Subject Description Form

Subject Code	CSE30460
Subject Title	Air and Noise Pollution Control
Credit Value	3
Level	3
Pre-requisite / Co-requisite/ Exclusion	Pre-requisites: CSE20331 Air and Noise Pollution Studies for ESD or CSE30331 Air and Noise Pollution Studies for Civil Engineering or CSE331 Air and Noise Pollution Studies or CSE336 Air and Noise Pollution Studies Exclusion: CSE460 Air and Noise Pollution Control
Objectives	This subject aims to provide students with knowledge of the principles in air and noise pollution control so that they can conduct proper design, operation and professional analysis on the selection of appropriate pollution control equipment for industrial or residential applications.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. have basic knowledge of prediction models of noise and air pollution levels from various machines and facilities in Hong Kong and various devices, such as enclosures, silencers, ventilation systems and scrubbers; b. be familiar with the common design methods for noise and air pollution control devices, and be able to exercise professional judgments on design parameters; c. carry out and evaluate proper tests on the effectiveness of noise and air pollution control devices; d. propose the most cost-effective proposals for noise and air pollution control in practical applications; e. have the basic ability to select the best solution to a problem under various technical and administrative constraints; f. understand the current pollution issues in Hong Kong and contribute to discussions on these contemporary problems; g. recongize the need for and engage in life-long learning.

Subject Synopsis/ Indicative Syllabus	**Air Pollution Control** 1. Engineering Control Concepts Pollution control via process change, fuel change, waste minimization and pollutant removal by control equipment. Considerations in the selection of engineering control approach. 2. Control Devices and Engineering Systems Control devices and engineering systems for the removal of dry particulate matter, liquid droplets and mists, gaseous pollutants and odors. Operation principle and maintenance of absorbers, incinerators, mechanical collectors, baghouses, wet scrubber and electrostatic precipitators.
	Noise Pollution Control 1. Sound Radiation and Transmission Wave equations - plane waves, 1-D spherical and cylindrical waves. Sound radiation, source strength, acoustic impedance and radiation efficiency, sound fields. Sound radiated by vibrating surfaces. Direct & Reverberant field. 2. Noise Control Devices Sound absorption and insulation materials. Measurement of sound absorption and insulation. Sound attenuators and enclosures. Vibration isolation and control. Reduction of direct and reverberant fields.
Teaching/Learning Methodology	The lecture program will establish the fundamental concepts and principles concerning the emission, and control of air pollutants and noise. Students are required to undertake coursework assignments, in the form of problem sheets, designed to elaborate and expand their knowledge base acquired in the lectures. The tutorials will be programmed to provide discussion of the assignments. The laboratory consists of the study on performance of noise control equipment and material; and the site visit is field study on practical air control systems used in Hong Kong like wet scrubber and electrostatic precipitators installed in factories, buildings or public service facilities.

<table>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/task</td><td rowspan="2">% weighting</td><td colspan="7">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td></tr>
<tr><td>1. Coursework</td><td>30</td><td>√</td><td>√</td><td></td><td></td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>2. Examination</td><td>70</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td></tr>
<tr><td>Total</td><td>100</td><td colspan="5"></td><td></td></tr>
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Students must pass the final examination and achieve a passing overall score/ grade to pass the subject.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

(1) The learning outcomes are monitored through class discussion, coursework assessment and tutorial and are assessed by continuous assessment and final examination; and

(2) Site visit report, laboratory report and tutorial assignment will be used in continuous assessment so that any problems from students can be solved in subsequent lecturers.
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<tr><td>Student Study Effort Expected</td><td>
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<tr><td></td><td>Average hours per week</td></tr>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures/ Tutorials/Seminar/ Laboratory/field reports</td><td>3 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Coursework study effort</td><td>3.8 Hrs.</td></tr>
<tr><td>▪ Laboratory/field reports</td><td>2.2 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>9 Hrs.</td></tr>
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Reading List and References	**<u>Books</u>** *Environment Hong Kong 1995-2020*, published by Environmental Protection Department. J.C. Mycock, J.D. McKenna, L. Theodore, *Handbook of Air Pollution Control Engineering and Technology*, Lewis Publishers, 1995 Noel De Nevers, *Air Pollution Control Engineering*, McGraw Hill, Second Edition, 2000 Thad Godish, *Air Quality*, Lewis Publishers, 4th Edition, 2004 Anthony J Buonicore and Wayne T David, A&WMA, Air Pollution Control Engineering R.F. Barron, *Industrial Noise Control and Acoustics*, 2003. Peters, R.J. et al., *Acoustics and Noise Control*, London: Routledge, 2013. **<u>Journals</u>** *Environmental Science & Technology* *Atmospheric Environment*