Introductory Logic: The Art of Thinking

Philosophy 120

Prof. Brandon C. Look

Classroom: CB 219
Meeting Times: TR 9:30–10:45am
Instructor's Office: POT 1401
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Office Hours: TR 11:00am-12:00pm and by appointment
Course Website: `http://www.uky.edu/~look/120Logic.htm`

I. Course Description

The aim of this course is to expose students to the science of logic, that is, to the branch of philosophy concerned with the analysis of arguments. We will concern ourselves, first, with the recognition and identification of arguments (and their premises and conclusions) and with basic logical concepts, such as truth, validity, soundness and cogency. We will study informal fallacies so that students can easily recognize and diagnose the logical errors and rhetorical tricks of everyday life. We will then study categorical propositions and syllogisms, how to translate ordinary language statements into such propositions, and how to analyze the validity of these syllogisms. We will then study modern propositional logic; students will learn how to formalize arguments and evaluate their validity. We will then turn to inductive logic and probability theory, where students will learn how to evaluate such arguments by mathematical analysis. Finally, we will concern ourselves with problems of rational choice and game theory: how best to make decisions in an uncertain world.

As this course fulfills part of the Quantitative Reasoning component of the General Education Program at the University of Kentucky, great emphasis will be placed on formal and mathematical modeling of real-life situations. Students will develop a sense of number and quantity through reflection on the nature of categorical syllogisms and probability theory; they will develop a sense of functional relationships of numerical values through an analysis of the truth-functional relationships of atomic propositions. Finally, students will be prepared by this course in Logic to understand better the nature of mathematical and statistical inference and the philosophical problems and issues therein.

II. Course Prerequisites

None. However, students should have had exposure to high-school mathematics through algebra in order to understand the basics of argumentative strategy and the notion of a proof.

III. Course Objectives and Learning Outcomes

By the end of the course, students should be able to do the following.

(1) Upon encountering a unit of discourse (a text or a rant from a TV bloviator), determine whether or not the unit of text contains an *argument*; and, if so,

   (a) identify the premises and conclusion of the argument,

   (b) determine whether the argument is *deductive* or *inductive*, and

   (c) determine whether or not the argument is guilty of committing any *informal fallacy*.

(2) If the argument is deductive, test for its *validity* by either

   (a) using the relations of obversion, conversion, or contraposition in the case of immediate inferences on categorical propositions, or

   (b) translating the argument into the form of a categorical syllogism and constructing and inspecting Venn diagrams or applying the Rules for Syllogisms, or

   (c) symbolizing the argument, using the tools of Propositional Logic, and inspecting the truth tables of the premises and conclusion.

(3) If the argument is inductive, determine how *strong* the argument is by

   (a) determining what grounds are given for acceptance of the conclusion,

   (b) assigning probabilities to the premises and conclusion and

   (c) calculating the complex probabilities by means of the probability calculus.

(4) If the argument deals with the grounds for an action, justify a particular course of action by

   (a) assigning an *expected utility* and a *probability* to different possible actions, and

   (b) representing the different possible actions (and responses from others or the environments) by means of a *partition* or *matrix*.

IV. Course Requirements and Grading Policies

Final grades will be based on the following components and given the following weights:

(1) Weekly homework assignments (30%)

(2) Mid-term Exam (20%)

(3) Final Exam (40%)

(4) Contributions to the "Bad Arguments Web-Site" (10%)

(1) This course will use Aplia, a web-based platform for homework and support. All students **must** register with Aplia by the first weekend of the semester.

If you have never used Aplia before...

- Connect to `http://www.aplia.com`.
- Click the "Create a New Account" link and choose "Student Account." You will then enter your course key: **QGDQ-8JJ4-DKQ5**. Continue following the instructions to complete your registration.

If you have used Aplia before...

- Connect to `http://www.aplia.com`.
- Sign in with your usual e-mail address and password and enter your Course Key when prompted: **QGDQ-8JJ4-DKQ5**. If you are not prompted for a new Course Key, click the "Enroll in a New Course" button at the top of your "My Courses" page to enroll in a new Aplia course. Enter your Course Key when you are prompted.

Beginning 9/3/2010, students will be required to do the homework every week on the Aplia site. These assignments will be due **every Friday night**. The only exceptions are the Fridays after the mid-term exam, Thanksgiving, and the Friday of dead week. For the first 11 weeks of the course, the assignments will be directly from the Aplia site and connected to the Hurley text. For the remainder of the course, the assignments will also be found on the Aplia site but will be drawn from the Hacking text. **The final grade for the homework component will be determined by the students average weekly percentage of homework scores.**

(2) – (3) There will also be one mid-term exam and one final exam. These exams will consist of questions and problems modeled on those from the textbooks. (Students are encouraged to practice on the unassigned problems from the textbooks.) **Both**

mid-term exam and final exam will be put on a 100 point scale. In the event of universally catastrophic performance on the exam(s), a curve may be employed.

(4) Finally, students must submit instances of bad arguments that they encounter in print (including on the web) or television and explain why they are bad arguments. To do so, post a message on the "Discussion Board" of the course Aplia site. Example: "In this article [hyperlink], X says [*short* summary]. That's an example of a Slippery Slope [or a Weak Analogy or . . .] because [*short* explanation]." (A student who submits 5 such arguments will receive 100% of the 10% for this component of the final grade; 4 arguments will receive 80%; 3 arguments 60%; and so on. Or, alternatively, **each instance of a bad argument will contribute two (2) points to the student's final grade.**

Final grades will follow the standard scale:

A = 90% – 100%

B = 80% – 89%

C = 70% – 79%

D = 60% – 69%

E $\leq$ 59%

In other words, to calculate your final grade: (.3)(Homework Average) + (.2)(MT Exam) + (.4)(Final Exam) + (.02)(Bad Argument (Max. five bad arguments))

Students will be notified of their Mid-Term grade by October 15, 2010.

V. Course Policy on Academic Accommodations due to disability
If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address `jkarnes@eamil.uky.edu`) for coordination of campus disability services available to students with disabilities.

VI. Course Policy on Academic Integrity
All assignments, projects, and exercises completed by students for this class should be the product of the personal efforts of the individual(s) whose name(s) appear on the corresponding assignment. The Ombud site (`http://www.uky.edu/Ombud`) also has information on plagiarism. Misrepresenting others' work as one's own in the form of cheating or plagiarism is unethical and will lead to those penalties outlined in the University Senate Rules (6.3.1 & 6.3.2). (See `http://www.uky.edu/Faculty/Senate/`

rules_regulations/ index.htm .) The minimum penalty for plagiarism or cheating is a zero on the assignment for a first, "minor offence"; more severe penalties may be recommended and are mandated by the faculty senate for "major" and subsequent offences. Students should also be aware that according to faculty senate rules, those charged with plagiarism may not withdraw for any reason from the course in which the offense occurred.

VII. Course Policy on Classroom Behavior

The university, college and department has a commitment to respect the dignity of all and to value differences among members of our academic community. There exists the role of discussion and debate in academic discovery and the right of all to respectfully disagree from time-to-time. Students clearly have the right to take reasoned exception and to voice opinions contrary to those offered by the instructor and/or other students (S.R. 6.1.2). Equally, a faculty member has the right – and the responsibility – to ensure that all academic discourse occurs in a context characterized by respect and civility. Obviously, the accepted level of civility would not include attacks of a personal nature or statements denigrating another on the basis of race, sex, religion, sexual orientation, age, national/regional origin or other such irrelevant factors.

VIII. Course Policy on Excused Absences

Students will not be penalized for missing class due to an excused absence. For definitions of excused absences, see SR 5.2.4.2. It is the student's responsibility to provide me with documentation in a timely manner.

IX. Additional Policies

- No late homework assignments will be accepted unless the student has a valid excuse. The Aplia site is merciless. Plan accordingly. (You can always do the assignment early!)
- Absent *extraordinary* circumstances, no extension will be given for the mid-term or final, nor will students be allowed to rescheduled an exam.
- Attendance will be recorded for every class meeting. Two unexcused absences will be allowed without penalty. After that, each absence will incur a 5% reduction in the final grade. Excused absences will be given at instructor's discretion only with proof as defined by S.R. 5.2.4.2.

X. Required Texts

- Patrick J. Hurley, *A Concise Introduction to Logic*, Thomson: Belmont, CA, 2008.
- Ian Hacking, *An Introduction to Probability and Inductive Logic*, Cambridge: Cambridge University Press, 2001.

XI. Schedule

Date	Topic	Reading
8/26	Class Mechanics & Basic Concepts of Logic	Hurley, §§1.1-1.3
8/31	Basic Concepts of Logic	Hurley, §§1.4-1.6
9/2	Informal Fallacies: Fallacies of Relevance	Hurley, §§3.1-3.2
9/7	Informal Fallacies: Fallacies of Weak Induction	Hurley, §3.3
9/9	Informal Fallacies: Fallacies of Presumption, etc.	Hurley, §3.4
9/14	Categorical Propositions: Quantity, Quality, etc.	Hurley, §§4.1-4.2
9/16	Categorical Propositions: Venn Diagrams	Hurley, §4.3
9/21	Categorical Propositions: Conversion, etc.	Hurley, §4.4
9/23	Categorical Propositions: Traditional Square & Venn Diagrams	Hurley, §§4.5-4.6
9/28	Categorical Propositions: Translations	Hurley, §4.7
9/30	Categorical Syllogisms: Standard Form, Mood, Figure	Hurley, §5.1
10/5	Categorical Syllogisms: Venn Diagrams	Hurley, §5.2
10/7	Categorical Syllogisms: Rules and Fallacies	Hurley, §5.3
10/12	**Mid-Term Exam**	
10/14	Propositional Logic: Symbolization and Truth Functions	Hurley, §§6.1-6.2
10/19	Propositional Logic: Truth Tables for Propositions	Hurley, §6.3
10/21	Propositional Logic: Truth Tables for Arguments	Hurley, §6.4
10/26	Propositional Logic: Indirect Truth Tables	Hurley, §6.5
10/28	Propositional Logic: Argument Forms and Fallacies	Hurley, §6.6
11/2	How to Calculate Probabilities: The Gambler's Fallacy	Hacking, Ch. 3
11/4	How to Calculate Probabilities: Elementary Probability Ideas	Hacking, Ch. 4
11/9	How to Calculate Probabilities: Conditional Probability	Hacking, Ch. 5
11/11	How to Calculate Probabilities: Basic Rules	Hacking, Ch. 6
11/16	How to Calculate Probabilities: Bayes' Rule	Hacking, Ch. 7
11/18	Combining Probabilies and Utilities: Expected Value	Hacking, Ch. 8
11/23	Combining Probabilies and Utilities: Maximizing Expected Value	Hacking, Ch. 9
11/25	**Thanksgiving** (No Class)	
11/30	Combining Probabilies and Utilities: Maximizing Expected Value	Hacking, Ch. 9
12/2	Combining Probabilies and Utilities: Decision under Uncertainty	Hacking, Ch. 10
12/7	Probability and Philosophy: The Problem of Induction	Hacking, Ch. 20
12/9	Review	
12/14	**Final Exam, 10:30am-12:30pm**	