

## **Subject Description Form**

<b>Subject Code</b>	ME1D01
<b>Subject Title</b>	Engineering and Environmental Management
<b>Credit Value</b>	3
<b>Level</b>	1
<b>GUR Requirements Intended to Fulfill</b>	<p>This subject intends to fulfill the following requirement(s):</p> <p> <input type="checkbox"/> <b>Healthy Lifestyle</b>  <input type="checkbox"/> <b>Freshman Seminar</b>  <input type="checkbox"/> <b>Languages and Communication Requirement (LCR)</b>  <input type="checkbox"/> <b>Leadership and Intra-Personal Development</b>  <input type="checkbox"/> <b>Service-Learning</b>  <input checked="" type="checkbox"/> <b>Cluster-Area Requirement (CAR)</b>              <input type="checkbox"/> Human Nature, Relations and Development [CAR(A)]              <input checked="" type="checkbox"/> Science, Technology and Environment [CAR(D)]              <input type="checkbox"/> Chinese History and Culture [CAR(M)]              <input type="checkbox"/> Cultures, Organisations, Societies and Globalisation [CAR(N)]  <input type="checkbox"/> <b>China-Study Requirement</b>              <input type="checkbox"/> Yes or <input type="checkbox"/> No  <input checked="" type="checkbox"/> <b>Writing and Reading Requirements</b>              <input checked="" type="checkbox"/> English or <input type="checkbox"/> Chinese       </p>
<b>Pre-requisite / Co-requisite/ Exclusion</b>	Nil
<b>Objectives</b>	<p>This subject aims to provide:</p> <ul style="list-style-type: none"> <li>• An understanding of the global environmental problems caused by human activities</li> <li>• Fundamental concepts of air, noise, water, solid waste and nuclear pollution: their nature, generation and impact on the environment</li> <li>• Current engineering technologies applied to tackle these environmental problems</li> <li>• Fundamental concept of environmental management</li> <li>• Opportunity to fulfill English Reading and English Writing requirements</li> </ul>
<b>Intended Learning Outcomes</b>	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> <li>(a) Understand the nature, origin and impact of the global environmental problems caused by human activities.</li> <li>(b) Understand the generation, characteristics and impact on the environment of air, noise, water, solid waste and nuclear pollution.</li> <li>(c) Understand the updated engineering technologies to monitor and control air, noise, water, solid waste and nuclear pollution.</li> <li>(d) Understand the fundamental concept of environmental management and its relationship with sustainable development of our community.</li> </ol>

	<p>(e) Understand the roles of different sectors of our community including government, industry and engineers in the development and implementation of environmental management policies and strategies.</p> <p>(f) Enhance English language skills in both Reading and Writing.</p>
<b>Subject Synopsis/ Indicative Syllabus</b>	<p><b>Global Environmental Problems</b> Global warming; Acid rain; Global weather changes; Depletion of natural resources; Rapid increase of illness and drop in birth rate.</p> <p><b>Air Pollution</b> Principal atmospheric and indoor air pollution: sources, characteristics and effects on human and community; Air pollution index; Technologies to monitor and control air pollution.</p> <p><b>Noise Pollution</b> Basic concepts of sound and noise; Basic concept of hearing: hearing loss; Technologies to monitor and control noise pollution.</p> <p><b>Water Pollution</b> Water quality; Sources of water pollution; Municipal and industrial waste water; Water treatment processes.</p> <p><b>Solid Waste Pollution</b> Solid waste disposal hierarchy; Sources of solid waste: municipal and industrial sources; Concept of Reduce-Reuse-Recycling; Composting; Landfill; Incineration; Transformation between solid waste and air pollution.</p> <p><b>Nuclear Pollution</b> Significance of nuclear power; Major components of and radioactive emissions from nuclear power plants; Safety systems against nuclear pollution.</p> <p><b>Environmental Management</b> Environmental impact assessment and statement; Major environmental problems of Hong Kong; Hong Kong Government strategies in pollution control: subsidies, polluter pays principle and regulations; Sustainable development and environmental protection adopted in Hong Kong.</p>
<b>Teaching/Learning Methodology</b>	<p>This is an introductory course aiming at arousing students' interest and awareness in multiple complex problems in our environment caused by pollution produced by human activities at the international and national levels. It also aims at developing interest and curiosity in the engineering technologies to monitor and control the five main types of pollution: air, noise, water, solid waste, and nuclear. It also spells out the importance of environmental management as a major tool to control pollution.</p> <p>It is not the intention of the subject to pre-empt any specific topic that is to follow. In addition to the traditional classroom lectures, hands-on case studies and small-group discussions will be used whenever appropriately. In order to understand the multi-dimensional pollution problems including their generation, effects on our community, inter-changes between different types, and monitoring and control, students need to search and learn the fundamental knowledge in environmental and engineering sciences.</p>

	<p>In addition, guest lecturers who are professional engineers or senior officers of energy industry or government sectors will be invited to give joint lectures/seminars, with the subject lecturer, on practical issues to facilitate understanding of the subject. Lecturing materials of the guest lecturers will be previewed by the subject lecturer to ensure their suitability and quality.</p> <p>In order to fulfill both English Reading and English Writing requirements, every student studying this subject will be required to perform an extensive reading and writing tasks. The knowledge obtained from the reading task will be used to conduct a case study, which will then be presented orally. Every student is also required to complete a mini project, regarding the pollution problems encountered in Hong Kong and their possible solutions and produce a written report to satisfy the writing requirement.</p>																																																						
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	<table><tr><th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="6">Intended subject learning outcomes to be assessed</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th><th>e</th><th>f</th></tr><tr><td>1. Written examination</td><td>50</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td></tr><tr><td>2. Mini project report</td><td>30</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr><tr><td>3. Process to perform the mini project</td><td>10</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td></tr><tr><td>4. Oral presentation of the case study</td><td>10</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr><tr><td>Total</td><td>100 %</td><td colspan="6"></td></tr></table> <p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>A written examination (50%) is an important assessment but it is not totally sufficient to achieve all the intended learning outcomes for this course because of the very broad coverage of the subject.</p> <p>There is a major writing task required: a written report (30%) of a mini project performed by every student on a given topic. The proper procedure to perform the mini project including objective identification, literature search, project planning and time control to complete the planned tasks will also be assessed (10%).</p> <p><i>In order to fulfill the writing component assessment, student should attain a minimum grade D in both tasks 2 and 3.</i></p> <p>Students are required to conduct a case study. In order to complete the case study, knowledge obtained from an intensive reading task will be required. References should be provided to students by the subject instructor. Information provided by the guest lecturer, if any, will also be very useful. An oral presentation of the case study is required (10%).</p> <p><i>In order to fulfill the reading component assessment, student should attain a minimum grade D in task 4.</i></p>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed						a	b	c	d	e	f	1. Written examination	50	√	√	√	√	√		2. Mini project report	30	√	√	√	√	√	√	3. Process to perform the mini project	10	√	√	√	√	√		4. Oral presentation of the case study	10	√	√	√	√	√	√	Total	100 %						
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<b>Student Study Effort Expected</b>	Class contact:	
	▪ Lectures	21 Hrs.
	▪ Seminars by Invited Speakers	6 Hrs.
	▪ Tutorials	6 Hrs.
	▪ Discussions on Mini Project and Case Study	6 Hrs.
	Other student study effort:	
	▪ Literature Survey and Extensive Reading	35 Hrs.
	▪ Conducting Mini Project and Producing Report	30 Hrs.
	▪ Conducting Case Study and Oral Presentation	16 Hrs.
	Total student study effort	120 Hrs.
<b>Reading List and References</b>	<ol style="list-style-type: none"> <li>1. L. R. Berg, M.C. Hager and D.M. Hassenzahl, Visualizing Environmental Science, Wiley, latest edition.</li> <li>2. E.S. Rubin and C. Davidson, Introduction to Engineering and the Environment, McGraw Hill, latest edition.</li> <li>3. M.L. Davis and S.J. Mastern, Principles of Environmental Engineering and Science, McGraw Hill, latest edition.</li> <li>4. R.L. McConnell and D.C. Abel, Environmental Issues: An Introduction to Sustainability, Pearson, latest edition.</li> </ol>	

*Revised May 2022.*