COMMON COURSE OUTLINE: Course discipline/number/title: PHIL 1145: Logic

A. CATALOG DESCRIPTION
1. Credits: 3
2. Hours/Week: 3
3. Prerequisites (Course discipline/number): None
4. Co-requisites (Course discipline/number): NA
5. MnTC Goals (if any): Goal 2/Critical Thinking and Goal 4/Mathematical/Logical systems

This course is an introduction to the formal study of reasoning using the concepts and techniques of symbolic logic. It will expand the method of natural deduction with the emphasis on detecting the presence or absence of logical properties and applying deductive rules to construct and prove valid arguments, especially ones drawn from ordinary language. While this course challenges students with abstract reasoning, the study of symbolic logic will demystify the underlying structure of language highlight abuses of reason, teach the values of critical reading and suggest strategies for formulating coherent, well-reasoned writing.

B. DATE LAST REVISED (Month, year): October, 2013

C. OUTLINE OF MAJOR CONTENT AREAS:
1. Informal Logic
   a) Basic concepts
      i. Arguments, Premises, and Conclusions
      ii. Recognizing Arguments
      iii. Deduction and Induction
      iv. Validity, Truth, Soundness, Strength, Cogency
      v. Argument Forms: Proving Invalidity

2. Formal Logic
   a) Categorical Propositions
      i. Categorical Propositions
      ii. Quality, Quantity, and Distribution
      iii. Modern Square of Opposition
      iv. Conversion, Obversion, and Contraposition
      v. Traditional Square of Opposition

   b) Propositional Logic
      i. Symbols and Translation
      ii. Truth Functions
      iii. Truth Tables for Propositions
      iv. Truth Tables for Arguments
      v. Indirect Truth Tables
      vi. Argument Forms and Fallacies

   c) Natural Deduction in Propositional Logic
      i. Rules of implication
      ii. Rules of Replacement
      iii. Conditional Proof
      iv. Indirect Proof
      v. Proving Logical Truths

   d) Predicate Logic
      i. Symbols and Translation
      ii. Using the Rules of Inference
      iii. Change of Quantifier Rule
D. LEARNING OUTCOMES (GENERAL): The student will be able to:
1. Understand the basic concepts of deductive and inductive logic.
2. Understand the various uses of language
3. Avoid fallacious reasoning
4. Complete problem sets designed to sharpen their analytical skills.
5. Reason in abstraction
6. Represent ordinary language arguments in symbolic form.
7. Distinguish between two or more arguments according to their soundness or cogency.

E. LEARNING OUTCOMES (MNCT):
Goal 2/Critical Thinking: The student will be able to:
1. Gather factual information and apply it to a given problem in a manner that is relevant, clear comprehensive, and conscious of possible bias in the information selected.
2. Imagine and seek out a variety of possible goals, assumptions, interpretations, or perspectives, which can give alternative meanings or solutions to given situations or problems.
3. Analyze the logical connections among the facts, goals, and implicit assumptions relevant to a problem or claim; generate and evaluate implications that follow from them.
4. Recognize and articulate the value assumptions, which underlie and affect decisions, interpretations, analyses, and evaluations made by ourselves and others.

Goal 4/Mathematics/Symbolic Systems: The student will be able to:
1. Illustrate historical and contemporary applications of mathematics/logical systems.
2. Clearly express mathematical/logical ideas in writing.
3. Explain what constitutes a valid mathematical/logical argument (proof).
4. Apply higher-order problem solving and/or modeling strategies.

F. METHODS FOR EVALUATION OF STUDENT LEARNING:
1. Essay exams and quizzes
2. Objective tests and quizzes
3. Homework problem sets

G. RCTC CORE OUTCOME(S) ADDRESSED:
- Communication
- Critical Thinking
- Global Awareness/Diversity
- Civic Responsibility
- Personal/Professional Accountability
- Aesthetic Response

H. SPECIAL INFORMATION (if any): None