PHIL C220: INTRODUCTION TO SYMBOLIC LOGIC

Item	Value
Curriculum Committee Approval Date	10/25/2019
Top Code	150900 - Philosophy
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)
Local General Education (GE)	• CL Option 1 Arts and Humanities (CC2)
California State University General Education Breadth (CSU GE-Breadth)	• CSU A3 Critical Thinking (A3)

Course Description

This course introduces the principles of valid deductive reasoning through a study of formal techniques of sentential logic and predicate logic. Students will learn how to translate arguments from a natural language (in this case English) to symbolic languages. These abstracted arguments can then be manipulated to derive other truth-preserved sentences. Students will also cover related logic and semantic concepts such as validity, soundness, and entailment. ADVISORY: A course taught at the level of Preparation for College Composition or appropriate English placement; This course will involve translation of English sentences into predicate logic; A reasonably firm grasp of the source language, therefore, is necessary in order to excel. Transfer Credit: CSU; UC. C-ID: PHIL 210.**C-ID:** PHIL 210.

Course Level Student Learning Outcome(s)

1. Translate natural language sentences into the symbolic language of truth functional logic and first order (predicate) logic.
2. Evaluate the logical properties of arguments using truth tables and natural deduction.
3. Test formal logic sentences and arguments in order to properly identify them using the essential logic and semantic concepts of validity, entailment, and consistency.

Course Objectives

• 1. Symbolization, truth tables, syntax, semantics and natural deduction method in sentential logic
• 2. The concept of and criteria for validity.
• 3. Symbolization, syntax, semantics and natural deduction method in predicate logic.

Lecture Content

Logical concepts such as validity, soundness, entailment, necessity, contingency, contradiction, identity, and scope. Truth value as part of truth functional and first order logic Translation from a natural language to truth function language (TFL) Translation from natural language into first order/predicate logic (FOL) Creation and use of truth tables including: Logical connectives The uses of full vs. partial truth tables First Order/Predicate logic, also known as predicate calculus. Including: Names Variables Predicates: Single and many-placed predicates Connectives Quantifiers Identity Rules of Inference Natural deduction Rules of inferences Interpretations Domains Derived rules. Derived rules can vary by the predicate logic system, but will probably include most of the following: Disjunctive syllogism Hypothetical syllogism Double negation elimination Reiteration Conversion of quantifiers De Morgan rules Explosion Proofs Sub-proofs

Method(s) of Instruction

• Lecture (02)
• DE Live Online Lecture (02S)
• DE Online Lecture (02X)

Instructional Techniques

Instructor pedagogical techniques may vary, but the course will contain lecture, readings, and require substantial practice work by students. Students will be required to solve practice problems and share their solutions with one another. Instructors will give substantial feedback on practice work, which will include explanations and solutions. Written answers on tests and quizzes which lose substantial points should, more often than not, contain an explanation of where the student went wrong."Lecture" as used here is taken to include "standard" in-person lectures, written, or video lectures.   Lectures may contain links to external videos or other material. Instructors are encouraged to use a free OER text such as "forallx" by P.D. Magnus. Several versions are available, including the Cambridge and Calgary remixes.

Reading Assignments

Students will read from the course textbook. Instructor may assign secondary readings and/or provide video links.

Writing Assignments

Written assignments will require the construction of truth tables, interpretations, and natural deduction proofs. Because this is a formal logic course, there is no required essay.

Out-of-class Assignments

Students will be required to do the course readings and practice questions.

Demonstration of Critical Thinking

Students will be required to create truth tables, translations, and proofs using natural deduction on the relevant exams, quizzes, and practice questions.The encouraged course structure is: Three exams Three quizzes Practice questions

Required Writing, Problem Solving, Skills Demonstration

Students will be required to generate translations from natural language into symbolic language, create truth tables, and construct proofs using natural deduction.

Eligible Disciplines

Philosophy: Masters degree in philosophy OR bachelors degree in philosophy AND masters degree in humanities or religious studies, OR the equivalent. Masters degree required.

Textbooks Resources

1. Required Magnus, P.D. forallX: Cambridge, Cambridge ed ed. OER text available here (http://www.homepages.ucl.ac.uk/~uctytbu/ forallxcam.pdf), 2018

Other Resources

1. Coastline Library 2. forallx: Cambridge OER