

**Introduction to Logic**  
**CTY Course Syllabus**

<b>Content</b>	<b>Activities</b>
<p><b>WEEK ONE</b></p> <p><b>1. Monday</b></p> <p><i>Morning</i></p> <p>1. Personal Introductions and Questionnaire</p> <p>2. Pre-test</p> <p>3. Hurley, chapter 1.1: The basics of arguments: argument, statement, truth value, non-statements (i.e. questions, proposals, etc).</p> <p>4. Premises and conclusions—indicator words; inferences</p>	<p>1. Discussion: should one ever believe something on insufficient evidence? What constitutes evidence? How does it relate to arguments?</p> <p>2. Arguing about arguments. TA and I act out Monty Python’s Argument Clinic.</p> <p>3. Class divided into Harry Potter Houses</p> <p>4. Students worked in houses to solve logic puzzle #1</p> <p>5. Viewed Monty Python’s Argument Clinic and then discussed the difference between an argument and a verbal fight</p> <p>6. Premise and Conclusion Indicator Game</p> <p>7. Exercises in Hurley I.1.I + II (group work through the exercises)</p>
<p><i>Afternoon</i></p> <p>1. Hurley 1.2: inferential versus non-inferential statements (arguments versus explanation, illustration, etc)</p> <p>2. What we don’t argue about: (1) facts, (2) opinions. The difference between an opinion and an arguable statement.</p>	<p>1. Students worked in houses to solve logic puzzle #2</p> <p>2. Students in groups gave mini-presentations on the nine types of non-inferential passages</p> <p>3. Game show: identifying types of non-arguments from arguments.</p> <p>4. A closer look at stating an opinion and giving an argument. Activity: write a rant about something. To what extent is it an argument? To what extent can it be turned into an argument?</p>
<p><i>Evening Study Hall</i></p> <p>1. Honor Code, Computer Use, and Rules for the Class</p>	<p>1. Worked on Rant/Argument Paper</p> <p>2. Students studied for Quiz #1</p>

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<p><b>2. Tuesday</b>  <i>Morning</i>            1. Quiz #1            2. Hurley 1.3: Induction versus Deduction: How to distinguish induction from deduction; five types of deduction, six types of induction.            3. Introduction to the five logical operators for propositional logic (and, or, not, if...then, if and only if)            4. Modus ponens, modus tollens, and the fallacies of denying the antecedent and affirming the consequent discussed            5. Reading and lecture/discussion of Paley’s Argument from Design (for the existence of God)</p>	<p>1. Students worked in Harry Potter houses to solve logic puzzle #3            2. Students made second presentation: in small groups, they explained to the class one of the types of inductive or deductive arguments.            3. Discussion of Sherlock Holmes: read a passage, talked about inductive methods and the difference between pure guessing and induction.            4. Worked through problems sets for Hurley 1.3 individually</p>
<p><i>Afternoon</i>            1. Review of Quiz #1            2. Focus on the Argument from Analogy as an example of induction and as an introduction to the dispute between creationists and evolutionists.            3. Evaluating Deductive Arguments: validity and soundness (Hurley, 1.4).</p>	<p>1. Students worked in Harry Potter houses to solve logic puzzle #4            2. Class debate: student broken up into two groups: one defended Paley’s argument, the other attempted to refute it.            3. Individual work on problem set for chapter 1.4.I Discussion of answers.</p>
<p><i>Evening Study Hall</i>            1. Evaluating Inductive Arguments: Strength and Cogency (Hurley 1.4)</p>	<p>1. Problem set for Hurley 1.4            2. Studying for the quiz #2</p>
<p><b>3. Wednesday</b>  <i>Morning</i>            1. Quiz #2            2. The Counter-Example Method to Test for Invalidity: how to isolate the logical form (Hurley 1.5)            3. Introduction to the discipline of philosophy: etymology of “philosophy”, origin of philosophy, differences between philosophy and science and philosophy and religion            4. The Branches of Philosophy            5. Bertrand Russell’s “The Value of Philosophy,” chapter 15 of his <i>Problems of Philosophy</i></p>	<p>1. Problem set for Hurley 1.5: students took turns presented their answers on the board            2. Students took turns reading and commenting on Russell’s “Value of Philosophy” argument</p>

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<p><i>Afternoon</i></p> <ol style="list-style-type: none"> <li>1. Review of Quiz #2</li> <li>2. Introduction to Categorical Propositions and Deductive Arguments: discussion and practice of key concepts—quantity, quality, subject term, predicate term, copula, and distribution.</li> <li>3. Introduction to Venn Diagrams</li> <li>4. The Traditional Square of Opposition (immediate inferences involving implication, contraries, sub-contraries, and contradictories)</li> <li>5. Using Venn Diagram to show the validity of the inferences on the Square of Opposition</li> </ol>	<ol style="list-style-type: none"> <li>1. Students worked in Harry Potter houses to solve logic puzzle #5,6,7</li> <li>2. Students worked individually to explain how to represent A, E, I, and O propositions using Venn Diagrams.</li> <li>3. Students discussed the four logical relationships of the Tradition Square of Opposition.</li> <li>4. Individual work on problem set for chapter 4.1 of the textbook. Discussion of answers.</li> </ol>
<p><i>Evening Study Hall</i></p>	<ol style="list-style-type: none"> <li>1. Finish reading the Russell essay; student wrote a paragraph response to the essay</li> <li>2. Studying for the quiz</li> </ol>
<p><b>4. Thursday</b></p> <p><i>Morning</i></p> <ol style="list-style-type: none"> <li>1. Quiz #3</li> <li>2. Introduction to Fallacies: formal from informal fallacies distinguished.</li> <li>3. The Informal Fallacies: examination of the fallacies of relevance (Hurley 3.1-3.2) and the fallacies of weak induction (Hurley 3.3)</li> </ol>	<ol style="list-style-type: none"> <li>1. Students worked in Harry Potter houses to solve logic puzzle #8</li> <li>2. Students broke up into groups of two or three and presented one fallacy of relevance each to the class with examples.</li> <li>3. Students worked together on problem set in Hurley 3.2 and 3.3</li> </ol>
<p><i>Afternoon</i></p> <ol style="list-style-type: none"> <li>1. Review of Quiz #3</li> <li>2. The Converse, Obverse, and Contrapositive of Categorical Propositions</li> <li>3. Using Venn Diagrams to show the validity of each of these three immediate inferences.</li> <li>4. The Informal Fallacies Concluded: fallacies of presumption, ambiguity, and grammatical syntax</li> </ol>	<ol style="list-style-type: none"> <li>1. Students worked in Harry Potter houses to solve logic puzzle #9</li> <li>2. As in the morning, students broke up into groups of two and presented one fallacy of the eight remaining.</li> </ol>
<p><i>Evening Study Hall</i></p>	<ol style="list-style-type: none"> <li>1. Fallacy Skit Project: Students broke into five groups of three, and wrote and practiced skits illustrating at least three informal fallacies.</li> <li>2. Quiet Study Time for morning quiz</li> </ol>

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<p><b>5. Friday</b>  <i>Morning</i>            1. Quiz #4            2. Categorical Syllogisms: standard form; major, minor, and middle terms; mood and figure;            3. Testing for validity using Venn Diagrams</p>	<p>1. Discuss of answers to the quiz.            2. Individual work on problem set for chapter 5.1 in the textbook. Discussion of answers.            3. Practice using Venn Diagrams to prove the validity of categorical syllogism; students took turns presenting their answers on the board.            4. Students made final preparations for their presentation of their fallacy skits.            5. Review of answers to quiz #4            6. Presentation of Fallacy Skits            7. Logic Puzzle #10            8. Practice problems for Venn Diagrams</p>
<p><i>Afternoon</i>            1. Further Illustration of the Informal Fallacies: students watched <i>Twelve Angry Men</i>, starring Henry Fonda.</p>	<p>1. Students watched the film and given a character to especially scrutinize in order to determine which informal fallacies the character committed.            2. Discussion of the film</p>
<p><b>6. Sunday</b>  <i>Evening Study Hall</i></p>	<p>1. Practice, practice, practice: immediate inferences and Venn Diagrams of categorical syllogism</p>
<p><b>WEEK TWO</b>  <b>7. Monday</b>  <i>Morning</i>            1. First Examination            2. Introduction to Semantics: theory of meaning; cognitive versus emotive meaning; defective cognitive meaning: vagueness and ambiguity; verbal versus factual (Hurley 2.1)</p>	<p>1. Students spent part of the morning reviewing for the test.            2. Fun with the word “buffalo” to illustrate problems with meaning.            3. Reading and discussion of George Wallace’s speech concerning the Civil Rights Act of 1964.            4. Problem set on verbal and factual disputes.</p>

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<p><i>Afternoon</i></p> <ol style="list-style-type: none"> <li>1. The Trial and Death of Socrates as reported by Plato. Close reading of the dialogue, <i>Euthyphro</i>. Introduction to Socratic irony, Socratic Method, and “the unexamined life is not worth living.”</li> <li>2. Testing Validity for Categorical Syllogisms: the four rules to test for validity, including the Fallacies of Undistributed Middle, Illicit Minor, and Illicit Major</li> </ol>	<ol style="list-style-type: none"> <li>1. Logic Puzzle #11</li> <li>2. Discussion of first part of the <i>Euthyphro</i>: students worked outside for this.</li> </ol>
<p><i>Evening Study Hall</i></p>	<ol style="list-style-type: none"> <li>1. Plato’s <i>Euthyphro</i>, continued. Discussion of the nature of sophistry, character development, moral relativism.</li> <li>2. Students read more the <i>Euthyphro</i> silently.</li> <li>2. Study time for tomorrow’s quiz.</li> </ol>
<p><b>8. Tuesday</b></p> <p><i>Morning</i></p> <ol style="list-style-type: none"> <li>1. Quiz #5</li> <li>2. Semantics continued: Hurley 2.2: definition of a term, the use/mention distinction, and the difference between intension and extension.</li> <li>3. Hurley 2.3: clearing up problems with verbal disputes; types of definitions</li> </ol>	<ol style="list-style-type: none"> <li>1. Logic puzzle #11</li> <li>2. For the semantics section, student took turns reading chapter one in Martin’s <i>There are Two Errors in the the Title of this Book</i>. (handout) Discussion of “differences that make no difference.”</li> <li>3. Discussion and reading of Plato’s <i>Euthyphro</i> concluded, including a look at Divine Command Theory and the value of philosophy and logic.</li> </ol>

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<p><i>Afternoon</i></p> <ol style="list-style-type: none"> <li>1. Introduction to Propositional Logic: the limits of categorical propositional logic; the notion of the statement as the elements of PL, and the meaning of the five logical connectives. (Hurley 6.1)</li> <li>2. Well-formed formulas (wff) versus poorly formed ones in propositional logic</li> <li>3. Translating English into Propositional Logic Notation</li> <li>4. Necessary and Sufficient Conditions</li> <li>5. Introduction to Inductive Inferences: Induction by Enumeration (Generalization); Problems with Induction:               <ol style="list-style-type: none"> <li>(a) Hemple’s Raven paradox</li> <li>(b) Hume’s Problem of Induction.</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. Logic puzzle #12</li> <li>2. Problem sets on translating statements into propositional logic: students presented their answers on the blackboard.</li> <li>3. Reading aloud from Martin’s <i>There are Two Errors in the the Title of this Book</i> on Induction. (handout)</li> <li>4. Discussion on these problems and on the nature of Induction.</li> </ol>
<p><i>Evening Study Hall</i></p>	<ol style="list-style-type: none"> <li>1. Quiet reading time on inductive methods (Hurley 9.1-9.2) + continued reading from Martin’s <i>There are Two Errors in the the Title of this Book</i> on Induction.</li> <li>2. Studying for the quiz.</li> </ol>
<p><b>9. Wednesday</b></p> <p><i>Morning</i></p> <ol style="list-style-type: none"> <li>1. Quiz #6</li> <li>2. Meaning of the word “cause” as a sufficient condition, necessary condition, or both.</li> <li>3. Types of Inductive Inferences: (a) Arguments from Analogy (Hurley 9.1); (b) Mill’s Five Methods of Induction (Hurley 9.2)</li> <li>4. More on Hume and the Problem of Induction: discussion on logical necessity versus physical necessity; a priori versus a posteriori knowledge</li> </ol>	<ol style="list-style-type: none"> <li>1. Logic Puzzle #13</li> <li>2. Students broke up into groups of three and took turns one of the five methods formulated by Mill.</li> <li>3. General discussion on the various issues surrounding Hume.</li> </ol>
<p><i>Afternoon</i></p> <ol style="list-style-type: none"> <li>1. Kant on Hume: the Copernican Revolution; the mind as experience maker, the influence of Kant on psychology and linguistics</li> <li>2. Propositional Logic continued: introduction to truth tables for the five logical connectives (Hurley 6.2)</li> <li>3. De Morgan’s Law</li> </ol>	<ol style="list-style-type: none"> <li>1. Logic Puzzle #14</li> <li>2. General discussion on the various issues surrounding Kant</li> <li>3. Students took turns constructing truth tables for formulas.</li> </ol>

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<p><i>Evening Study Hall</i></p> <ol style="list-style-type: none"> <li>Types of Inductive Inferences continued: Hypothetical or Scientific Reasoning (Hurley 9.5)</li> <li>Karl Popper on the difference between science and pseudo-science.</li> <li>Science, pseudo-science and the paranormal</li> </ol>	<ol style="list-style-type: none"> <li>Reading and discussion of scientific method.</li> <li>Students took turns reading and discussing Karl Popper's essay.</li> <li>Quiet study and reading time.</li> </ol>
<p><b>10. Thursday</b></p> <p><i>Morning</i></p> <ol style="list-style-type: none"> <li>Quiz #7</li> <li>Hume on miracles and the paranormal: what should our criterion be for believing extraordinary claims?</li> <li>Logical positivism and the verification principle + a brief look at the paradoxes of set theory (Cantor, Russell)</li> <li>Classifying propositions with truth tables: tautologies, self-contradictions, and contingent wffs (Hurley 6.3)</li> <li>Comparing Propositions: logical equivalence, logically contradictory, consistency and inconsistency. (Hurley 6.3)</li> </ol>	<ol style="list-style-type: none"> <li>Discussion on Hume and Logical Positivism</li> <li>Practice classifying and comparing wffs</li> <li>Logic Puzzles #15-18, and "proving" that <math>1 = 2</math>.</li> </ol>
<p><i>Afternoon</i></p> <ol style="list-style-type: none"> <li>Review of quiz #7</li> <li>Finished reading Karl Popper on the difference between science and pseudo-science.</li> </ol>	<ol style="list-style-type: none"> <li>John (T.A.) led a discussion on the meaning of truth: distinction between statement and proposition; the correspondence theory of truth; bivalence.</li> <li>Discussion of Popper: does evolution really satisfy Popper's criterion for science?</li> </ol>
<p><i>Evening Study Hall</i></p>	<ol style="list-style-type: none"> <li>Silent reading of articles on the debate between creationism and science. Selections from Gould's "Evolution as Fact and Theory," selections from Shermer's <i>Why People Believe Weird Things</i>, and Bohlin's "Mere Creation: Science, Faith and Intelligent Design."</li> </ol>

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<p><b>11. Friday</b> <i>Morning</i></p> <p>1. Using truth table to prove validity and invalidity. (Hurley 6.4) 2. Library Day: students spent the entire morning at the Siena College library researching for their debate on teaching creationism and evolution in the schools</p>	<p>1. Wall of Shame Game, Round #1: Students broke up into Harry Potter houses and tried to answer questions involving truth tables. 2. In groups of four, students worked on the reference room computers, researching for their debate.</p>
<p><i>Afternoon</i></p> <p>1. Plato's <i>Apology</i> 2. Indirect Truth Tables to prove the validity of arguments in propositional notation</p>	<p>1. Students took turns reading and discussing the <i>Apology</i>. 2. Hurley 6.5 problem set</p>
<p><b>WEEK THREE</b> <b>12. Sunday</b> <i>Evening Study Hall</i></p>	<p>1. Quiet study time for the Second Examination.</p>
<p><b>13. Monday</b> <i>Morning</i></p> <p>1. The Second Examination</p>	<p>1. Review and Question and Answer time for the last exam 2. Preparation for the Debate 3. Logic Puzzle #19</p>
<p><i>Afternoon</i></p> <p>1. <b>THE DEBATE</b></p>	<p>1. Entire afternoon devoted to the debate. The issue: "should creationism be taught alongside evolution in high school biology classes?"</p> <p>(a) Entire class split up into four groups: two representing the affirmative; two, the negative. (b) Two independent debates were held with the two groups not debating serving as the juror.</p>
<p><i>Evening Study Hall</i></p>	<p>1. Review of the answers to the Second Examination (1 hour) 2. Remaining time spent working on formal (2-3 page) essay answering the question debated in the afternoon.</p>

Content	Activities
<p><b>14. Tuesday</b> <i>Morning</i></p> <p>1. Introduction to Natural Deduction for Propositional Logic. First five rules covered today.</p> <ul style="list-style-type: none"> <li>(a) Reiteration</li> <li>(b) Conjunction Introduction</li> <li>(c) Conjunction Elimination</li> <li>(d) Conditional Elimination (aka Modus Ponens)</li> <li>(e) Conditional Introduction (aka Conditional Proof)</li> </ul>	<ul style="list-style-type: none"> <li>1. Logic Puzzle #20</li> <li>2. Students discussed the meaning of the truth functions for the operators and attempted to derive the rules for natural deduction, rather than the rules simply being given to them.</li> <li>3. Practice problems throughout, for each new set of rules.</li> </ul>
<p><i>Afternoon</i></p> <p>1. Discussion on the Paradox of Implication: does the material conditional really capture what we mean by “if...then”; is there a problem with the fact that anything follows from a logical contradiction?</p>	<ul style="list-style-type: none"> <li>1. Students discussion the issues surrounding this problem in the philosophy of logic. Discussion led by John (TA).</li> <li>2. Students had some time to continue to work on drafts of their paper. John and I read drafts and made comments.</li> </ul>
<p><i>Evening Study Hall</i></p>	<ul style="list-style-type: none"> <li>1. Time spent writing the final draft of the essay on computers in the Siena College computer lab.</li> </ul>
<p><b>15. Wednesday</b> <i>Morning</i></p> <p>1. Movie and discussion</p> <p>2. Natural Deduction continued:</p> <ul style="list-style-type: none"> <li>(a) Negation Introduction</li> <li>(b) Negation Elimination Rules (both also known as reduction ad absurdum arguments).</li> </ul>	<ul style="list-style-type: none"> <li>1. Students watched <i>Inherit the Wind</i>, and then discussed the movie afterwards. The movie is a fictional account of the Scopes “monkey trial”, over the teaching of evolution in public school.</li> <li>2. Problem sets on Natural Deduction</li> </ul>
<p><i>Afternoon</i></p> <p>1. Natural Deduction Concluded:</p> <ul style="list-style-type: none"> <li>(a) Disjunction Introduction</li> <li>(b) Disjunction Elimination</li> <li>(c) Biconditional Introduction</li> <li>(d) Biconditional Elimination</li> </ul> <p>2. Aristotle on the Three Laws of Thought: identity, excluded middle, and non-contradiction.</p>	<ul style="list-style-type: none"> <li>1. Logic Puzzle #21</li> <li>2. Problem sets involving natural deduction</li> <li>3. Discussion on the Laws of Thought</li> </ul>
<p><i>Evening Study Hall</i></p>	<ul style="list-style-type: none"> <li>1. Post-test</li> <li>2. Preparation for debate with the Philosophy of Mind class. Students read articles on their topics in preparation.</li> </ul>

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<p><b>16. Thursday</b>  <i>Morning</i>            1. Plato (a last look) – the <i>Apology</i> and the <i>Crito</i>.</p>	<p>1. Discussion of Plato            2. Further preparation for debates with Philosophy of Mind class.</p>
<p><i>Afternoon</i></p>	<p>1. Debate with Philosophy of Mind: took the entire afternoon session. Students participated in two one-hour debates. The first on whether we should permit human cloning, the second on whether we should permit “designer babies”.</p>
<p><i>Evening Study Hall</i></p>	<p>1. Logic Jeopardy with the Mathematical Logic class.</p>
<p><b>17. Friday</b>  <i>Morning</i>            1. Wrap-up and goodbyes.</p>	