Regulation of energy markets and cost-benefit analysis

Academic Year: (2022 / 2023) **Review date: 27-06-2022**

Department assigned to the subject: Electrical Engineering Department

Coordinating teacher: USAOLA GARCIA, JULIO

Type: Compulsory ECTS Credits : 6.0

Year : 4 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Principles of economics: markets and financial failures
Transmission and distribution of energy

OBJECTIVES

Basic knowledge of optimal pricing based on the cost structure of companies and demand.
Ability to assess when competitive markets can function without intervention and when the public sector must intervene.
Analysis of the economic and social profitability of energy investment projects. Energy and the Sustainable Energy Goals.

DESCRIPTION OF CONTENTS: PROGRAMME

The energy system in the world and in Spain
Optimal prices and market failures
Fossil fuels. Uses and reserves.
Fossil fuel markets: coal, oil and natural gas. General features
Externalities of energy. Pollution and climate change. Fossil fuel subsidies
Decarbonization of energy systems and Sustainable Development Goals (SDGs). Emissions markets.
Electric system. Characteristics. Optimization of costs in the electrical system.
Principles of electricity markets. Organized markets and price formation.
Restrictions and zonal prices. Auxiliary services.
Regulated activities: transport and distribution networks.
Retail market - tariffs
LCOE and cost of energy
Return on energy investments and cost-benefit analysis

LEARNING ACTIVITIES AND METHODOLOGY

Learning activities:
Theoretical practical classes
Computer classroom practices
Tutoring on request
Individual or group work of the student
Methodology:
Presentations by the teacher with computer and audiovisual media support, in which the main concepts of the subject are developed and the bibliography is provided to complement the learning of the students.
Resolution of practical cases, problems, etc. raised by the teacher individually or in groups.
Exhibition and discussion in class, under the teacher's moderation of topics related to the content of the subject, as well as practical cases.
Preparation of works and reports individually or in groups.

ASSESSMENT SYSTEM

1. Final exam (40% of the final grade)
2. Mid-term exam (20% of the final grade).
3. Projects and activities proposed in class (40% of the final grade).

It is necessary to obtain a minimum grade of 4 out of 10 in the final exam to pass the course. Theory and problems in this exam will have additional requirements of minimum grade.
Attendance at practical activities is compulsory to pass the subject in ordinary call.

In the extraordinary call the evaluation conditions are the same, and the exam will include contents from all the course.

% end-of-term-examination:	40
% of continuous assessment (assigments, laboratory, practicals…):	60

BASIC BIBLIOGRAPHY

- Bhattacharyya, S.C Energy Economics: Concepts, Issues, Markets , and Governance, Springer Verlag, London , 2019
- D. S. Kirschen and G. Strbac Fundamentals of power system economics, Wiley, 2019
- I. Pérez-Arriaga, Ed. Regulation of the power sector, Springer, 2013
- Peter Zweifel Aaron Praktiknjo Georg Erdmann Energy Economics, Springer, 2017

ADDITIONAL BIBLIOGRAPHY

- A.E. Boardman, D.H. Greenberg, A.R. Vining, D.L. Weimer Cost-Benefit Analysis, Pearson - Prentice Hall2011.
- P.A. Schwarz Energy Economics, Routledge, 2018
- S. Managy, K. Kuriyama Environmental Economics, Routledge, 2017

BASIC ELECTRONIC RESOURCES

- International Energy Agency . Home page: http://https://www.iea.org/
- United Nations. Department of Economic and Social Affairs . Sustainable Development: http://https://sdgs.un.org/