

Subject Description Form

Subject Code	ABCT1D14
Subject Title	Chemistry and Sustainable Development
Credit Value	3
Level	1
Pre-requisite / Co-requisite/ Exclusion	None
Objectives	This subject offers a chemistry perspective to understand current environmental issues. Key chemical principles involved will be introduced. The upsides and downsides of technology and the impact to our lifestyle will be evaluated critically.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ul style="list-style-type: none"> (a) Read with greater comprehension on issues related to Chemistry and Environmental issues (b) Identify the achievements of Chemistry in modern lifestyle (c) Identify impacts of human activities on the environment (d) Develop rational judgment on responsible, safe use of chemistry, and hence, a responsible life style (e) Study and work more effectively in small teams (f) Communicate scientific argument effectively <p><u>Literacy</u>: Reading materials and news will be assigned from the textbook before lectures for students to read as a preparation of the lecture topics. The students are also required to read through one of the textbooks listed in this document. A few questions will be asked for each reading materials to help the students to think about the context before they read the materials as a preparation. [Outcomes (a), (b), (c) and (e)]. Students are also required to write a long essay with more than 1,500 words on selected topics related to course contents.</p> <p><u>Higher order thinking</u>: This subject is a broad introduction to science as a way of thinking and knowing. Chemistry or the use of new chemicals and materials are the basis of human civilization and technological innovations. This development and the impacts of the use of chemicals serve as a good example on the importance of scientific methods in a study to provide evidence for sound conclusions. Tutorials will be used to guide them to complete their essays. During the preparation of the essay, based on the background materials in the textbook, students are required to prepare an outline of issues to be addressed in their essays. Then, they need to perform literature survey to look for evidences and data supporting their arguments. A student completing this subject ought to be empowered by the way of thinking rationally and make judgment based on evidence; and be able to apply it throughout life. [Outcomes (b), (c), (d) and (e)]</p> <p><u>Life-long learning</u>: Making rational judgment will be an emphasis of this course and students are expect to keep an journals with entries stimulated by questions after the lecture. Some of the questions will be directed to reflection on whether systematic</p>

	<p>observations, scientific reasoning and rational judgment are being applied in their own decision making processes in scenarios related to their academic study, career development and personal issues. Students are required to organize into groups to prepare a presentation on selected topics with individual report. Literature survey techniques will be introduced to help students to identify information and access the credibility of the text based on whether the evidence are supported by experimental data. [Outcomes (d) and (f)]</p>
<p>Subject Synopsis/ Indicative Syllabus</p>	<p><u>What the weather forecast never tells you: Acid Rain and Global Warming</u></p> <ul style="list-style-type: none"> • Combustion and the major sources of energy • Global Warming and green house gases • Kyoto protocol in the political arena • Acid rain and environmental concerns <p><u>Burn! Let it burn...</u></p> <ul style="list-style-type: none"> • Renewable energy sources • Solar Energy • Biofuels and other alternatives <p><u>Water – Scarcity of the abundant</u></p> <ul style="list-style-type: none"> • Water and our health • What do we mean by clean water? Ions in water and the concept of pH, conductivities • Water Pollutions due to human activities: sewage and contamination from industries and agricultures • Water cycle – water purification in nature • Water treatment in Hong Kong and common water purification technology <p><u>Look! There is a hole in the sky</u></p> <ul style="list-style-type: none"> • Structure of the earth atmosphere • Effects on ozone layer depletion and ozone hole • Problems arise from the use of halogenated hydrocarbons (a type of refrigerant). • Ozone-friendly materials
<p>Teaching/Learning Methodology</p>	<p><u>Lectures</u>: This is the major teaching method used in this subject. A few questions will be asked for each reading materials to help the students to think about the context before reading the materials as a preparation.</p> <p><u>Tutorials</u>: Tutorials are designed to guide the students to complete their essays with the support of evidences and data. Students working on similar topics formed groups to discuss and comment on the outline. Tutorials will allow students to more directly engage the material with ready access to the teacher. Scientific publications database will be introduced for literature survey. The students will also learn to cite other information properly. In later stage, the students will also prepare a poster with oral presentation based on their essays.</p> <p><u>Individual Study</u>: Students will be expected to spend two to three hours on reading outside the classroom. Questions will be given to prepare the students on the issues discussed. Since this may be an area of weakness for Hong Kong students, clear guidelines and checks will be put in place to ensure that it occurs. Exercises with questions on the textbook materials will be used to keep track on the students' participation in reading assignment. This is also part of their continuous assessment.</p> <p>The emphasis in this subject on reading comprehension is designed to give the student an essential experience of empowerment in learning to study effectively.</p>

Assessment Method	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
			a	b	c	d	e	f
	1. Quiz	45%	√	√	√	√	-	-
2. Tutorial participation + lecture attendance	10%	-	√	√	√	√	√	
3. Presentation	15%	√	√	√	√	√	√	
4. Essay	30%	√	√	√	√	-	√	
Total	100 %							
	<p>Quiz is designed to test the comprehension and understanding of the subject contents. The presentation and essay require literature survey skills and students are required to support their points with evidences obtained from scientific literature. They have to judge whether the evidences are convincing to support their conclusions. Questions will be raised after the oral presentation to examine their understanding and rational thinking. The presentation is a group effort which they have to cooperate in literature surveys and the final presentation. At the end a written report will be submitted by each individual student on a sub-topics of their presentation.</p>							
Student Study Effort Required	Class contact:							
	▪ Lecture						26 Hrs.	
	▪ Tutorial						13 Hrs.	
	Other student study effort:							
	▪ Preparation for presentation						16 Hrs.	
	▪ Self-study						62 Hrs.	
	Total student study effort							117 Hrs.
Reading List and Reference	<ol style="list-style-type: none"> 1. Frammer, G. Thomas and Cook, John "Climate Change Science: A Modern Synthesis", Springer, 2013. (eBook available) 2. Trevor M. Letcher, "Climate Change: Observed Impacts on Planet Earth", Elsevier, 2009. (eBook available) 3. Craven, G., "What's the Worst That Could Happen?: A Rational Response to the Climate Change Debate", Perigee Trade, 2009. 4. Zero carbon footprint (In Cantonese) / Hong Kong: RTHK, 2007 (24001 DVD; 1 videodisc (22 minutes). 5. Sustainable Living Guide, http://www.planetfriendly.net/living.html (accessed 2010) 6. Water Resources, http://www.wsd.gov.hk/en/water_resources/raw_water_sources/index.html, Water Supplies Department, HKSAR 7. What's in Your Drinking Water? https://www.nrdc.org/stories/whats-your-drinking-water, NRDC, USA 							