

# PHIL-1020: INTRODUCTION TO LOGIC

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## Cuyahoga Community College

**Viewing: PHIL-1020 : Introduction to Logic**

**Board of Trustees:**

September 2023

**Academic Term:**

Fall 2024

**Subject Code**

PHIL - Philosophy

**Course Number:**

1020

**Title:**

Introduction to Logic

**Catalog Description:**

Introduction to evaluation of arguments. Concentration on basic principles of formal logic and application to evaluation of arguments. Explores notions of implication and proof and use of modern techniques of analysis including logical symbolism.

**Credit Hour(s):**

3

**Lecture Hour(s):**

3

**Lab Hour(s):**

0

**Other Hour(s):**

0

## Requisites

**Prerequisite and Corequisite**

ENG-0995 Applied College Literacies, or appropriate score on English Placement Test; or departmental approval.

Note: ENG-0990 Language Fundamentals II taken prior to Fall 2021 will also meet prerequisite requirements.

## Outcomes

**Course Outcome(s):**

Basic Logical Concepts and Skills: Define and apply concepts from logic.

**Objective(s):**

1. Define "statement". Identify statements.
2. Define "argument" (including "premise" and "conclusion"). Identify arguments, their premises and conclusions, and write arguments in standard form.
3. Define "logically true" (or "tautology"), "logically false" (or "self-contradictory"), and "contingent". Classify individual statements as logically true, false, or contingent.
4. Define "equivalent" and "contradictory". Classify pairs of statements as equivalent or contradictory.
5. Define "consistent" and "inconsistent". Classify sets of statements as consistent or inconsistent.
6. Describe the difference between deductive and inductive arguments. Classify arguments as deductive or inductive.
7. Define "valid" and "sound". Evaluate arguments for validity and soundness.
8. Define "strong" and "cogent". Evaluate arguments for strength and cogency.
9. Explain relationships between logical concepts.

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**Course Outcome(s):**

Sentential/Propositional Logic: Demonstrate competency understanding and using sentential logic.

**Essential Learning Outcome Mapping:**

Quantitative Reasoning: Analyze problems, including real-world scenarios, through the application of mathematical and numerical concepts and skills, including the interpretation of data, tables, charts, or graphs.

**Objective(s):**

1. Translate English statements into sentential logic and vice versa.
2. Identify the main operators of complex statements.
3. Calculate the truth value of a complex statement based on the truth values of its component atomic statements.
4. Construct truth tables for individual complex statements and use those to classify statements as logically true, logically false, or contingent.
5. Construct truth tables for pairs of complex statements and use those to classify the pairs as equivalent or contradictory.
6. Construct truth tables for sets of complex statements and use those to classify the sets as consistent or inconsistent.
7. Construct truth tables for arguments and use those to evaluate arguments for validity.
8. Construct derivations using direct proof techniques.
9. Construct derivations using conditional proof techniques.
10. Construct derivations to show an individual statement is logically true.

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**Course Outcome(s):**

Categorical Logic: Gain competency with categorical logic.

**Essential Learning Outcome Mapping:**

Quantitative Reasoning: Analyze problems, including real-world scenarios, through the application of mathematical and numerical concepts and skills, including the interpretation of data, tables, charts, or graphs.

**Objective(s):**

1. Identify the components of categorical propositions (quantifier, subject, copula, and predicate).
2. Identify the logical properties of categorical propositions (quality and quantity).
3. Formalize English statements as standard-form categorical propositions.
4. Apply contradiction, obversion, conversion, and contraposition to categorical propositions.
5. Use contradiction, obversion, conversion, and contraposition to evaluate the validity of immediate inferences.
6. Draw Venn diagrams for categorical propositions.
7. Use Venn diagrams to evaluate the validity of immediate inferences.
8. Identify the components of categorical syllogisms (major term, minor term, and middle term).
9. Put categorical syllogisms in standard form.
10. Identify the mood and figure of categorical syllogisms.
11. Use Venn diagrams to evaluate the validity of categorical syllogisms.
12. Evaluate enthymemes and sorites.

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**Methods of Evaluation:**

1. Unit exams covering 20-50% of the term
2. Section quizzes
3. Text exercise assignments
4. Class participation

**Course Content Outline:**

1. Why study logic?
  - a. Improve critical thinking skills
  - b. Improve analytical reasoning skills

2. What is logic?
  - a. Distinguishing between correct and incorrect reasoning
  - b. Definition of "argument":
    - i. Premises
    - ii. Conclusions
    - iii. Proof
  - c. Identifying arguments: indicator words and phrases
    - i. Classifying arguments as deductive
    - ii. Classifying arguments as inductive
  - d. The Traditional Square of Opposition
    - i. Construct the Square of Opposition
    - ii. Construct logical relations around the Traditional Square of Opposition
  - e. Construct the three further immediate inferences of conversion, obversion, and contraposition
    - i. Apply the three further immediate inferences to standard form categorical propositions
    - ii. Show validity and invalidity of immediate inferences
  - f. Construct Venn diagram proofs of validity for standard form categorical syllogisms
    - i. Construct diagrams for syllogisms containing universal propositions exclusively
    - ii. Construct diagrams for syllogisms containing universal propositions exclusively
    - iii. Construct diagrams for syllogisms containing singular propositions exclusively
    - iv. Construct diagrams for syllogisms containing both universal and particular propositions
  - g. Construct rule-method proofs of validity for standard form categorical syllogisms
    - i. Master the rules.
    - ii. Develop a hierarchy for applying the rules in a proof
  - h. Perform reduction to standard form analyses on non-standard form categorical syllogisms
    - i. Reduce syllogisms to three terms using the three further immediate inferences of conversion, obversion, and contraposition
    - ii. Recognize terms that are equivocated to reduce the terms of the syllogism to three
  - i. Translate non-standard form categorical propositions into standard form categorical propositions
    - i. Demonstrate why singular propositions can be treated as universals
    - ii. Apply techniques aimed at creating proper subject and predicate terms
  - j. Perform uniform translations of non-standard form categorical propositions.
  - k. Analyze enthymematic argument structures
  - l. Syntax (structure of compound statements)
    - i. Statements and their forms
      1. Simple
      2. Conjunction
      3. Disjunction
      4. Hypothetical
      5. Biconditional
    - ii. The parts of compound statements/statement forms
      1. Conjuncts
      2. Disjuncts
      3. Antecedents
      4. Consequents

## Resources

Copi, I., C. Cohen, and Kenneth McMahon. *Introduction to Logic*. 15th. Prentice Hall, 2019.

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Govier, Trudy. *A Practical Study of Argument*. 7th. Wadsworth, Boston, MA, 2013.

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Hurley, P. J. and Lori Watson. *A Concise Introduction to Logic*. 13th. Thompson/Wadsworth/Cengage: Boston, MA, 2017.

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Sacks, Oliver. *The Man Who Mistook His Wife for a Hat and Other Clinical Tales*. 1st. Picador, 2021.

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Schick, Theodore and Lewis Vaughn. *How To Think About Weird Things: Critical Thinking for a New Age*. 8th ed. McGraw-Hill; New York, New York, 2019.

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Copi, Irvin, Car Cohen, and Samuel LiPuma. *Introduction to Logic, Custom Edition*. 1st ed. Upper Sadle River, New Jersey: Pearson, Prentice Hall, 2010.

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Carter, Codell, K. *A First Course in Logic*. 1st ed. Pearson, Prentice Hall; Upper Sadle River, New Jersey, 2004.

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Hausman, Alan, Howard Kahane, and Paul Tidman. *Logic and Philosophy: A Modern Introduction*. 13th ed. Wadsworth/Cengage; Boston, MA, 2021.

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Baronett, Stan. *Logic: An Emphasis on Formal Logic*. 5th ed. Oxford University Press, 2021.

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Howard-Snyder, Frances; Howard-Snyder, Daniel; Wasserman, Ryan. *The Power of Logic*. 6th ed. McGraw-Hill; New York, New York, 2019.

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### Resources Other

1. Internet Encyclopedia of Philosophy: <http://www.iep.utm.edu/>
2. Stanford Encyclopedia of Philosophy: <http://plato.stanford.edu/>
3. EpistemeLinks: <http://www.epistemelinks.com/index.aspx> (<http://www.epistemelinks.com/>)
4. Yale University Library, Philosophy: <http://www.library.yale.edu/humanities/philosophy/associations.html>
5. P (<http://www.library.yale.edu/humanities/philosophy/associations.html>)hilosophy Courses at [philosophy.lander.edu](http://philosophy.lander.edu) <http://philosophy.lander.edu/logic/trans.html>

### Instructional Services

#### OAN Number:

Ohio Transfer 36 TMM027

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