Lingnan University
Department of Philosophy

Course Title : Modal Logic
Course Code : PHI4101
Recommended Study Year : 4th 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 : Programme Elective - Philosophy of Natural and Human Sciences Profile
Prerequisite(s) : PHI3101 Deductive Logic
Co-requisite(s) : N/A
Exclusion(s) : N/A
Exemption Requirement(s) : N/A

Brief Course Description

This course introduces students to modal logic, a branch of modern logic that studies the logic of necessity and possibility and has special relevance to philosophy. The first part of the course covers modal propositional logic, with an emphasis on the basic ideas and techniques of possible worlds semantics, and on the relationship between various formal systems studied in the literature. The second part of the course deals with quantification in modal logic, in which some related philosophical issues, having mainly to do with identity, *de re* modality, and descriptions, will be highlighted and discussed. Time permitting, the course will also include a brief survey of well-known philosophical logics such as conditional logic, epistemic logic, and tense logic.

Aims

1. Reinforce students' understanding and appreciation of formal logic.
2. Expose students to the rich field of modal logic (and philosophical logic in general).
3. Improve students' sensitivity to different kinds of necessity, and their ability to analyze and criticize arguments involving necessity and possibility.
4. Familiarize students with useful formal methods and important philosophical problems related to modal logic.

Learning Outcomes

1. Students should be familiar with several well-known formal systems in modal propositional logic, and understand how they are related to one another.
2. Students should grasp the central ideas of possible-worlds semantics and the use of semantic diagrams and related methods to analyze modal arguments and construct counter-models.
3. Students should understand the basic setup of modal predicate logic and be able to elaborate some philosophical issues with the setup.

Indicative Content

1. Introduction and review of non-modal logic
2. Modal propositional logic
    a. The formal language
    b. The possible-worlds semantics and the notion of validity
    c. The formal system K
    d. Extensions of K: T, D, S4 and S5
    e. Semantic diagrams
    f. Normal forms

3. Modal predicate logic
   a.   The formal language
   b.   The possible-worlds semantics and the notion of validity
   c.   *De re* vs. *De dicto*
   d.   The Barcan formulas and the domain problem
   e.   Identity and descriptions
   f.   Rigid designators
4. Basics of philosophical logics
   a.   Deontic logic
   b.   Epistemic logic
   c.   Tense logic
   d.   Conditional logic

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. In tutorials both technical and philosophical issues will be discussed. In the second half of the course students are expected to do presentations on selected philosophical problems with modal logic.

Measurement of Learning Outcomes
Students' progress towards the learning outcomes will be measured by
1. In-class quizzes (LO1, LO2, LO3)
2. Homework (LO1, LO2, LO3)
3. mid-term and final exams (LO1, LO2, LO3)

Assessment
In-class quizzes   15%
Homework   15%
Midterm exam   30%
Final exam   40%

Required Reading
Selected chapters from
G.E. Hughes, and M.J. Cresswell, *A New Introduction to Modal Logic*, London: Routledge, 1996.
周北海,《模態邏輯導論》, 北京大學出版社,1996.

Supplementary Readings
Brian F. Chellas, Modal Logic: An Introduction, Cambridge: Cambridge University Press, 1980.
James W. Garson, Modal Logic for Philosophers, Cambridge: Cambridge University Press, 2006.
張清宇,郭世銘,李小五,《哲學邏輯研究》,社會科學文獻出版社,2007.
康宏逵 編譯,《可能世界的邏輯》,上海譯文,1993.

Important Notes

(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/