

COURSE OUTLINE

PHIL-102

Introduction to Logic

3 Credits

Humanities Core Course

HOWARD COMMUNITY COLLEGE

Description

An introduction to both the practice and study of reason. Taking the essence of reason to be argument -- a set of premises supporting a conclusion -- the basic notions of validity, truth, soundness, strength and cogency will be studied. Two systems of formal symbolic logic will then be studied and practiced: categorical syllogism (Aristotelian and Boolean) and modern propositional/predicate logic. These final elements have a distinctly mathematical feel. (3 hours weekly)

Statement on General Education and Liberal Learning

A liberal education prepares students to lead ethical, productive, and creative lives and to understand how the pursuit of lifelong learning and critical thinking fosters good citizenship. General education courses form the core of a liberal education within the higher education curriculum and provide a coherent intellectual experience for all students by introducing the fundamental concepts and methods of inquiry in the areas of mathematics, the physical and natural sciences, the social sciences, the arts and the humanities, and composition. This course is part of the general education core experience at Howard Community College.

Overall Course Objectives

Upon completion of the course, the student will be expected to:

1. Recognize premises and conclusions, validity/strength versus soundness/cogency
2. Render simple English sentences as categorical propositions.
3. Use Venn diagrams to check for validity of immediate inference.
4. Recognize validity/invalidity of standard-form categorical syllogisms
5. Render simple English sentences into propositional form.
6. Recognize the nature of truth functional operators.
7. Construct truth tables for propositions/arguments.
8. Test for consistency and validity with indirect truth tables.
9. Prove conclusions using the eighteen rules of inference & replacement.
10. Recognize conditional and indirect proof forms
11. Render simple English sentences into predicate form.
12. Use change of quantifier, relational predicates and overlapping quantifiers.
13. Use identity, and note general philosophical implications.

Major Topics

- I. Arguments: Premises and Conclusions
 - A. Recognition of Arguments
 - B. Validity and Soundness; Strpositional ength and Cogency
- II. Categorical Propositions
 - A. Components of a Categorical Proposition
 - B. Venn diagrams and the square of opposition
 - C. Aristotelian versus Boolean logic
- III. Categorical Syllogisms
 - A. Standard form, mood and figure
 - B. Venn diagrams applied to syllogisms
 - C. Rules and Fallacies
- IV. Propositional Logic
 - A. Symbols and translation
 - B. Truth functions
 - C. Truth tables
 - D. Tautology, contradiction and replacement
- V. Natural deduction in propositional logic
 - A. Rules of implication and replacement
 - B. Proving logical truths
- VI. Predicate Logic
 - A. Symbols and translation
 - B. Change of Quantifier
 - C. Relational and Overlapping Quantifiers
- VII. Logic Truth Trees
 - A. Propositional Logic
 - B. Predicate Logic
 - C. Church's Theorem
- VIII. Philosophical Implications
 - A. Identity
 - B. Problems
 - C. The nature of reason

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member but will include the following:

- Final grades will be based primarily on homework and exams
- Homework will include proofs and related work with symbolic logic

Other Course Information

This is a Humanities Core Course, a Humanities Elective, and an Arts and Sciences Elective