

## Energy demand management and risk management in non-financial companies

Academic Year: ( 2021 / 2022 )

Review date: 09-02-2022

Department assigned to the subject: Economics Department

Coordinating teacher: ALONSO BORREGO, CESAR

Type: Compulsory ECTS Credits : 6.0

Year : 4 Semester : 1

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

The prerequisite to follow the first part of this course is a basic knowledge usually introduced in courses of Principles of Economics.

## OBJECTIVES

The material taught in the first part of this course will lead the students to acquire the ability to model demand and the supply of energy and to address the difficulties faced to match the supply of energy produced with the amount of energy demanded at different time periods (hours, days, weeks, months, years, etc.). Regarding the electricity sector, the main role played by the system operator (REE) will be discussed.

Financial decisions and alternative portfolio investment considerations are important issues in any company. Therefore, in the second part of this course financial decision related to asset and risk management are addressed. The risk management tools required to evaluate decisions in the energy sector are in many cases similar to the ones used by financial companies, but in other cases are different. In particular, the evaluation of the risks faced by companies of the electricity sector when selecting different technologies in the generation of electricity, using alternative natural resources or raw materials, might require the use of risk management techniques. Simulation of different energy scenarios.

## DESCRIPTION OF CONTENTS: PROGRAMME

## Part I: Energy management

Demand and Supply of a firm. Demand and Supply of the Market. Equilibrium in a Competitive Market. The concepts of Elasticity. Estimation of Demand Functions and Supply Functions: the Identification Problem. The need to Forecast the Demand of Electricity and the role of the System Operator (REE).

## Part II: Risk management in non financial companies

Introduction to forward and future contracts. Introduction to option markets. The Black-Scholes model. Term structure of interest rates. Credit risk, credit spread, credit spread estimations. Hedging the interest rate risk. Market efficiency and portfolio choice. Hedging strategies: practical applications. Capital Asset Pricing Model (CAPM). Risk management and firm value. Risk management with forwards and swaps. Risk management with futures and options. Hedging options. Market risk. Credit risk measurement and derivatives.

## LEARNING ACTIVITIES AND METHODOLOGY

The teaching method will be the following:

- (1) Lectures, where the theoretical concepts will be developed in detail. To facilitate understanding and learning of this material by the student, the students will have access to the class material (slides, etc.) via Aula Global. They will also receive an ample list of complementary materials that will permit them to understand and go deeper into issues covered in class, and into some related issues of interest that may not have been covered in class.
- (2) Discussion of the exercises done by the students.
- (3) Discussions on current issues regarding economics of energy to make students familiar with the concepts acquired in the course and to deepen their understanding.
- (4) Practical classes in reduced groups where the students will learn to make arguments and discuss them in public.

## ASSESSMENT SYSTEM

The final grade will be the result of weighting the grade obtained in the final exam (35%) and the continuous evaluation (65%), which will be based on two midterms, regular assignments and class participation.

The student must achieve at least 40% (4 over 10) of the grade in the final exam to pass the course. This rule applies both in the regular and the second call. In those cases in which, after weighting the grades from the continuous assessment and the final exam, the weighting grade is above (or equal to) 5, but the required minimum grade in the final exam is not fulfilled, the final grade in the course will be 4 (Fail), unless the exam grade is below 3, in which case the final grade will be 3 (Fail).

<b>% end-of-term-examination:</b>	35
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	65

## BASIC BIBLIOGRAPHY

- Bhattacharyya, S.C Energy Economics: Concepts, Issues, Markets , and Governance, Springer ¿ Verlag, London, 2011
- Grinblatt, M., & S. Titman Financial Market and Corporate Strategy. Irwin/McGraw-Hill, Irwin/McGraw-Hill, 2003
- Hull, J. Futures and other Derivatives, Prentice-Hall International, Inc., 1997

## ADDITIONAL BIBLIOGRAPHY

- Smithson, C. W. Managing Financial Risk, 3rd edition. McGraw-Hill., 1998