

PHI 103 - Introduction  
Lecture 2

Overview of Logic  
The Big Picture of the Discipline

# Logic an Overview

**Definition:** Logic (Gr. *logike*) - the systematic investigation of argumentation (or *rational thinking*).

## I. Three Basic Questions of Logic -

- A. What *is* an argument?
- B. How do arguments work?
- C. Why do arguments fail?

# Logic an Overview

## II. Two Types of Logical Systems -

### A. INFORMAL LOGIC - *Induction* - type/amount of evidence determines success

1. **Prediction** - from past to future
2. **Analogy** - from known similarities, to unknown similarities (*legal and moral reasoning*)
3. **Generalization** - from a particular sample to the whole class (*the social scientific method*)
4. **Authority** - from expertise to likely explanation (*deferring to experts in a field*)
5. **Signification** - from a sign to what the sign indicates
6. **Causation** - from knowledge of causation to probable effects

**NOTE:**

**Inductive** arguments yield *probable conclusions*

# Logic an Overview

B. **FORMAL LOGIC** - *Deduction* - structure/form determines success

1. **Syllogistic Logic** - relations of *terms* in categorical propositions
2. **Propositional Logic** - relations between ordinary *propositions*
3. **Predicate Logic** - functions of *quantifiers* (i.e., universal and particular)
4. **Modal Logic** - functions of *modality* (i.e., necessary and contingent)

*NOTE:*

**Deductive** arguments yield *necessary conclusions*

# Logic an Overview

## III. An Absurdly Brief History of Logic -

### A. Pre-Aristotelian - *logos* versus *muthos*

1. Pythagorianism/Euclid - linear deduction
2. Zeno of Elea - (c. 450 BCE) *reductio ad absurdum*
3. Socrates/Plato - truth and definition

### B. Aristotle (384-322 BCE) - first *systematic* Logic

### C. Stoicism - Chrysippus (280-206 BCE) propositional Logic

### D. Medieval Logic -

1. Scholasticism
2. Islamic

# Logic an Overview

## E. Modern Logic -

1. **Enlightenment** - logic as scientific instrument
  - a. Francis Bacon (1561-1626 CE)
  - b. Rene Descartes (1596-1650 CE)
  - c. Gottfried Leibniz (1646-1716 CE) - symbolic logic
2. **Nineteenth Century** -
  - a. Mathematical Logic - *Algebraic Logic*
  - b. Logicism - mathematics *as* logic
3. **Twentieth Century** -
  - a. Set Theory
  - b. Computational Programming (*computer language*)