

### **Subject Description Form**

<b>Subject Code</b>	ME601
<b>Subject Title</b>	Economy, Energy and Environment: Strategies for Sustainable Development
<b>Credit Value</b>	3
<b>Level</b>	6
<b>Pre-requisite/ Co-requisite/ Exclusion</b>	Nil
<b>Objectives</b>	<p>The subject aims at understanding the interdependent and mutually reinforcing pillars of sustainable development as economic development, social development, and environmental protection. Various approaches to achieve sustainable development are covered.</p> <ol style="list-style-type: none"> <li>1. To understand the urgent need for sustainable development.</li> <li>2. To understand the formation of various types of pollution generated by engineering processes, which have significant impact to the environment and their assessment methods.</li> <li>3. To acquire the knowledge of the updated environmental technologies in handling and controlling these pollution.</li> <li>4. To understand the importance of environmental management and the role of different parties on cleaner production and sustainable product development.</li> </ol>
<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. have an understanding on the impact of new government policies on sustainability upon their business growth and technology development directions</li> <li>b. select appropriate environmental technologies for their enterprises.</li> <li>c. advise or formulate strategies for their organizations for sustainable development.</li> </ol>
<b>Subject Synopsis/ Indicative Syllabus</b>	<p><b>Sustainability of the Global Community:</b> Economy-energy-environment Spheres, Framework Convention to Climate Change (UNFCCC), Kyoto Protocol, Government Policies.</p> <p><b>Engineering and Global Environmental Problems:</b> Global Warming; Greenhouse Gases Emissions; Acid Rain; Nuclear Wastes; Natural Resources Contamination.</p> <p><b>Pollution Prevention (or Source Reduction):</b> Air Pollution, Noise Pollution, Water Pollution, Solid Waste Pollution, Radioactive Pollution.</p> <p><b>Environmental Technology:</b> Recycling, Water Purification, Air Purification , Sewage Treatment, Environmental Remediation , Solid Waste Management, Renewable Energy, eGain Forecasting, Energy Conservation , Alternative</p>

	<p>and Clean Power.</p> <p><b>Environmental Management Strategies:</b> Transfer among Various Types of Pollution; Sustainable Development; Environmental Impact Assessment; Government Strategies and Regulations in Pollution Control.</p> <p><b>Cleaner Production Strategies:</b> Documentation of Consumption , Use of Indicators and Controlling, Substitution of Raw Materials and Auxiliary Materials (especially Renewable Materials and Energy), Cradle to Cradle Design, Green design, Improved Control and Automatisation, Reuse of Waste, New, Low Waste Processes and Technologies.</p>			
<b>Teaching/Learning Methodology</b>	A mixture of lectures, case studies and seminars will be used to deliver the various topics in this subject.			
	Teaching/Learning Methodology	Intended subject learning outcomes		
		a	b	c
		1. Lecture	√	√
		2. Experiments/projects/tutorials	√	√
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed	
			a	b
	1. Individual Report	40	√	√
	2. In-class Exercises	30	√	√
	3. Group Report	30	√	√
	Total	100		
<b>Student Study Effort Expected</b>	Class contact:			
	▪ Lecture			36 Hrs.
	▪ Case Studies			3 Hrs.
	Other student study effort:			
	▪ Report			20 Hrs.
	▪ Self Study			46 Hrs.
	Total student study effort			105 Hrs.

<b>Reading List and References</b>	<ol style="list-style-type: none"> <li>1. Achieving sustainable development / Ann Dale and John B. Robinson</li> <li>2. Cleaner technologies and cleaner products for sustainable development / Harry M. Freeman, Zsuzsa Puskas, Rada Olbina</li> <li>3. Green Engineering – environmentally conscious design of chemical processes / David T. Allen and David R. Shonnard</li> <li>4. Energy and the environment : scientific and technological principles / James A. Fay, Dan S. Golomb</li> <li>5. Clean energy and environment : combating climate change by Hong Kong researchers and professionals / editor, Wilton W.T. Fok ; photographers, Eric H.H. Au Yeung, Lisa L. Xu</li> <li>6. Environment, energy, and economy : strategies for sustainable development / edited by Yoichi Kaya and Keiichi Yokobori</li> <li>7. Handbook of sustainable engineering [electronic resource] / Joanne Kauffman, Kun-Mo Lee, editors</li> </ol>
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*Revised June 2022*