Annexe A: New/Revised Course Content in OBTL+ Format

Course Overview

The sections shown on this interface are based on the templates UG OBTL+ or PG OBTL+
If you are revising/duplicating an existing course and do not see the pre-filled contents you expect in the subsequent sections e.g. Course Aims, Intended Learning Outcomes etc. please refer to Data Transformation Status for more information.

Expected Implementation in Academic Year	AY2017-2018
Semester/Trimester/Others (specify approx. Start/End date)	Semester 2
Course Author * Faculty proposing/revising the course	Lee-Chua Lee Hong
Course Author Email	clhlee@ntu.edu.sg
Course Title	Air Pollution Control Engineering
Course Code	EN3004
Academic Units	3
Contact Hours	39
Research Experience Components	Not Applicable

Course Requisites (if applicable)

Pre-requisites	Year 3 standing
Co-requisites	
Pre-requisite to	
Mutually exclusive to	
Replacement course to	
Remarks (if any)	

Course Aims

To provide an understanding of the sources & effects of air pollutants and their control legislations; and the fundamental theories and practices of various devices for major air pollutant control.

Course's Intended Learning Outcomes (ILOs)

Upon the successful completion of this course, you (student) would be able to:

ILO 1	Describe air pollution, sources and effects on the human health & the environment;
ILO 2	Apply meteorology knowledge to estimate air pollutants' emissions and evaluate air quality;
ILO 3	Describe global environmental issues due to air pollution;
ILO 4	Explain the working principle of various air pollution control technology and propose appropriate approaches/control technologies to reduce air pollution;
ILO 5	Apply appropriate knowledge to evaluate the performance of air pollution control devices.

Course Content

Introduction to air pollution control. Air pollution effects. Air pollution control legislations and philosophies. Measurement, emission estimates and meteorology. Air pollution concentration models. Indoor air quality and global climate. Engineering approach for air quality control. Natural of particulate pollutants. Control of particulates, volatile organics and hydrocarbons. Characteristics & control of sulphur oxides and nitrogen oxides. Control of mobile source pollutants. Special topic: global efforts & advanced technology for CO2 control.

S/N	Topic	Lecture Hrs	Tutorial Hrs
1.	Introduction to air pollution control (overview, sources and effects, emission standards, unit conversion, Air Quality Index, etc)	2	1
2.	Measurement, emission estimates and structure of atmosphere	2	1
3.	Meteorology & winds. Stability of the atmosphere, lapse rates& inversions	2	1
4.	Air pollution dispersion models, Gaussian equation and variation	4	2
5.	Indoor air quality and box model, global climate and global warming	2	1
6.	Combustion related emissions	2	1
7.	Engineering approach for air quality control & IAQ sampling analysis	2	1
8.	Properties of particulate matters & collection mechanisms	2	1
9.	Control of particulate matters	2	1
10.	Characteristics and control of VOCs and HCs	2	1
11.	Characteristics and control of sulphur oxides and nitrogen oxides	2	1
12.	Control of mobile source pollutants & special topic	2	1
	Total:	26	13

Reading and References (if applicable)

Textbooks : 1. “Air Pollution Control Engineering” Noel De Nevers, McGraw Hill International, 2nd or 3rd Edition.
References : Nil

Planned Schedule

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
1	Introduction to air pollution control (overview, sources and effects, emission standards, unit conversion, Air Quality Index, etc)	1, 2	Reading ppt slides		Tutorial
2	Measurement, emission estimates and structure of atmosphere	1, 2	Reading ppt slides	In-person	Tutorial
3	Meteorology & winds. Stability of the atmosphere, lapse rates& inversions	1, 2	Reading ppt slides	In-person	Tutorial
4	Air pollution dispersion models, Gaussian equation and variation	1, 2	Reading ppt slides	In-person	Tutorial; Grouping for Project
5	Indoor air quality and box model, global climate and global warming	1, 2, 3, 5	Reading ppt slides	In-person	Tutorial; Group Project Selection
6	Combustion related emissions	1, 2, 4, 5	Reading ppt slides	In-person	Tutorial; Group Project Selection

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
7	Engineering approach for air quality control & IAQ sampling analysis	2, 4, 5	Reading ppt slides	In-person	Quiz; Tutorial; Group Project Allocation
8	Properties of particulate matters & collection mechanisms	2, 4, 5	Reading ppt slides	In-person	Tutorial; Working on group project
9	Control of particulate matters	2, 4, 5	Reading ppt slides		Tutorial; Working on group project
10	Characteristics and control of VOCs and HCs	2, 4, 5	Reading ppt slides	In-person	Tutorial; Group Project report
11	Characteristics and control of sulphur oxides and nitrogen oxides	2, 4, 5	Reading ppt slides		Tutorial
12	Control of mobile source pollutants & special topic	2, 4, 5	Reading ppt slides	In-person	Quiz; Tutorial

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Lecture	Formal lectures on topics with in-class discussions
Tutorials	This helps you to understand the concept taught during lectures as well as promote life-long learning
Quiz	This helps you to achieve one or more of the outcomes as you need to do self-study and research.
Group Report	This helps you to achieve one or more of the outcomes as you need to do self-study and research as well as promote team works.

Assessment Structure

Assessment Components (includes both continuous and summative assessment)

No.	Component	ILO	Related PLO or Accreditation	Weightage	Team/Individual	Rubrics	Level of Understanding
1	Summative Assessment (EXAM): Final exam(Final Examination)	1,2,3,4,5	EAB SLOs a, b, c, g, j	50	Individual	Holistic	Relational
2	Continuous Assessment (CA): Test/Quiz(Quiz 1)	1,2,3	EAB SLOs a, b, f, g	15	Individual	Analytic	Multistructural
3	Continuous Assessment (CA): Test/Quiz(Quiz 2)	2,4,5	EAB SLOs a, b, c, g	15	Individual	Analytic	Multistructural
4	Continuous Assessment (CA): Project(Group Project)	1,2,3,4,5	EAB SLOs d, f, g, h, i , j, l	20	Team	Analytic	Multistructural

Description of Assessment Components (if applicable)

Part A - Continual Assessment (50%) consist of,

(1) 2 quizzes (15% each)
- Will be conducted during the Teaching Week to evaluate learning outcomes. Questions are designed to test students' understanding of basic concepts and principles as well as their ability in applying them in real application scenarios. The quizzes will be close book written exams.

(2) A group-based project (20%)
- The project is to test students' ability in understanding and applying basic concepts and principles in environmental sustainability. Students will be given a list of topics in environmental sustainability and each group (10 groups total) will pick one or come up with their own topic. Each group will be required to conduct a literature survey and present their work in a 5-min presentation and a final report.

Part B - Examination (50%)

- Examination covers topics taught in all 13 Teaching Weeks. Questions are designed to test students' ability in understanding and applying basic concepts and principles in environmental sustainability

- It will be a 2.5 hours closed book written examination.

Formative Feedback

The quiz questions will be discussed during tutorial sessions and the students will be able to view their quiz results individually through Blackboard Grade Centre.

The result of group project reports will be released through Blackboard Grade Centre. The students can opt to meet the lecturer in office to view and discuss their group project performance.

NTU Graduate Attributes/Competency Mapping

This course intends to develop the following graduate attributes and competencies (maximum 5 most relevant)

Attributes/Competency	Level
Care for Environment	Intermediate
Collaboration	Intermediate
Creative Thinking	Intermediate
Decision Making	Basic
Problem Solving	Intermediate

Course Policy

Policy (Academic Integrity)

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values. As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the academic integrity website for more information. On the use of technological tools (such as Generative AI tools), different courses / assignments have different intended learning outcomes. Students should refer to the specific assignment instructions on their use and requirements and/or consult your instructors on how you can use these tools to help your learning. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Policy (General)

Students are expected to take all scheduled assignments and tests by due dates. Students are expected to take responsibility to follow up with course notes, assignments and course related announcements. Students are expected to participate in all group project discussions and activities.

Policy (Absenteeism)

Valid reasons include falling sick supported by a medical certificate and participation in NTU's approved activities supported by an excuse letter from the relevant bodies. There will be no make-up opportunities for in-class activities.

Policy (Others, if applicable)

Last Updated Date: 21-06-2024 05:34:49

Last Updated By: Yang, En-Hua