Universidad Zaragoza

Academic Year/course: 2021/22

30130 - Economic Engineering

Syllabus Information

Academic Year: 2021/22
Subject: 30130 - Economic Engineering
Faculty / School: 175 - Escuela Universitaria Politécnica de La Almunia
Degree: 425 - Bachelor's Degree in Industrial Organisational Engineering
ECTS: 6.0
Year: 3
Semester: Second semester
Subject Type: Compulsory
Module:

1. General information

1.1. Aims of the course

The subject and its expected results respond to the following approaches and objectives:

It aims to interest the student in a characteristic and distinctive element of engineering such as decision-making between different alternatives.

In this context it is essential to make economic estimates, for which historical data can be used, but what is relevant is the data expected in the future.

For this purpose, cost elements, financial mathematics and technologies for digital transformation, among others, are studied.

Alignment with the SDGs

These approaches and objectives are in line with the following Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (https://www.un.org/sustainabledevelopment/es/), in such a way that the acquisition of the course learning outcomes provides training and competence to contribute to their achievement to some degree.

Goal 8: Promote inclusive and sustainable economic growth, employment and decent work for all

Goal 12: Ensure sustainable consumption and production patterns

Specifically with the following goals:

8.2Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors

12.6Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle

1.2. Context and importance of this course in the degree

The degree of Industrial Organization Engineering has a strong management component among which it is considered that should be the skills of the graduate. It is therefore the objective of the degree to provide the student with competencies for making business decisions or, in general, organizational and management decisions in organizations that must relate to the business environment. This advises the existence of disciplinary contents that, beyond instructing in managerial skills, offer knowledge of cost analysis, financial operations and skills in the handling of technologies to help decision making.

1.3. Recommendations to take this course

In order to take the course, it is recommended to have a basic knowledge of Economics and Business Administration.

2. Learning goals

2.1. Competences

By passing the course, the student will be more competent to...

Generic competencies:
1. Ability to plan, budget, organize, direct and control tasks, people and resources (C2)
2. Ability to solve problems and make decisions with initiative, creativity and critical thinking (C4)
3. Capacity to apply information and communication technologies in engineering (C5)
4. Ability to communicate and transmit knowledge, skills and abilities in Spanish (C6)
5. Ability to learn continuously and develop autonomous learning strategies (C11)

Specific competences:
1.- Knowledge and skills for economic decision-making in the fields of production and technology in organizations. (C36)

2.2. Learning goals

In order to pass this course, the student must demonstrate the following results...

Identifies and knows how to calculate the different types of costs for each productive environment and distribute them among the products, services and areas of the company for decision making.
Establishes the profitability threshold of the company and performs cost-volume-benefit sensitivity analysis to overcome the uncertainty in the company's decision making.
It prepares productivity indicator tables and develops learning and integral improvement systems in the organization.
Establishes sales prices for the company's products and services in the market.
Prepares sales, cost and treasury budgets
Knows how to analyze and select investment projects and their internal rates of return

2.3. Importance of learning goals

The course is largely aimed at providing students with a management and direction profile, in order to achieve greater skills and competences, both specific and generic, which will improve their competitiveness. In the development of their profession, engineers will inevitably come into contact with the world of business and its organization and will move in an economic environment. The knowledge of the business organization helps them to develop skills and competences applicable to many fields of action and allows providing a greater added value to those who have them and therefore makes them more desirable in the labour market.
In order to carry out the above professional tasks in an effective and efficient way, it will be necessary for them to master the contents that are the object of this subject.

3. Assessment (1st and 2nd call)

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

The student must demonstrate that he/she has achieved the intended learning outcomes through the following assessment activities
Following the spirit of Bologna, in terms of the degree of involvement and continuous work of the student throughout the course, the assessment of the subject considers the method of Continuous Assessment as the most appropriate to be in line with the guidelines set by the new framework of the EHEA.
The qualification of the subject through the system of Continuous Assessment has been established so that any student can take advantage of it, taking into account that to opt for the system of Continuous Assessment at least 80% of the classroom activities must be attended (practices, technical visits, classes, etc.). To this end, a table has been designed to weigh up the qualification process of the different activities, consisting of evaluation tests and participation tests on the thematic blocks in which the course subject has been structured.
The evaluation process will be carried out according to the:
- Direct observation of the student in order to know his/her attitude towards the subject and the work it requires (attention in class, completion of assigned work, resolution of questions and problems, active participation in the classroom, etc.).
- Checking their progress in the conceptual field (questions in class, comments in the classroom, taking exams, etc.).
- Periodic oral and/or written tests to assess the degree of knowledge acquired, as well as the qualities of expression which, at this educational level, must be shown to be widely correct.
Prior to the first call, the subject teacher will notify each student whether or not he or she has passed the subject, based on the sum of the scores obtained in the different activities carried out throughout the semester. If the student does not pass in this way, he/she will have two additional opportunities to do so.
In order to evaluate these two calls, the grade obtained in a final exam will be used to assess the content of all the subject matter dealt with throughout the course by means of short, multiple choice questions and practical exercises, all of which will be assessed using the same criteria established for continuous assessment.
SYSTEM OF CONTINUOUS EVALUATION
The following table shows the weight of the various evaluation milestones:
Evaluation of Activities

	During the course	1st Call	2nd Call
Written tests	70%	70%	70%
Practical work	30%	30%	30%
TOTAL		100%	100%

- The Participation Tests will consist of the realization of exercises, theoretical and/or practical, associated to the different thematic blocks. It is possible to develop these tests in groups and for their evaluation a public presentation must be made to encourage debates of opinion and reflection in class.
- The written tests will consist of individual exercises to be developed in class of a theoretical and practical nature.
Theoretical tests will consist of short open-ended questions and multiple choice questions.
The evaluation criteria for the short open-ended questions are the precision, relevance and clarity of the answers.
Practical tests; consisting of problem solving.
The evaluation criteria for these tests are the obtaining of results, analysis and interpretation of them.
SUMMONING TESTS
In this case the assessment of the learning outcomes will be carried out by means of a single test containing all the subject matter covered during the course. The number of calls available to the student throughout the course is two. The presentation and adequate completion of the work is considered obligatory.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process designed for this subject is based on the following:

Strong interaction between the teacher/student. This interaction is brought into being through a division of work and responsibilities between the students and the teacher. Nevertheless, it must be taken into account that, to a certain degree, students can set their learning pace based on their own needs and availability, following the guidelines set by the teacher.

The current subject Economic engineering is conceived as a stand-alone combination of contents, yet organized into three fundamental and complementary forms, which are: the theoretical concepts of each teaching unit, the solving of problems or resolution of questions and laboratory work, at the same time supported by other activities.

The organization of teaching will be carried out using the following steps:

- **Lectures**: Theoretical activities carried out mainly through exposition by the teacher, where the theoretical supports of the subject are displayed, highlighting the fundamental, structuring them in topics and or sections, interrelating them.
- **Practice Sessions**: The teacher resolves practical problems or cases for demonstrative purposes. This type of teaching complements the theory shown in the lectures with practical aspects.
- **Laboratory Workshop**: The lecture group is divided up into various groups, according to the number of registered students, but never with more than 20 students, in order to make up smaller sized groups.
- **Individual Tutorials**: Those carried out giving individual, personalized attention with a teacher from the department. Said tutorials may be in person or online.

"If classroom teaching were not posible due to health reason, it would be carried out on-line"

4.2. Learning tasks

The programme offered to the student to help them achieve their target results is made up of the following activities...

Involves the active participation of the student, in a way that the results achieved in the learning process are developed, not taking away from those already set out, the activities are the following:

- **Face-to-face generic activities**:

Theory Classes: The theoretical concepts of the subject are explained and illustrative examples are developed as a support to the theory when necessary.

Practical Classes: Problems and practical cases are carried out, complementary to the theoretical concepts studied.

Laboratory Workshop: This work is tutored by a teacher, in groups of no more than 20 students.

- **Generic non-class activities**:

Study and understanding of the theory taught in the lectures.

Understanding and assimilation of the problems and practical cases solved in the practical classes.

Preparation of seminars, solutions to proposed problems, etc.

Preparation of laboratory workshops, preparation of summaries and reports.

Preparation of the written tests for continuous assessment and final exams.

The subject has 6 ECTS credits, which represents 150 hours of student work in the subject during the trimester, in other words, 10 hours per week for 15 weeks of class.

A summary of a weekly timetable guide can be seen in the following table. These figures are obtained from the subject file in the Accreditation Report of the degree, taking into account the level of experimentation considered for the said subject is moderate.

Activity	Weekly school hours
Lectures	3
Laboratory Workshop	1
Other Activities	6

Nevertheless, the previous table can be shown in greater detail, taking into account the following overall distribution:

- 35 hours of lectures, with 50% theoretical demonstration and 50% solving type problems.
- 17 hours of laboratory workshop, in 1 or 2-hour sessions.
- 8 hours of written assessment tests, one hour per test.
- 90 hours of personal study, divided up over the 15 weeks of the 2nd semester.

There is a tutorial calendar timetable set by the teacher that can be requested by the students who want a tutorial.

4.3. Syllabus

The course will address the following topics:

CONTENTS 1. THEORETICAL

1. FOUNDATIONS OF ECONOMIC ENGINEERING

2. PAYMENT FACTORS AND THEIR USE

3. INVESTMENT ALTERNATIVES I

4. INVESTMENT ALTERNATIVES II

5. DEPRECIATION METHODS

6. REPLACEMENT ANALYSIS

7. DECISIONS UNDER UNCERTAINTY

8. ANALYTICAL ACCOUNTING

9. PARTIAL COSTS

10. FULL COSTS

11. ACTIVITY-BASED COSTS

12. PREPARATION AND BUDGET CONTROL

13. PRODUCTIVITY INDICATORS

2. PRACTICAL CONTENT
Each topic discussed in the previous section has associated practices in this regard, whether by practical cases, interpretation and commentary on the topic leading to associated obtaining results and their analysis and interpretation. As topics are developed it will pose such practices, either in class or through the Moodle platform.

4.4. Course planning and calendar

Schedule sessions and presentation of works

In the following table, the indicative schedule which includes the development of the activities presented above may vary depending on the educational activity is shown.

- Sessions 1.2 Basic Financial Concepts
- Factors 3,4,5 payment session. Delivery practices 1
- Sessions 6,7,8,9,10 Investment alternatives
- Sessions 11.12 depreciation methods. Delivery of Practice 2

- Sessions 13.14 Sensitivity analysis and decisions expected value
- Sessions 15 First partial exam. Delivery of Practice 3
- Sessions 16 Cost accounting
- Sessions 17,18,19 partial or direct costs. Delivery Practice 4
- Sessions 20 Costs per order
- Sessions 20,21 full session costs per process. Delivery Practice 5
- Session Complete sections 25,26,27 costs
- Session 28 Development and budgetary control. Delivery Practice 6
- Session 29 Productivity Indicators
- Session 30 Second midterm exam session. Practical delivery in July

The weekly schedule of the subject will be published at
http://www.eupla.unizar.es/asuntos-academicos/calendario-y-horarios

The dates of the global evaluation test (**official calls**) will be published at
http://www.eupla.unizar.es/asuntos-academicos/examenes

4.5. Bibliography and recommended resources

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=30130