Subject Description Form

Subject Code	CSE523
Subject Title	Air Pollution Control
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Recommended background knowledge: A fundamental knowledge of environmental engineering or chemistry would be helpful.
Objectives	To provide students with knowledge of the principles in air 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: a. to understand sources and transportation of air pollutants, characteristics of traffic and industrial pollution problems and air pollution monitoring techniques; b. to predict the air pollutant distribution with air pollution models and to familiarize with the working mechanism for various categories of control devices, such as cyclone collectors, electrostatic precipitators and wet scrubbers; and c. to apply the fundamental knowledge about control of particulate and gaseous emissions to propose the most cost-effective ways for air pollution control in practical application.
Subject Synopsis/ Indicative Syllabus	**Keyword Syllabus** i) Overview & introduction to air pollution control Primary and secondary pollutants, air pollution index, air quality objectives, process of air pollution control. ii) Air Pollution Modeling Air modeling, thermal inversion, the Gaussian model. iii) Air Pollution Monitoring & Measurement Criteria pollutants, ozone chemistry, particle measurements, gas chromatographic method, chemical composition of airborne particles. iv) Combustion & Incineration Sources of combustion and incineration, PCDD/F emissions, air-fuel ratio.

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<tr><td></td><td>v) <u>Control of Particulate Emissions</u>

Air pollution control engineering for the removal of dry particulate matters. Cyclone, scrubber, EP, processes will be introduced.

vi) <u>Control of Gaseous Emissions</u>

Air pollution control engineering for the removal of gaseous pollutants (NO_x, SO_2, VOC, Dioxins).</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A series of lectures will be given to introduce the principles of air pollution control. The lectures will cover the nature and characteristics of air pollution, air pollution modeling and the mechanism of particulate and gaseous pollutants control. Simultaneously, two assignments should be finished by students in order to fully capture the main contents of air pollution control.

Tutorials will provide a platform for students to solve any problems relating to the contents of the lecture.

Laboratory works will provide students with opportunities to carry out real experimental for air modeling and monitoring various air pollutants.

Case study includes preparation of presentation and report. Students should make critical literature reviews cooperatively about local or global air pollution cases.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="3">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a.</td><td>b.</td><td>c.</td></tr>
<tr><td>1.Continuous Assessment</td><td>40%</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>2.Written Examination</td><td>60%</td><td>√</td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td colspan="3"></td></tr>
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Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The continuous assessment will be based on 2 assignments (30%) and laboratory/field reports (10%).

Written examination is evaluated by final examination.</td></tr>
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	Students must attain at least Grade D in both coursework and final examination (whenever applicable) in order to attain a passing grade in the overall result.
Reading List and References	**<u>Books</u>** J.C. Mycock, J.D. McKenna, L. Theodore, *Handbook of Air Pollution Control Engineering and Technology*, Boca Raton: CRC Press, c1995. Call# TD883 .M93 1995. L.K. Wang, N.C. Pereiea, Y.-T. Hung, *Air Pollution Control Engineering*, Totowa, N.J.: Humana Press, c2004. Call# TD883 .A56 2004. Noel De Nevers, *Air Pollution Control Engineering*, Long Grove, Illinois: Waveland Press, 2017 Third Edition, 2017. Call# TD883 .D42 2017. Thad Godish, Wayne T. Davis, Joshua S. Fu, *Air Quality*, Boca Raton: Taylor & Francis, 2015. Call# TD883 .G57 2015. W.T. Davis, Air & Waste Management Association, APCA, *Air Pollution Engineering Manual*, New York Wiley, 2nd ed. C2000. Call# TD889 .A39 2000. **<u>Journals</u>** Atmospheric Environment Atmospheric Research Environment International Environmental Pollution Environmental Research Environmental Science & Technology Journal of Air and Waste Management Association Science of the Total Environment