

# Course guide

## 240SEL85 - 240SEL85 - Microeconomics and Energy Markets

Last modified: 16/04/2024

**Unit in charge:** Barcelona School of Industrial Engineering  
**Teaching unit:** 732 - OE - Department of Management.

**Degree:** MASTER'S DEGREE IN ENERGY ENGINEERING (Syllabus 2022). (Compulsory subject).

**Academic year:** 2024    **ECTS Credits:** 5.0    **Languages:** English

### LECTURER

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**Coordinating lecturer:** Lucas van Wunnik

**Others:** Lucas van Wunnik  
Carlos González de Miguel

### PRIOR SKILLS

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Basic knowledge of energy systems and their operation, economics and linear programming.

### TEACHING METHODOLOGY

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#### - CLASSROOM TEACHING

Lectures (CM)  
Participatory classes (problem solving, kahoots, etc.) (CP)  
Presentation of a discussion topic (TD)  
Evaluation activities (final exam) (EV)

#### - STUDENT'S HOME ACTIVITY

Limited scope activity (small assignments, warming-up exercises...) (PR)  
Broad Scope activity (Discussion Topic: Written Paper and Class Presentation) (PA)  
Self-Study (EA)

### LEARNING OBJECTIVES OF THE SUBJECT

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The objective of the course is double. We would like the student:

- (1) to acquire and assimilate the microeconomic tools presented and to be able of using them to analyse questions related to energy.
- (2) to acquire the knowledge about the concrete functioning of some energy markets (natural gas, electricity, GHG emission allowances).

### STUDY LOAD

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Type	Hours	Percentage
Hours large group	40,5	100.00

**Total learning time:** 40.5 h



## CONTENTS

### Tools to analyse energy markets

**Description:**

Economic concepts: costs, opportunity cost, sunk costs, income, profit, economic profit, supply and demand, elasticity, tax incidence, externalities, abatement costs, common resources, public goods, cost-benefit analysis, entry barriers, economies of scale, etc.

Market structures: models of perfect competition, monopoly and oligopoly.

Government policies: taxes and subsidies, emissions tax, tradable emission allowances, price control, tax on windfall profits, subsidies, etc.

**Specific objectives:**

Understand the functioning of the markets, the consequences of market failures, the effect of taxes and subsidies in the markets, the consequence of the introduction of a CO<sub>2</sub> emission trading system.

**Related activities:**

Analysis of energy markets with microeconomics tools: oil market, natural gas market, electricity market and CO<sub>2</sub> emissions markets.

**Full-or-part-time:** 83h

Theory classes: 12h

Guided activities: 16h

Self study : 55h

### Structure of the energy markets

**Description:**

Introduction to energy markets. Agents, operating rules of the different energy markets and participation of agents in the markets. Procurement. Impact of environmental changes on the electricity market.

**Specific objectives:**

Understand the functioning of the energy markets in the socio-technical-economic environment, its particularities according to the type of energy, as well as the contracting options.

**Related activities:**

Analysis of the markets for natural gas, electricity and CO<sub>2</sub> emission allowances. Calculations of the equilibrium price and quantity in the markets with different scenarios.

**Full-or-part-time:** 42h

Theory classes: 8h

Guided activities: 6h

Self study : 28h



## ACTIVITIES

### Lectures

**Description:**

Presentation of contents (theory/description and applications of the theory/description to the present).

**Material:**

- Photocopies (available in Atenea).
- Slides used by the teacher (available in Atenea).
- Databases (available in Atenea).
- Bibliography (books, articles, press articles...).

**Full-or-part-time:** 21h

Theory classes: 21h

### Classroom activities directed by the teacher

**Description:**

Resolution of exercises and problems.

Analysis of market scenarios, introductory exercises of the sessions, multiple-choice questions, experiments, calculations and activities to assimilate concepts and the functioning of markets, critical analysis of market design, proposals for changes.

Group activities: Analysis of a discussion topic and presentation of the conclusions in class.

**Specific objectives:**

Analyse rules, structures and characteristics of an energy market, analyse and evaluate government policies in the field of energy markets (emissions tax, tradable emission allowances, subsidies, environmental standards, etc.)

**Material:**

- Photocopies (available in Atenea).
- Slides used by the teacher (available in Atenea).
- Databases (available in Atenea).
- Bibliography (books, articles, press articles...).

**Delivery:**

Report with the analysis of a discussion topic, answers to multiple choice questions.

**Full-or-part-time:** 18h

Theory classes: 18h

### Final exam

**Description:**

Written exam (final exam) that the student has to take (theory, concepts, exercises, text comments).

**Full-or-part-time:** 3h

Theory classes: 3h



### Individual preparation work before the session

**Description:**

1. For some sessions: Do the warm-up exercise before the session and upload the solutions on Atenea.
2. For other sessions: Read texts or watch videos beforehand about the theme of the session to be able to answer to the multiple-choice questions asked during the session.

**Specific objectives:**

Possessing the basic knowledge to be able to follow the sessions more easily.

**Material:**

- Statement of the exercise
- Bibliography (texts to read or videos to watch)

**Delivery:**

Answers to warm-up exercise.

**Full-or-part-time:** 18h

Theory classes: 18h

### Group work to be done outside of class

**Description:**

1. Discuss a topic and present the conclusions in class (big assignment)
2. Solve exercises and answer open questions (small assignments).

**Specific objectives:**

Evaluation of the students' knowledge and the richness of their ideas and arguments on a discussion topic.

**Material:**

- Problem sets (statement) (small assignments)
- Presentation of the discussion topics (big assignment)

**Delivery:**

- Answers to the problems/exercises (small assignments)
- Report with the analysis of a debate topic raised (big assignment)

**Full-or-part-time:** 36h

Theory classes: 36h

### Final exam preparation

**Description:**

Study of the contents of the course.

**Specific objectives:**

Evaluation of the students knowledge of the subject.

**Material:**

Class notes, slides used in class, solved old exams, bibliography.

**Full-or-part-time:** 29h

Theory classes: 29h



## GRADING SYSTEM

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Written final exam (PE): 60%

Individual and group assignment during the course (TR): 40%

## EXAMINATION RULES.

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The written final exam will include a theoretical and a practical part (problems, exercises, text commentary...).

During the course, the students will have to do activities (assignments, exercises, multiple choice questions) (individually and in group).

## BIBLIOGRAPHY

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### Basic:

- Frank, Robert H.; Cartwright, E. Microeconomics and behaviour. 2nd ed. London: McGraw-Hill Education, 2016. ISBN 9780077174088.

### Complementary:

- Bhattacharyya, S. C. Energy Economics : Concepts, Issues, Markets and Governance. 1st edition. London: Springer London, 2011. ISBN 0857292684.

- Dahl, Carol A. International energy markets : understanding pricing, policies, and profits. 2nd edition. Tulsa, Oklahoma: PennWell Corporation, 2015. ISBN 9781593702915.

- Kirschen, D. S. and Strbac, G.. Fundamentals of power system economics [on line]. 2nd edition. Chichester: John Wiley, 2019 [ Consultation : 24/03/2023 ]. Available on : <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?docID=5446642>. ISBN 9781119309888.

- CORE Team. The Economy [on line]. [s.l.]: CORE Econ, [s.d.] [Consultation: 22/05/2023]. Available on: <https://www.core-econ.org/the-economy/book/text/0-3-contents.html>.

- Cowen T. ; A. Tabarrok [et al.]. Course: Principles of Economics: Microeconomics [on line]. Fairfax: Marginal Revolution University, [s.d.] [Consultation: 22/05/2023]. Available on: <https://mru.org/principles-economics-microeconomics>.

## RESOURCES

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### Other resources:

- Slides used in class
- Articles