

JEE 667 Environmental Pollution Control Technology

(Course coordinator and instructor: Dr. Savitri Garivait [savitri.jgsee@gmail.com])

1. Course Description

[Briefly describe the course content, especially how it supports the PLO.]

The objective of this course is to provide a broad-based introduction to aspects of environmental pollution and control in air, water, and soil media. The course will introduce environmental monitoring and analysis techniques and environmental impact assessment. The course will include an introduction to pollutants present in aqueous systems, the fate and transport of these pollutants, and an introduction to water and wastewater treatment processes. The course will include an introduction to the sources, fate, and transport of air and climate pollutants and an introduction to air and climate pollution control technology. It will also include an introduction to solid and hazardous wastes, their fate and interactions with other media, and handling, control, and treatment technologies.

2. Target Knowledge, Skills, and Abilities (KSA)

[Indicate what KSA this course will provide the students with.]

This course allows students to understand and explain key concepts and tools in environmental pollution control technology, and to develop skills to analyze environmental problems and related impacts in a life cycle thinking manner. The ability to synthesize by combining theoretical knowledge and analyzed information to address and identify strategies and action plans to prevent and control environmental pollution issues will also be emphasized and enhanced.

3. Target group of students

[Indicate if the course is open to all students, including non-degree ones.]

The course is open to Master's and PhD students with a background in science or engineering.

4. Pre-requisites

[Indicate if the course requires some prerequisites.]

None

5. Course Learning Outcomes

[Indicate the alignment of CLOs with the PLOs.]

CLO 1: Capable of understanding the basic notions and related issues of environmental pollution.

CLO 2: Capable of understanding the environmental pollution control technologies and their concepts.

CLO 3: Capable of contributing to technology selection to appropriately remediate environmental problems due to anthropogenic activities.

CLO 4: Able to synthesize key information and concepts related to environmental pollution control technologies.

CLO 5: Able to communicate in writing and orally the acquired and synthesized knowledge.

6. Method of Teaching and Learning

[Specify if it would be 1/ Online; 2/ On-site; 3/ Hybrid; 4/ Online for lectures and On-site in small groups for discussions and workshops; 5/ Others.]

This course will be delivered in a hybrid format, i.e., simultaneously online and on-site, with live lectures, group discussions, and individual/team project presentations.

7. Course Outline and Organization

*[Following KMUTT's recommendations, a course should be organized based on the OBEM approach. A course can, therefore, be split over the semester, but also organized in consecutive weeks as before. A module can contain from 2 up to a maximum of 5 lectures depending on the target LOs. A 3-credit course can be composed of 3 to a maximum of 5 modules. In addition, indicate if **the course is opened every Semester or a specific Semester.**]*

This course is open in Semester 2 only. Semester 2/2024 (2567) is scheduled every Tuesday afternoon (1.30 pm-4.30 pm) from **Tuesday, 14 January, to Tuesday, 27 May 2025.**

[See attached "Course Outline"]

8. Evaluation Methods

[Indicate the methods used to evaluate the LOs, e.g. online or on-site exams, assignments, take-home exams, projects, etc. Following KMUTT's recommendations, the LOs evaluation should be organized at the end of each module.]

In-class participation / Assignments / Take-home Exam / Mini-Project.

- **Grading System:**

Assignments (Presentation + Participation to Discussion)	60 %
Module Evaluation	20 %
Presentation of "Learning Outcomes Summary"	20 %

- **Coordinator and Instructor:**

Assoc. Professor Dr. Savitri Garivait [savitri.jgsee@gmail.com]

9. References/Resources

[Indicate the references/resources students are recommended to consult for the modules/course.]

Lecture notes and related literature distributed by the instructors.

Course Outline
JEE667 Environmental Pollution Control Technology
Semester 2/2024
In Class and Online via MS Teams Classroom
Every Tuesday (Tuesday 14 January – 27 May 2025), 13.30-16.30 (Bangkok Time)

No.	Date	Topics	Details	Lecturers
1	14 Jan 2025	Introduction and Discussion on the expected teaching and learning process	<ul style="list-style-type: none"> • Get started together! • Survey of student background and expected learning outcomes. • Introduction to Environmental Pollution Control Technology 	Dr. Savitri Garivait
2	28 Jan 2025	Pollution of the Aquatic Environment: Priority Pollutants and Their Control (Part 1: Oceanic and Marine Environment)	Review of water pollution by chemicals resulting from human activities and their control technology (Part 1: Oceanic and marine environment)	Dr. Savitri Garivait
3	04 Feb 2025	Pollution of the Aquatic Environment: Priority Pollutants and Their Control (Part 2: In-Land Watershed)	Review of water pollution by chemicals resulting from human activities and their control technology (Part 2: In-land watershed)	Dr. Savitri Garivait
4	11 Feb 2025	Water Pollution from Wastewater (Industry and Households) and Their Control and Treatment Technologies	Review of wastewater (industry and households) and their control and treatment technologies	Dr. Savitri Garivait
5	18 Feb 2025	Sewage, Sewage Sludge, and Industrial Sludge Treatment	Review of management, treatment, and utilization of sewage, sewage sludge, and industrial sludge	Dr. Savitri Garivait
6	25 Feb 2025	Evaluation of Module 1: Water Pollution and Their Control Technology		Dr. Savitri Garivait

No.	Date	Topics	Details	Lecturers
7	04 Mar 2025	Soil Pollution and Land Contamination	Review of soil pollution resulting from human activities, especially those related to energy use and production	Dr. Savitri Garivait
8	11 Mar 2025	Soil Pollution and Land Contamination Remediation Technology	Review of soil pollution remediation technology: chemical and biological techniques	Dr. Savitri Garivait
9	18 Mar 2025	Solid Waste Management	Review of solid waste and MSW, their characteristics, and possible management	Dr. Savitri Garivait
10	25 Mar 2025	Solid Waste Management and Treatment	Self-study	Dr. Savitri Garivait
11	01 April 2025	Solid Waste Treatment and Waste to Energy	Review of solid waste treatment and waste-to-energy technologies, especially Anaerobic Digestion, Incineration, and Mechanical and Biological Treatment. Submission of the Integrated Assignment (=Evaluation of Module 2)	Dr. Savitri Garivait
12	08 Apr 2025	Evaluation of Module 2: Soil Pollution and Land Contamination and Solid Waste Management and Treatment		Dr. Savitri Garivait
13	22 Apr 2025	<ul style="list-style-type: none"> •Emissions of Gases from Points/Stationary Sources and Their Control Technologies •Emissions of Particulate Matter from Points/Stationary Sources and Their Control Technologies 	<ul style="list-style-type: none"> • Review of emitted gases and technologies to control gaseous emissions from stationary sources, especially Scrubber, Adsorber, Thermal Techniques, FGD • Review of emitted particulate matter (PM) and technologies to control PM emissions at stationary sources, especially Cyclone, 	Dr. Savitri Garivait

No.	Date	Topics	Details	Lecturers
			Fabric Filtration, and Electrostatic Precipitation	
14	29 Apr 2025	Emissions from Mobile Sources	Review mobile source characteristics and their control technologies, especially catalytic converters, particulate filters, etc.	Dr. Savitri Garivait
15	06 May 2025	Evaluation of Module 3: Air Pollution Control Technology		Dr. Savitri Garivait
16	13 May 2025	<ul style="list-style-type: none"> Mitigation Technology of GHG (Part 1: CCS, CCUS and CSS) Mitigation Technology of GHG (Part 2: CCS, CCUS, and CSS for Power Plant) 	<ul style="list-style-type: none"> General review of carbon capture and storage technology, carbon capture, usage, and storage, as well as carbon sequestration and storage technology and their applications. Review of carbon capture and storage technology, carbon capture, usage, and storage, as well as carbon sequestration and storage technology for power plants. 	Dr. Savitri Garivait
17	20 May 2025	Mitigation Technology of GHG (Part 3: CCS, CCUS, and CSS for Cement Industry)	Review of carbon capture and storage technology, carbon capture, usage, and storage, and carbon sequestration and storage technology for the Cement Industry	Dr. Savitri Garivait
18	27 May 2025	Evaluation of Module 4: Mitigation Technology of GHG and Individual Presentation of the “Learning Outcomes Summary”		Dr. Savitri Garivait