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 to the basic concepts of economics, economic sectors and activities, 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, 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 uses, and basic energy audit, identification of energy conservation opportunities, 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 its 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 (KSA)

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

This course provides students with an ability to understand and explain key concepts and tools in energy and environment 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 and energy related environmental issues.

3. Target group of students

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

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

4. Pre-requisites

[Indicate if the course requires some pre-requisites.]

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 in writing and orally the outcomes of problem solving projects.

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 discussion, 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 credits 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 opened every Semester. For the Semester 1/2022 (2565), this course is scheduled every Tuesday afternoon (13.30 pm – 16.30 pm) from **Tuesday 9 August to 13 December 2022.**

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	09 Aug 2022
LECTURE 2: Discussion on General Overview of Energy and Environmental Economics, Management and Policy (Introduction to energy and energy related environmental issues)	Dr. Savitri Garivait	16 Aug 2022
MODULE 1: Energy and Environment 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 environment systems)	Dr. Athikom Bangviwat	23 Aug 2022
LECTURE 2: Efficient resource allocation (Static and dynamic efficiency, efficient energy resource allocation)	Dr. Athikom Bangviwat	30 Aug 2022
LECTURE 3: Sustainability and Market failure (Dilemma of economic development and environmental deterioration. Externality and market failure)	Dr. Athikom Bangviwat	06 Sep 2022

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	13 Sep 2022
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	20 Sep 2022
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	27 Sep 2022
EVALUATION:		**04 Oct 2022**
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 key concepts and tools in energy management**		
Lecture No.: Title	Name of Instructor (Affiliation)	Teaching Period
LECTURE 1: Introduction to energy management and the concept of rational energy uses (Concept of rational energy uses and comparisons on ease of uses of energy in various forms and related technology. Energy demand management and energy conservation)	Prof. Surapong Chirarattananon	11 Oct 2022
LECTURE 2: Basic of energy audits (Development of an energy program, planning energy audits and organization, techniques of auditing)	Prof. Surapong Chirarattananon	18 Oct 2022
EVALUATION:		**25 Oct 2022**
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 component. Environmental and health risk assessment, concept of life cycle assessment, environmental international standard)	Prof. Shabbir H. Gheewala	25 Oct 2022

Lecture No.: Title	Name of Instructor (Affiliation)	Teaching Period
LECTURE 2: Sustainability assessment of energy systems (Concept of sustainability assessment. Case-studies: micro-hydro, PV, biomass and biofuels. Mitigation pathways and measures in the context of sustainable development)	Prof. Shabbir H. Gheewala	01 Nov 2022
SPECIAL LECTURE: SEE 2022 Conference	Dr. Savitri Garivait	08 Nov 2022
LECTURE 3: Energy and Climate Change (Global energy current situation and perspectives. Energy and climate change interrelationship) **Discussion on the assigned Mini-Projects** (Mini-Project preparation guidelines and Mini-Project topic selection)	Dr. Savitri Garivait	15 Nov 2022
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	22 Nov 2022
LECTURE 5: Mini-project Progress 2 (Workshop on the progress of the Mini-Project preparation)	Dr. Savitri Garivait	29 Nov 2022
LECTURE 6: Mini-project Progress 3 (Workshop on the progress of the Mini-Project preparation)	Dr. Savitri Garivait	06 Dec 2022
EVALUATION: • **Take-home exam on Prof. Shabbir's part** • **Presentation of Mini-Project**		06 Dec 2022 13 Dec 2022

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. Professor Dr. Savitri Garivait (Instructor and Course Coordinator)
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Dr. Athikom Bangviwat [athikom.bangviwat@outlook.com]
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Assoc. Professor Dr. Chumnong Sorapipatana [chumnong.jgsee@gmail.com]
Prof. Dr. Shabbir H. Gheewala [shabbirg@hotmail.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.