Universidad Zaragoza

Academic Year/course: 2022/23

29974 - Energy, Economy and Sustainable Development

Syllabus Information

Academic Year: 2022/23
Subject: 29974 - Energy, Economy and Sustainable Development
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 430 - Bachelor's Degree in Electrical Engineering
434 - Bachelor's Degree in Mechanical Engineering
435 - Bachelor's Degree in Chemical Engineering
436 - Bachelor's Degree in Industrial Engineering Technology
438 - Bachelor's Degree in Telecomunications Technology and Services Engineering
439 - Bachelor's Degree in Informatics Engineering
440 - Bachelor's Degree in Electronic and Automatic Engineering
470 - Bachelor's Degree in Architecture Studies
476 -
558 - Bachelor's Degree in Industrial Design and Product Development Engineering
581 - Bachelor's Degree in Telecomunications Technology and Services Engineering
ECTS: 4.0
Year: 470 - Bachelor's Degree in Architecture Studies: 5
581 - Bachelor's Degree in Telecomunications Technology and Services Engineering: 3
440 - Bachelor's Degree in Electronic and Automatic Engineering: 4
434 - Bachelor's Degree in Mechanical Engineering: 4
439 - Bachelor's Degree in Informatics Engineering: 4
435 - Bachelor's Degree in Chemical Engineering: 4
430 - Bachelor's Degree in Electrical Engineering: 4
438 - Bachelor's Degree in Telecomunications Technology and Services Engineering: 4
436 - Bachelor's Degree in Industrial Engineering Technology: 4
476 - : XX
558 - Bachelor's Degree in Industrial Design and Product Development Engineering: 4

Semester: Second semester
Subject Type: Optional
Module:

1. General information

1.1. Aims of the course

The expected results of the course respond to the following general aims:

- Acquire a global knowledge of the problems associated with the use of energy and materials and their socioeconomic implications.
- It should provide an ethical background of sustainability issues not covered in regular courses.
- Learn to make a good presentation and be able to defend a certain topic to a general audience.

The whole subject is based on providing students with ethical training. In all sessions the fundamental framework is sustainable development, sustainable lifestyles, human and natural rights. In this sense, practically all Sustainable Development Goals, SDGs, of the 2030 Agenda (https://www.un.org/sustainabledevelopment/es/) will be addressed directly or indirectly in the course. Only those that are addressed in dedicated sessions are listed below.

SDG2: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture
SDG4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
SDG 7. Affordable and clean energy
SDG 6: Ensure availability and sustainable management of water and sanitation for all
SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
SDG 9. Industry, innovation and infrastructure
SDG 12. Responsible production and consumption

SDG 13. Take urgent action to combat climate change and its impacts
SDG 15. sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss

1.2. Context and importance of this course in the degree

The subject is the starting point for understanding the current economic state of the energy sector and its environmental, social and political consequences. The course will offer students an overview of the energies that will serve as a decision tool for the subsequent choice of more in-depth studies of one or another energy technology alternative.

1.3. Recommendations to take this course

This is a very interactive course. The learning is achieved through discussion in class, the use of multimedia means such as videos, online software, etc., team work, role playing, presentations by students in class, etc.

The main language in class is English, so a sufficient knowledge of this language is necessary (level B1 is recommended).

No knowledge of previous courses is necessary.

2. Learning goals

2.1. Competences

C04 - Ability to solve problems and take decisions with initiative, creativity and critical analysis.

C07 - Ability to analyze and assess the social and environmental analysis of technical solutions, acting with professional responsibility, social and ethical compromise.

C08 - Ability to work in a multidisciplinar and multilingual environment.

C11 - Ability to apply ITC technologies in Engineering.

2.2. Learning goals

- Knowledge of the interactions between energy, development, the environmental impact of growth and economic needs. The world, European and national levels.
- Analyze current energy and material consumption and future trends; global and local impacts and social sustainability models associated with energy and material consumption.
- Critical analysis on the sustainability of the different energy and resource use models.

2.3. Importance of learning goals

The course will provide students with a critical view of the various options for resource savings and resource production. It will bring of alternative decision elements other than purely technical, including social, environmental, political and economic aspects.

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that he or she has achieved the intended learning outcomes through the following evaluation activities:

Option 1: Attendance to most of the sessions (a maximum of 2 missed classes is allowed). The final score involves the following:
1. Assignment 1: (60%) Reading a book selected from a list provided during the course. Extensive summary of the report and presentation.
2. Assignment 2: (40%) Participation in class and small activities proposed during the course, including a presentation of a specific topic on sustainability.

The final score is obtained applying the following formula:

Final score= 0.6*Assignment 1+0.4*Assignment 2

To pass the course , the student needs to get at least an average score of 5 and should not have obtained less than 4 in each of the assignments.

Option 2: Final exam

In case the minimum of attendance has not been reached and/or the proposed activities have not been presented, the

student can opt for an exam that will consist in answering questions regarding the different sessions that have been explained during the course.

The final score is obtained considering the best score of the following formulas:

- Final score 1= [0.6*(Assignment 1)+0.4*(Assignment 2)]*0.5+Exam*0.5

- Final score 2=Exam

The summary of the book must have the following structure:

- Initial data with the book and authors page.
- Summary of about 8 pages.
- Critical analysis of the book.
- Additional information about the author and the impact of the book.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. It is a course open to discuss the current energy situation and the social, economic and technological impact of different energy alternatives and its associated problems. A wide range of teaching and learning tasks are implemented, such as:

- Lectures will be combined with videos, case studies and student presentations.
- The reading and presentation of a book in class, which encourages autonomous learning and critical thinking. S tudents can also develop additional skills, such as teamwork, oral and written expression, preparing powerpoint presentations, clear and organized presentations, proper time management, etc.
- The oral presentation of the book and the proposed topic will be held in class and evaluated in situ, promoting in this way the participation of all students. It will be assessed according to the following criteria:
    - Preparation
    - Organization
    - Slides
    - Presentation
    - Message
    - Impact
    - Time
    - Contents
    - Security

Students will learn from the mistakes that have been done by the previous groups, thereby improving their presentations.

Emphasis on the use of new information technologies (ICT) is made. Moodle constitutes the basic computer tool on which the course will be built. Content, additional information, forums and grades will be available at the virtual platform Moodle 2. It will also be the communication tool where topics and books will be assigned to students.

Teachers will therefore be a means for students to achieve learning of the course through a semi-autonomous way. Teachers will be available to students through tutorials. But through Moodle, and the forum, the students themselves can raise and solve doubts.

4.2. Learning tasks

This is a 4 ECTS course organized as follows:

- Lectures open to discussion (1.5 ECTS: 30 hours)
- Practical exercises, including teamwork and role playing (1.5 ECTS: 30 hours)
- Student presentations in class (0.5 ECTS: 5 hours)
- Assessment tasks (0.5 ECTS: 5 hours).

4.3. Syllabus

The course will address the following topics:

1. Energy and sustainability
2. The real value of money
3. Climate change

4. The climate conference
5. The depletion of minerals
6. Sustainable development goals
7. Food and soil depletion
8. The energy efficiency laws

4.4. Course planning and calendar

Further information concerning the timetable, classroom, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the EINA web page.