JEE 625 Energy and Environmental Economics, Management, and Policy

(Course coordinator: Dr. Savitri Garivait [savitri.jgsee@gmail.com; savitri.gar@kmutt.ac.th])

1. Course Description

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

This course introduces first the basic concepts of economics, economic sectors and activities, and the relationship between economic development and energy demands. The roles of energy supply and energy security, energy resources and conversion, environmental and climate implications due to modern energy utilization and externality, limitation of growth theory, a new paradigm shift in economic development and sustainable development, UNFCCC and Kyoto Protocol, economic tools for efficient energy resources utilization and environmental remedy, protection and control, contemporary energy and environmental issues, are also presented. Drivers of energy-saving program initiatives, analysis of rational energy use, basic energy audit, identification of energy conservation opportunities, the concept of economic analysis, and evaluation are then introduced and discussed. Environmental impact assessment tools and indicators, such as LCA and environmental standards, state of environmental assessment reporting, and their applications, are then presented in the form of mini-projects and case studies as an introduction to the individual/team projects to be presented at the end of the course.

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

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

This course enables students to understand and explain key concepts and tools in energy and environmental economics, management, and policy, and to develop skills to analyze energy systems and related environmental impacts in a life-cycle thinking manner. An ability to synthesize by combining theoretical knowledge and analyzed information to address and identify strategies and action plans to solve energy-related environmental issues.

3. Target group of students

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

The course is open to Master's and Ph.D. 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: Able to understand key concepts and tools in energy and environment economics, management, and policy.

CLO 2: Able to explain key concepts and tools in energy and environment economics, management, and policy.

CLO 3: Able to synthesize key concepts and tools in energy and environment economics, management, and policy.

CLO 4: Able to apply the acquired key concepts and tools in energy and environment economics, management, and policy to solve energy and energy-related environmental issues.

CLO 5: Able to communicate the outcomes of problem-solving projects in writing and orally.

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 or 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 it can also be organized in consecutive weeks as before. A module can contain from 2 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. Additionally, please indicate if the course is offered once a year, typically **in Semester 1.***

This course is offered once a year, in Semester 1. For Semester 1/2024 (2567), it is scheduled every Tuesday afternoon [13.30-16.30 (1.30 pm—4.30 pm)] from **Tuesday, 05 August, to 09 December 2025.**

Lecture No.: Title	Name of Instructor (Affiliation)	Teaching Period
LECTURE 1: Introduction and Discussion on the teaching and learning process involved in this course (Survey of student background and expected learning outcomes)	Dr. Savitri Garivait	5 Aug 2025
LECTURE 2: Discussion on General Overview of Energy and Environmental Economics, Management, and Policy (Introduction to energy and energy-related environmental issues)		
MODULE 1: Energy and Environmental Economics **MLO 1: Able to understand key concepts and tools in energy and environment economics** **MLO 2: Able to explain key concepts and tools in energy and environment economics** **MLO 3: Able to synthesize key concepts and tools in energy and environment economics** **MLO 4: Able to apply the acquired key concepts and tools in energy and environment economics**		
LECTURE 1: Economy and Environment Interactions (Traditional economic system, Ecosystem, Economic and environmental systems)	Dr. Athikom Bangviwat	19 Aug 2025
LECTURE 2: Efficient resource allocation (Static and dynamic efficiency, efficient energy resource allocation)	Dr. Athikom Bangviwat	26 Aug 2025
LECTURE 3: Sustainability and Market failure (Dilemma of economic development and environmental deterioration. Externality and market failure)	Dr. Athikom Bangviwat	02 Sep 2025

Lecture No.: Title	Name of Instructor (Affiliation)	Teaching Period
LECTURE 4: Environmental valuation (Measures of economic value in theory and empirical methods for valuing the environment)	Dr. Athikom Bangviwat	09 Sep 2025
LECTURE 5: Impacts on the environment due to economic activities and energy uses, and solutions (Environmental impacts due to fossil energy resource development, transportation, transformation, and final uses. Solutions and alternative energy technologies for environmental abatement and their limitations)	Dr. Chumnong Sorapipatana	16 Sep 2025
LECTURE 6: An overview of energy and environmental policies for sustainable development (An overview of energy and environmental policies for sustainable development)	Dr. Chumnong Sorapipatana	23 Sep 2025
EVALUATION OF MODULE 1:		**30** Sep **2025**
MODULE 2: Introduction to Energy Management **MLO 1: Able to understand key concepts and tools in energy management** **MLO 2: Able to explain key concepts and tools in energy management** **MLO 3: Able to synthesize key concepts and tools in energy management** **MLO 4: Able to apply the acquired vital concepts and tools in energy management**		
LECTURE 1: Rational use of energy (Concept of rational energy uses and comparisons on ease of use of energy in various forms and related technology. Energy demand management and energy conservation)	Asst. Prof. Dr. Pattana Rakkwamsuk	07 Oct 2025
LECTURE 2: Basics of energy audits (Development of an energy program, planning energy audits and organization, techniques of auditing)	Asst. Prof. Dr. Pattana Rakkwamsuk	14 Oct 2025
EVALUATION OF MODULE 2:		**21 Oct 2025**
MODULE 3: Environmental Management and Sustainability Assessment **MLO 1: Able to understand key concepts and tools in environmental management and sustainability assessment** **MLO 2: Able to explain key concepts and tools in environmental management and sustainability assessment** **MLO 3: Able to synthesize key concepts and tools in environmental management and sustainability assessment** **MLO 4: Able to apply the acquired key concepts and tools in environmental management and sustainability assessment**		
LECTURE 1: Management tools: Environmental impact assessment tools and indicators, LCA and environmental standards (Concept of EIA and SEA, and its components. Environmental and health risk assessment, concept of life cycle assessment, environmental international standard)	Prof. Shabbir H. Gheewala	28 Oct 2025
LECTURE 2: Sustainability assessment of energy systems (Concept of sustainability assessment). Case studies: micro-hydro, PV, biomass, and biofuels.	Prof. Shabbir H. Gheewala	04 Nov 2025

Lecture No.: Title	Name of Instructor (Affiliation)	Teaching Period
Mitigation pathways and measures in the context of sustainable development)		
EVALUATION OF MODULES 2 & 3:		**11 Nov 2025**
LECTURE 3: Introduction to the Mini-Project concept and Discussion on possible topics (Mini-Project preparation guidelines and Mini-Project topic selection), and **Energy and Climate Change** (Global energy current situation and perspectives, Energy and climate change interrelationship)	Dr. Savitri Garivait	18 Nov 2025
LECTURE 4: Mini-project Progress 1 (Workshop on the Mini-Project topic selection and content outline based on the Mini-Project preparation guidelines)	Dr. Savitri Garivait	25 Nov 2025
LECTURE 5: Mini-project Progress 2 (Workshop on the progress of the Mini-Project preparation)	Dr. Savitri Garivait	02 Dec 2025
EVALUATION: • **PRESENTATION OF MINI-PROJECT**		**09 Dec 2025**

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:**

Dr. Athikom (Exam Paper)	30 %
Dr. Chumnong (Exam Paper)	10 %
Prof. Surapong (Exam Paper)	10 %
Prof. Shabbir (Exam Paper)	10 %
Dr. Savitri (Mini-Projects)	40 %

- **Instructors:**

Assoc. Prof. Dr. Savitri Garivait (Instructor and Course Coordinator)
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Dr. Athikom Bangviwat [athikom.bangviwat@outlook.com]
Prof. Dr. Surapong Chirarattananon [surapong.chi@kmutt.ac.th]
Assoc. Professor Dr. Chumnong Sorapipatana [chumnong.jgsee@gmail.com]
Prof. Dr. Shabbir H. Gheewala [shabbirg@hotmail.com; shabbir.ghe@kmutt.ac.th]

9. References/Resources

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

Lecture notes and related literature are distributed by the instructors.