Lingnan University
Department of Philosophy

Course Title	:	Deductive Logic
Course Code	:	PHI3101
Recommended Study Year	:	2nd Year
No. of Credits/Term	:	3
Mode of Tuition	:	Lecture and tutorial
Class Contact Hours	:	2 hours Lecture/week; 1 hour Tutorial/week
Category in Major Programme	:	Required
Prerequisite(s)	:	N/A
Co-requisite(s)	:	N/A
Exclusion(s)	:	N/A
Exemption Requirement(s)	:	N/A

Brief Course Description

This course provides a rigorous introduction to modern symbolic logic, suitable for beginning students of philosophy who have taken a course on logic and critical thinking. Students are expected to master the key elements of propositional logic and predicate logic, including (1) syntax of formal languages, (2) model-theoretic semantics, (3) expression of sentence and argument forms in a formal language, (4) semantic and syntactic methods to determine whether an argument is deductively valid or whether a sentence expresses a logical truth, and (5) basic meta-theoretical concepts and results.

Aims

1. Provide students with substantial knowledge of modern symbolic logic.
2. Teach students rigorous ways to analyze and evaluate arguments.
3. Improve student's ability to engage in abstract, symbolic, and mathematical reasoning.

Learning Outcomes

Upon completion of the course, students are expected to

1. grasp the key concepts and methods of modern symbolic logic;
2. master some formal techniques to distinguish valid from invalid arguments;
3. use the formal techniques to analyze arguments in everyday life and in philosophy;
4. be adept at constructing cogent arguments.

Indicative Content

1. Introduction
   a. A brief history of pre-modern logic
   b. The genesis of modern logic
   c. Review: deductive validity and logical truth
2. Propositional logic
   a. A formal language for propositional logic
   b. Structural induction
   c. Formal semantics: truth function and truth assignment
   d. Normal forms and truth-tree
   e. Formal deductive systems (prime example: the system of natural deduction)
3. Predicate logic
   a. A formal language for predicate logic
   b. Translation into the formal language

c. Formal semantics: models and counter-models
d. Prenex normal form
e. Natural deduction

4. Meta-theory
   a. Soundness
   b. Completeness
   c. Compactness
   d. Decidability
   e. Definability

Teaching Method

The course will be taught in lecture/tutorial format. Lecturing on abstract concepts and general techniques will be supplemented with as many concrete examples as possible. Tutorials will be used to discuss exercise questions and logical puzzles.

Measurement of Learning Outcomes

Students' progress towards the learning outcomes will be measured by

1. homework which will measure their grasp of the concepts and techniques in each week's material (LO1, LO2, LO3);
2. a mid-term exam and a final exam which will test, in addition to their knowledge of the course material, their abilities to apply the learned techniques to analyze real arguments (LO1, LO2, LO3);
3. in-class exercises to gauge their skills of constructing arguments (LO4).

Assessment

In-class exercises	20%
Homework	15%
Midterm exam	25%
Final exam	40%

Required Readings

Paul Teller, *The Modern Formal Logic Primer*, Prentice Hall, 1989.
(Online version: http://tellerprimer.ucdavis.edu/.)

Supplementary Readings

Barwise J. and Etchemendy J., *Language, Proof, and Logic*, CSLI Publications, 2002.
Guttenplan, S. *The Languages of Logic*. 2nd ed. Oxford: Blackwell, 1997.
Lemmon, E. J. *Beginning Logic*. 2nd ed. London: Chapman & Hall, 1987.
Newton-Smith, W. H. *Logic: An Introductory Course*. London: Routledge & Kegan Paul, 1985.
Van Dalen, D., *Logic and Structure*, 4th ed., Springer Verlag, 2004.
Salmon, W. C. *Logic*. 3rd ed. Englewood Cliffs, N.J.: Prentice-Hall, 1984.
陳波，《邏輯學》，台北市：五南圖書出版股份有限公司，2004.

<u>Important Notes</u>

(1) Students are expected to spend a total of 9 hours (i.e. 3 hours of class contact and 6 hours of personal study) per week to achieve the course learning outcomes.
(2) Students shall be aware of the University regulations about dishonest practice in course work, tests and examinations, and the possible consequences as stipulated in the

Regulations Governing University Examinations. In particular, plagiarism, being a kind of dishonest practice, is "the presentation of another person's work without proper acknowledgement of the source, including exact phrases, or summarised ideas, or even footnotes/citations, whether protected by copyright or not, as the student's own work". Students are required to strictly follow university regulations governing academic integrity and honesty.

(3) Students are required to submit writing assignment(s) using Turnitin.

(4) To enhance students' understanding of plagiarism, a mini-course "Online Tutorial on Plagiarism Awareness" is available on https://pla.ln.edu.hk/