HON 359                                                  Spring 2014
Fundamentals of Deductive and Inductive Logic

Catalog Description:
Prerequisite: acceptance to the University Honors Program, or consent of instructor. A study of methods to distinguish good and bad reasoning. Students will learn how to “translate” natural language arguments into formal languages of sentential and predicate logic, to construct proofs in the language, and to understand the semantics (or model theory) for the language. (Offered as needed.) 3 credits.

Course Learning Outcomes:
a. GE 7QI Learning Outcome: To apply and analyze quantitative techniques.
b. Philosophy Program Critical Reasoning Outcome: To develop students’ ability to construct and analyze complex arguments, and distinguish good reasoning from bad.
c. To understand how to analyze and “translate” natural language arguments into symbolic languages and evaluate them.
d. To understand deductive logical systems of predicate and propositional logic.
e. To understand inductive logic, including probability theory.
f. To appreciate some historical and philosophical contributions to the development of logic and challenges to its use.

Honors Program Learning Outcomes:
Upon completing a course in the University Honors Program students will have:
a. Obtained a starting point for integrative exploration of the development of cultures and intellectual achievements through a variety of disciplinary and interdisciplinary perspectives;
b. Sharpened their ability to critically analyze and synthesize a broad range of knowledge through the study of primary texts and through engagement in active learning with fellow students, faculty, and texts (broadly understood);
c. Understood how to apply more integrative and interdisciplinary forms of understanding in the advancement of knowledge and in addressing complex challenges shaping the world;
d. Developed effective communication skills, specifically in the areas of written and oral exposition and analysis.
Content:
I. Propositional Logic
   • Translating English sentences into propositional logic
   • Evaluating deductive validity using truth-tables
   • Proving Deductive Validity
   • Philosophical and historical issues: Aristotle’s arguments for law of non-contradiction, Aristotle's “Sea Battle” and disputes over the Law of Excluded Middle, Semantic Paradoxes (e.g., Sorites and the Liar)

II. Predicate Logic
   • Translating English arguments into Predicate Logic
   • Semantics: evaluating deductive validity by constructing countermodels
   • Proving deductive validity
   • Philosophical and historical issues: Russell’s Paradox; Lewis Carroll’s Paradox

III. Inductive Logic
   • The Axioms of the Probability Calculus
   • Bayes’ Theorem
   • Fallacies of Inductive Reasoning
   • Philosophical and Historical Issues: the debate over interpretations of probability theory; Hume’s problem of induction, paradoxes of decision theory

Current Required Texts:

Articles available on Blackboard

Instructional strategies:
The course will include lectures, oral presentations by students, critical thinking exercises, and information technology. The material is predominantly mathematical in nature, and thus there are few regular writing assignments. One 4-6 page journal entry on philosophical issues arising from logic will be required.

Methods of Evaluation:
Homework/Journals: 10%
Attendance/Oral Presentations 5%
Paper Assignment 10%
Exam 1 15%
Exam 2 15%
Exam 3 15%
Final Exam (Comprehensive): 30%

Chapman University Academic Integrity Policy:
The course syllabus should include the following statement:
Chapman University is a community of scholars which emphasizes the mutual responsibility of all members to seek knowledge honestly and in good faith. Students are responsible for doing their own work, and academic dishonesty of any kind will not be tolerated anywhere in the university.

**Students with Disabilities Policy:**
The course syllabus should include the following statement:
In compliance with ADA guidelines, students who have any condition, either permanent or temporary, that might affect their ability to perform in this class are encouraged to inform the instructor at the beginning of the term. The University, through the Center for Academic Success, will work with the appropriate faculty member who is asked to provide the accommodations for a student in determining what accommodations are suitable based on the documentation and the individual student needs. The granting of any accommodation will not be retroactive and cannot jeopardize the academic standards or integrity of the course.

**Prepared by:** Michael Pace

**Last revised:** March, 2013