<td>Comprehensive Examination</td>
<td>1 @ 25% = 25%</td>
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POLICIES:

Attendance is required, along with a willingness to participate in classroom problem solving. Students are to have both read the assignments and completed the associated exercises before class. Students having difficulty are strongly encouraged to attend office hours and review sessions. Although homework assignments are not graded, they will be periodically collected for instructor assessment. The five mid-term examinations test students’ mastery of specific areas of formal and informal logic analysis. The comprehensive examination is administered at the scheduled time of finals week. 3 unexcused absences will result in a full grade reduction.

TEXT:

INTRODUCTION: BASIC CONCEPTS.

TUESDAY:
   Hour 1: 1.1 Arguments, Premises, and Conclusion
   Hour 2: 1.2 Recognizing Arguments

THURSDAY:
   Hour 1:
      A. 1.2 Deduction and Induction
      B. 1.4 Validity, Truth, Soundness, Strength, Cogency
   Hour 2:
      A. 1.5 Argument Forms: Proving Invalidity
      B. 1.6 Extended Arguments

LANGUAGE, MEANING AND DEFINITION:

TUESDAY:
   Hour 1:
      A. 2.1 Varieties of Meaning
      B. 2.2 The Intension and Extension of Terms
   Hour 2:
      A. 2.3 Definitions and Their Purposes
      B. 2.4 Definitional Techniques
      C. 2.5 Criteria for Lexical Definitions

THURSDAY:
   1. Hour 1: TEST #1

INFORMAL FALLACIES:

Hour 2:
   A. 3.1 Fallacies in General
   B. 3.2 Fallacies of Relevance

TUESDAY:
   Hour 1:
      A. 3.3 Fallacies of Weak Induction
      B. 3.4 Fallacies of Presumption, Ambiguity, and Grammatical Analogy
   Hour 2: 3.5 Fallacies in Ordinary Language

CATEGORICAL PROPOSITIONS:

THURSDAY:
   Hour 1:
      A. 4.1 The Components of Categorical Propositions
      B. 4.2 Quality, Quantity, and Distribution
   Hour 2:
      A. 4.3 Venn Diagrams and the Modern Square of Opposition
      B. 4.7 Translating Ordinary Language Statements into Categorical Form

THURSDAY EXAMINATION: TEST #2.
PROPOSITIONAL LOGIC:

TUESDAY:  
Hour 1: 6.1 Symbols and Translation  
Hour 2:  
A. 6.2 Truth Functions  
B. 6.3 Truth Tables for Propositions

THURSDAY:  
Hour 1:  
A. 6.4 Truth Tables for Arguments  
B. 6.5 Indirect Truth Tables  
Hour 2: 6.6 Argument Forms and Fallacies

TUESDAY:  
Hour 1: Review  
Hour 2: Review

TUESDAY EXAMINATION: TEST # 3

NATURAL DEDUCTION IN PROPOSITIONAL LOGIC:

THURSDAY:  
Hour 1: 7.1 Rules of Implication 1  
Hour 2: 7.2 Rules of Implication 1

TUESDAY:  
Hour 1: 7.3 Rules of Replacement 1  
Hour 2: 7.4 Rules of Replacement 2

THURSDAY:  
Hour 1:  
A. 7.5 Conditional Proofs  
B. 7.6 Indirect Proofs  
Hour 2: 7.7 Proving Logical Truths

TUESDAY:  
Hour 1: Review  
Hour 2: Review

TUESDAY EXAMINATION: TEST # 4.

PREDICATE LOGIC:

THURSDAY:  
Hour 1: 8.1 Symbols and Translation  
Hour 2: 8.2 Using Rules of Inference

TUESDAY:  
Hour 1: 8.3 Change of Quantifier Rule  
Hour 2: 8.4 Conditional and Indirect Proof

THURSDAY:  
REVIEW:

TUESDAY:  
Hour 1: 8.5 Proving Invalidity
Hour 2: 8.6 Relational Predicates and Overlapping Quantifiers

THURSDAY:
   Hour 1: 8.7 Identity
   Hour 2: Review

TUESDAY EXAMINATION: TEST # 5.     WEEK TEN

THURSDAY:
   1. Hour 1: Review
   2. Hour 2: Student Evaluations.

FINAL EXAMINATION: