

introduction to two principal systems, sentential/propositional logic and predicate logic. Emphasis will be given to both proof construction and translation from natural language to symbolic form. Time permitting, attention will be given to “meta-logic” and the key properties of formal systems, namely consistency and completeness.

III. Statement of Course Need

This course examines how information is captured in sentences and how it is possible for one statement to be a consequence of another. In order to understand connection and process in any area, but particularly philosophy, science and mathematics, the course provides a working understanding of the structure of deductive reasoning.

A. Transferability

1. This course generally transfers as a Humanities general education course.
2. This course generally transfers as a Philosophy program requirement.
3. This course generally transfers as a Philosophy program elective.

IV. Place of Course in College Curriculum

- A. Free Elective
- B. This course serves as a General Education course in Humanities
- C. This course meets a program elective for Game Development and for Information Systems & Technology AAS

V. Outline of Course Content

- A. the nature of reasoning
 1. deduction and induction
 2. truth, validity and soundness
 3. terms used in formal logic
 4. truth tables to determine:
 - a. tautology, contradiction, contingent statements
 - b. equivalence and consistency
 - c. validity/invalidity
- B. propositional/sentential logic
 1. symbolization techniques
 2. 18 valid rules of inference and equivalence
 3. technique of conditional proof
 4. technique of indirect proof
 5. proof construction for establishing validity
 6. terms used in propositional/sentential logic
- C. predicate logic
 1. same as B. 1-5 above

2. 4 quantifier rules
3. QN rule
4. symbolizations involving relational properties
5. terms used in predicate logic
6. formulation, symbolization and proof of an original natural language argument

VI. General Education and Course Learning Outcomes

A. General Education Learning Outcomes:

At the completion of the course, students will be able to:

1. explain the underlying deductive reasoning used in a wide range of human activity (GE 3, 6)
2. develop skills involved in formal proof construction (GE 1, 2, 3, 4, 6)
3. recognize the importance of the rigor of formal systems (2, 4, 6)
4. demonstrate heightened attention to detail and organization in the discipline of formal logic and academic activity in general (GE 1, 2, 3, 6)

B. Course Learning Outcomes:

At the completion of the course, students will be able to:

1. construct formal proofs in sentential/propositional logic involving all 18 rules of inference
2. construct formal proofs in predicate logic involving the rules of inference as well as quantifier rules
3. translate natural language sentences into each system
4. demonstrate mastery in the use of relational predication with multiple quantifiers
5. demonstrate a working understanding of the following concepts: deduction, induction, validity, soundness, consistency, equivalence, tautology, contradiction and contingency

C. Assessment Instruments

- A. tests
- B. final exam

VII. Grade Determinants

- A. participation/citizenship
- B. homework
- C. quizzes

- D. tests
- E. final exam

Formats, modes, and methods for teaching and learning that may be used in the course:

- A. demonstration of proof on whiteboard and document camera (by both instructor and students)
- B. explanation of techniques of proof and translation using text problems (by both instructor and students)
- C. discussion of strategies involved in these problems (by both instructor and students)
- D. illustration of arguments via examples from natural language (historical, literary, pop culture) using print copy and web sources (by both instructor and students)

VIII. Texts and Materials

- A. textbook: Hausman, Alan, *Logic and Philosophy*, 12th edition (Cengage Learning, 2013), ISBN #9781133050001
- B. web sources

(Please Note: The course outline is intended only as a guide to course content and resources. Do not purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.)

IX. Resources

- F. whiteboard
- G. document camera