

## The Hong Kong Polytechnic University

### Subject Description Form

Please read the notes at the end of the table carefully before completing the form.

<b>Subject Code</b>	CBS1C31
<b>Subject Title</b>	Logic and Reasoning
<b>Credit Value</b>	3
<b>Level</b>	1
<b>Pre-requisite / Co-requisite/ Exclusion</b>	Exclusion GEC1C25 Logic and Reasoning
<b>Objectives</b>	<p>The primary focus of this subject is</p> <p><input type="checkbox"/> Art</p> <p><input type="checkbox"/> History</p> <p><input checked="" type="checkbox"/> Philosophy and Religion</p> <p>In this subject, the following cluster specific attributes will be emphasized:</p> <p><input checked="" type="checkbox"/> Develop a facility for systematic thinking;</p> <p><input type="checkbox"/> Cultivate moral reasoning;</p> <p><input type="checkbox"/> Cultivate aesthetic judgment;</p> <p><input type="checkbox"/> Cultivate a cultural sense; and</p> <p><input type="checkbox"/> Become more globally aware.</p> <p>The objective of this subject is to enhance students' ability to think clearly and logically, and to evaluate claims and arguments critically. Students will learn how to ask and answer the following questions: What is the issue? What is the main conclusion? What are the reasons given to support the conclusion? Are the arguments good? Is the view expressed adequately clear? What are the assumptions? Is there any inconsistency? Is there any logical fallacy in the reasoning? Is the information provided reliable? What reasonable conclusions are possible? Have we ourselves been biased in making our own judgments? Have we been tricked by methods of irrational persuasion?</p>
<b>Intended Learning Outcomes</b>  (Note 1)	<p>Upon completion of the subject, students will be able to:</p> <p>(a) master the basic skills of logical reasoning and critical thinking;</p> <p>(b) evaluate whether an argument is sound or unsound (and explain why it is sound/unsound) with the help of logical analysis;</p> <p>(c) detect unclear or misleading uses of language and logical fallacies in arguments;</p> <p>(d) be aware of and avoid cognitive biases and traps of irrational persuasions;</p> <p>(e) master the basic skills of judging the reliability of information;</p> <p>(f) construct good and logical arguments of their own.</p>

	<p>Please explain how the stated learning outcomes relate to the following three essential features of GUR subjects: Literacy, Higher order thinking, and Life-long learning</p> <p><u>Literacy:</u> The ability to critically analyze arguments is indispensable for developing students' ability of comprehension. Moreover, in some of the tutorial exercises, students will be asked to read and analyze sustained arguments in relatively long articles. In the tutorial discussions, students will be asked to present their analysis of both short and sustained arguments in a clear and systematic way. These exercises in reading, analysis and rational discussion are conducive to the enhancement of their literacy level.</p> <p><u>Higher order thinking:</u> The subject will help students acquire the abilities of logical reasoning, argument analysis, detection of fallacies and other pitfalls in arguments, as well as sifting reliable from unreliable information. All of these are essential constituents of higher order thinking, especially critical thinking.</p> <p><u>Life-long learning:</u> All the basic skills of logical reasoning and argument analysis are indispensable for the development of an effective problem-solving ability and proactively inquisitive mind, which is essential for any academic pursuit and life-long learning. In addition, the ability to sift reliable from unreliable information is essential for life-long self-learning in this age of information explosion.</p>
<p><b>Subject Synopsis/ Indicative Syllabus</b></p> <p><i>(Note 2)</i></p>	<ol style="list-style-type: none"> <li>1. Basic logical concepts: <ol style="list-style-type: none"> <li>a. Sentences, statements, propositions, arguments.</li> <li>b. Truth, validity and soundness.</li> <li>c. Logical relations between statements: <ol style="list-style-type: none"> <li>(i) Contradiction</li> <li>(ii) Contrariety</li> <li>(iii) Sub-contrariety</li> <li>(iv) Implication</li> <li>(v) Equivalence</li> <li>(vi) Indifference</li> </ol> </li> </ol> </li> <li>2. Analysis and assessment of arguments: <ol style="list-style-type: none"> <li>a. Distinction between arguments and non-arguments</li> <li>b. Deductive and Inductive arguments</li> <li>c. Identifying the issues</li> <li>d. Identifying the conclusions.</li> <li>e. Identifying the reasons supporting the conclusions.</li> <li>f. A diagrammatic method to analyze an argument.</li> <li>g. Assessing whether an argument is good or bad – the ARG conditions.</li> </ol> </li> <li>3. Deductive reasoning: <ol style="list-style-type: none"> <li>a. Propositional logic: <ol style="list-style-type: none"> <li>(i) Atomic statements and compound statements.</li> <li>(ii) Logical connectives.</li> <li>(iii) Symbolization of statements and arguments in natural language.</li> <li>(iv) The Truth-table method, the Short method and the Tree method for testing the validity of an argument in propositional logic.</li> </ol> </li> <li>b. Syllogistic logic: <ol style="list-style-type: none"> <li>(i) Types of categorical statements.</li> <li>(ii) The structure of categorical syllogisms.</li> </ol> </li> </ol> </li> </ol>

	<p>(iii) The Venn diagram method for testing the validity of a categorical syllogism.</p> <p>4. Inductive and scientific reasoning:</p> <ol style="list-style-type: none"> <li>a. Inductive generalization.</li> <li>b. Inference by analogy.</li> <li>c. Causal inference.</li> <li>d. Explanation and hypothesis.</li> <li>e. The distinction between science and pseudo-science.</li> </ol> <p>5. Informal fallacies:</p> <ol style="list-style-type: none"> <li>a. Fallacies of irrelevance.</li> <li>b. Fallacies of defective grounds.</li> <li>c. Fallacies of inappropriate presuppositions.</li> <li>d. Fallacies related to the abuse of language.</li> </ol> <p>6. Pitfalls in uses of language:</p> <ol style="list-style-type: none"> <li>a. Meaning incomplete.</li> <li>b. Ambiguity.</li> <li>c. Vagueness.</li> <li>d. Coloured expression.</li> <li>e. Idiosyncratic meaning.</li> <li>f. Reification.</li> </ol> <p>7. Reliability of information:</p> <ol style="list-style-type: none"> <li>a. Sources of information.</li> <li>b. Problem of vested interest.</li> <li>c. Collaborating evidence.</li> <li>d. Logical consistency and consistency with established knowledge.</li> </ol> <p>8. Cognitive biases:</p> <ol style="list-style-type: none"> <li>a. Heuristics and Cognitive biases.</li> <li>b. Availability of information.</li> <li>c. Representativeness and stereotyping.</li> <li>d. Hind-sight bias.</li> <li>e. Anchoring and adjustment effect.</li> <li>f. Framing effect.</li> </ol> <p>9. Traps of irrational persuasions:</p> <ol style="list-style-type: none"> <li>a. The illusion of invulnerability.</li> <li>b. Persuasion by likeability and apparent kindness.</li> <li>c. Persuasion by inappropriate contrasts.</li> <li>d. Gradual escalation of the commitments.</li> <li>e. The art of resistance.</li> </ol>
<p><b>Teaching/Learning Methodology</b></p> <p><i>(Note 3)</i></p>	<p>The basic concepts and principles of logical and critical thinking will be explained and discussed in the lectures. Emphasis will be put on practical applications of these concepts and principles in everyday life, drawing updated examples from newspapers, magazines and everyday discourses and arguments, sometimes with video clips taken from television and social media. Students should prepare for lectures by going through assigned readings. They will fill in forms and exercise sheets during lectures which will be submitted and discussed in succeeding lectures.</p> <p>Tutorials will be devoted to discussion of exercises which mainly consist of arguments and discourses drawn from the above-mentioned sources.</p>

	Besides, students will be asked to write individual term papers in which they will critically evaluate an issue, examining fallacies and/or misuses of language found in arguments surrounding the issue.							
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>  <i>(Note 4)</i>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
			a	b	c	d	e	f
	1. Tutorial Exercises	10%	√	√	√	√	√	√
	2. In-class Q&A & participation	10%	√	√	√	√		
	3. Individual term paper	20%	√	√	√	√	√	√
	4. Mid-term quiz	20%	√	√	√	√	√	√
	5. Final quiz	40%	√	√	√	√	√	√
	Total	100 %						
(Different types of questions will be set in the exercises so that, taken as a whole, all intended learning outcomes would be assessed. The same applies to the mid-term and final quizzes. As for individual term paper, it will be marked according to the whether the expected learning outcomes have been shown to be achieved.)								
<b>Student Study Effort Expected</b>	Class contact:							
	▪ Lectures							26 Hrs.
	▪ Tutorials							13 Hrs.
	Other student study effort:							
	▪ Completing exercises, reading, collection of everyday examples of fallacies and/or misuses of language from newspapers, TV, internet discourses, etc., writing & self-study							62 Hrs.
▪ Total student study effort							101 Hrs.	
<b>Reading List and References</b>	<p><b>Please indicate clearly in this section if the subject should have an “R” designation. If so, subject proposers should also indicate clearly which items on the Reading List constitute the expected reading requirement and include the page numbers.</b></p> <p><b>Supplementary Reading:</b></p> <p>Selected from Cavender, Nancy &amp; Howard Kahane. (2014). <i>Logic and Contemporary Rhetoric: The Use of Reason in Everyday Life</i> (12th Edition). USA: Wadsworth, Cengage learning.</p> <p><b>Reference List:</b></p> <p>Browne, M. Neil &amp; Stuart Keeley. (2014) <i>Asking the Right Questions</i> (11<sup>th</sup> Edition). USA: Pearson Education.</p>							

	<p>Copi, I.M. &amp; C. Cohen. (2008) <i>Introduction to Logic</i> (13<sup>th</sup> Edition). Upper Saddle River, NJ: Prentice-Hall.</p> <p>Fisher, Alec. (2004). <i>The Logic of Real Arguments</i> (2nd Edition). Cambridge University Press.</p> <p>Govier, Trudy. (2005) <i>A Practical Study of Argument</i>. Belmont, Calif.: Wadsworth/Thomson Learning.</p> <p>Hurley, Patrick J. (2003) <i>A Concise Introduction to Logic</i> (8<sup>th</sup> Edition). Belmont, CA: Wadsworth.</p> <p>Levine, Robert. (2003) <i>The Power of Persuasion</i>. Hoboken, NJ: John Wiley &amp; Sons.</p> <p>Nisbett, Richard E. (2005) <i>The Geography of Thought: How Asians and Westerners think differently--and Why</i>. London: Nicholas Brealey.</p> <p>Tidman, Paul &amp; Howard Kahane. (2003) <i>Logic and Philosophy: A Modern Introduction</i> (9<sup>th</sup> Edition). Belmont, CA: Wadsworth.</p> <p>Yu Kam-por. (2007) <i>Logic: The First Art</i>. Singapore: McGraw-Hill.</p> <p>Yu Kam-por. (2016). <i>Logic as a Foundational Science</i>. Singapore: McGraw-Hill.</p> <p>方子華 等著 (2005), 《批判思考》 (<i>Critical Thinking</i>), Singapore: McGraw-Hill。</p> <p>余錦波 (2010), 《邏輯學: 自由人的第一技藝》 (<i>Logic: the First Art</i>), 北京: 人民大學出版社。</p>
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Note 1: Intended Learning Outcomes

Intended learning outcomes should state what students should be able to do or attain upon completion of the subject. Subject outcomes are expected to contribute to the attainment of the overall programme outcomes.

Note 2: Subject Synopsis/ Indicative Syllabus

The syllabus should adequately address the intended learning outcomes. At the same time over-crowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology

This section should include a brief description of the teaching and learning methods to be employed to facilitate learning, and a justification of how the methods are aligned with the intended learning outcomes of the subject.

Note 4: Assessment Method

This section should include the assessment method(s) to be used and its relative weighting, and indicate which of the subject intended learning outcomes that each method purports to assess. It should also provide a brief explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes.

<b>Subject Offering Department</b>	CBS
<b>Cluster Area</b>	<input type="checkbox"/> Human Nature, Relations and Development <input type="checkbox"/> Community, Organization and Globalisation <input checked="" type="checkbox"/> History, Cultures and World Views <input type="checkbox"/> Science, Technology and Environment
<b>Medium of Instruction</b>	English
<b>Requirements intended to fulfil</b>	<input type="checkbox"/> China-Study Requirement (CSR) <input type="checkbox"/> English Reading (ER) and English Writing (EW) <input type="checkbox"/> Chinese Reading (CR) and Chinese Writing (CW)