Subject Description Form

Subject Code	CSE560
Subject Title	Indoor Air Quality Management
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Mutual exclusions: *Indoor Air Quality Engineering* (BSE547)
Objectives	To provide students with knowledge of management of common IAQ problems. It is expected that students can conduct appropriate measurements, analysis and management of IAQ problems after finishing studying this course.
Intended Learning Outcomes	Upon completion of the subject, students will be able: a. to understand the nature and characteristics of indoor air pollutants, and common IAQ measurements and assessment; b. to identify IAQ problems which can be caused by different factors, such as the existence of indoor emission source, or penetration of air pollutants from outdoors in order to adopt proper control strategies; and c. to apply the fundamental knowledge about IAQ management to analyze and propose effective solutions to common IAQ problems caused by different emission sources indoors.
Subject Synopsis/ Indicative Syllabus	**Keyword Syllabus** i) Introduction to indoor air pollutants and sources Potential indoor air pollutants, HKIAQ management program, factors affecting IAQ, sick building syndrome (SBS). ii) Indoor air pollutants and sources Aerosols, formaldehyde, radon, airborne bacteria, indoor air quality model. iii) Common IAQ measurements & assessment Continuous vs. intermittent measurements, data analysis and interpretation, instrumentation for IAQ studies, method precision and detection limits.

<table>
<tr><td></td><td>iv) <u>VOC / HCHO emissions</u>

Sources and characteristics of indoor VOCs / HCHO, factors affecting emissions of indoor VOCs / HCHO, control or prevention of indoor VOCs / HCHO pollution, emission criteria and certifications.

v) <u>Environmental Chamber Studies</u>

Chamber loading ratio, emission factor, emission rate, tracer gas, first order decay model.

vi) <u>IAQ control technology</u>

Source controls, mitigation measures, particulate removal, gaseous pollutant removal.

vii) <u>Indoor odour</u>

Odour characteristics, odour measurement, sampling of source odour emissions, dynamic dilution olfactometry test.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A series of lectures will be given to introduce the principles of IAQ management. The lectures will cover indoor air pollutants and sources, indoor air pollutants measurements and IAQ control technology. 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 work will provide students with opportunities to conduct real experiments for monitoring various air pollutants.

Case study includes preparation of presentation and report. Students should make critical literature reviews cooperatively about indoor 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. Assignments</td><td>10%</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>2. Group project report</td><td>10%</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>3. Group project presentation</td><td>10%</td><td>√</td><td>√</td><td>√</td></tr>
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	4. Final Exam	70%	√	√	√
	Total	100%			

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

Continuous assessment includes assignments (10%) and group project (20%) (a written report (10%) and an oral presentation (10%)), and a final exam (70%).

Students must pass the final examination and achieve a passing overall score / grade to pass the subject.

Reading List and References

Burton, D.J., *IAQ and HVAC workbook*. Publisher Bountiful, Utah: IVE, Inc. c1997. Edition Rev. and updated 3rd Ed. Call# TD883.2 .B87 1997.

Hays, Steve M., *Indoor Air Quality*. Publisher New York: McGraw-Hill, c1995. Call# TD883.1.H39 1995.

Indoor Air Quality Case Studies Reference Guide, Fairmont Press, c1999. Call# TD883.2 .I5277 1999.

Indoor Air Quality Design Guidebook. Publisher Lilburn, GA: Fairmont Press; Englewood Cliffs, N.J.: Prentice-Hall, Inc., c1991. Call# TD883.1 .I48 1991.

Indoor Air Quality Handbook. Publisher New York: McGraw-Hill, c2001. Call# RA770 .I42 2001.

Indoor Air Quality. Publisher Berlin; New York: Springer-Verlag, c1990. Call# TD884.I53 1990.

Indoor Air Quality. Publisher Vienna, Va.: Sheet Metal and Air Conditioning Contractors National Association, 1988. Edition 1st Ed. Call# TH6021.I55 1988.

Indoor Air Quality: A Comprehensive Reference Book. Publisher Amsterdam; New York: Elsevier Science, 1995. Call# TD883.17 .I53 1995.

Indoor Air: Quality and Control. PTR Prentice Hall, 1993. Call# TD883.1.I476 1993.

Knoespel, Paul David, *Indoor Air Quality Modelling*. Madison, Wis.: University of Wisconsin-Madison, 1990. Call# TD883.15 .K56 1990.

Thad Godish, Wayne T. Davis, Joshua S. Fu, *Air Quality*, Boca Raton: Taylor & Francis, 2015. Call# TD883 .G57 2015.

	Wheeler, Arthur E. *Indoor Air Quality*. Atlanta, Ga.: American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1991. Call# TD883.1 .W43 1991. **<u>Journal list</u>**: American industrial hygiene association Journal Atmospheric Environment Environmental International Environmental Science and Technology Indoor Air Indoor and Built Environment Journal of Air and Waste Management Association Science of Total Environment