Universitat Autònoma de Barcelona

2021/2022

Basic Engineering

Code: 42642
ECTS Credits: 6

Degree	Type	Year	Semester
4313489 Logistics and Supply Chain Management	OT	1	1

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

Name: Jose Luis Muñoz Gamarra

Email: JoseLuis.Munoz.Gamarra@uab.cat

Use of Languages

Principal working language: english (eng)

Teachers

Romualdo Moreno Ortiz

Jose Luis Muñoz Gamarra

Prerequisites

None.

Objectives and Contextualisation

Understanding of what engineering is and the different aspects on problem solving.

Practical problem solving by the application of the appropriate methodology.

Learning and practicing of some aspects and methodologies applied to innovation application in problem solving.

Competences

- Apply quantitative methods and techniques based on optimisation and/or simulation models in order to evaluate the different alternatives and select the most promising solution to be implemented
- Demonstrate abilities to document and reflect the problem-solving process in order to extract the lessons learned.
- Face a new problem under a scientific perspective.
- Identify the main aspects to be planned in the resolution of a logistic project, specifying the project boundaries, and leading with a solution
- Possess and understand knowledge that provides a basis or opportunity for originality in the development and/or application of ideas, often in a research context
- Select and apply the most relevant analytical methodologies, strategies and current technologies for designing solutions to the problams of management and coordination of material, information and financial flows.
- Student should possess an ability to learn that enables them to continue studying in a manner which is largely self-supervised or independent

- Work collaboratively in a group.

Learning Outcomes

1. Analyse how to apply information technologies in logistics.
2. Demonstrate abilities to document and reflect the problem-solving process in order to extract the lessons learned.
3. Face a new problem under a scientific perspective.
4. Identify the main aspects to be planned in the resolution of a logistic project, specifying the project boundaries, and leading with a solution
5. Know the basic information technologies.
6. Know the general concepts for solving engineering problems.
7. Organize and allocate the material resources required to meet the different tasks and project needs.
8. Possess and understand knowledge that provides a basis or opportunity for originality in the development and/or application of ideas, often in a research context
9. Student should possess an ability to learn that enables them to continue studying in a manner which is largely self-supervised or independent
10. Work collaboratively in a group.

Content

Theoretical sessions

1. Introduction to Engineering
2. Engineering as a profession
3. Obstacles and Tools in Problem Solving
4. Framework for Problem Solving in Engineering
5. Introduction to Project Management
6. Model-driven Design
7. Engineering calculus
8. Innovation

Practical sessions

1. Introduction to Lego Mindstorms: general aspects and programming issues.
2. Project development following the Framework for Problem Solving
    Definition phase
    Exploration phase
    Planning phase
    Development phase
4. Oral project presentation

Methodology

Teaching will be offered on campus or in an on-campus and remote hybrid format depending on the number of students per group and the size of the rooms at 50% capacity.

The general methodological approach of the course is based on the principle of multidiversity of strategies which it is intended to facilitate the active participation and the construction of the learning process by the student, under the principle of "learning by doing".

The proposed teaching methodology may undergo some modifications according to the restrictions imposed by the health authorities on on-campus courses.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Exercise sessions	8	0.32	4, 9, 3
Individual problem solving	20	0.8	2, 4, 7, 9, 3
Oral project presentations	2	0.08	2
Practical sessions	22	0.88	1, 5, 4, 7, 3, 8, 10
Theoretical sessions	15	0.6	6, 5, 4, 3
Type: Supervised			
Project development	45	1.8	1, 2, 4, 7, 3, 8, 10
Tutorship sessions	8	0.32	9
Type: Autonomous			
Self-study	30	1.2	9

Assessment

The assesment method has two main elements:

- Continuous assesment in theory and problem lectures: Students are assessed by means of multiple problems proposed in class. Along the course they get more and better strategies to face these problems. Thus, their evolution is assessed.
- Project development: A problem to solve will be proposed. Working in groups, the students have to design, plan and implement a solution to the problem following the problem solving framework presented in the theory lectures. A report containing the main aspects of the project development has to be written. Finally, an oral presentation of the work development and obtained results will be done.

In order to average all the evaluation activities, the mark of each of them must be above 5 points (out of 10). All the report-based activities must be submitted within the due dates specified by the professor. If a report-based activity is failed, the student will be asked to re-submit its report according to the corrections/indications provided by the professor. If the exam is failed, the student will have the opportunity to retake it. The dates for retaking an exam will be communicated to the student well in advance.

The student can submit to the recovery whenever it has been presented to a set of activities that represent a minimum of two thirds of the total grade of the subject.

The assessment method is the same for students who repeat the subject.

The weights of each evaluation activity are given in the table below.

The proposed evaluation activities may undergo some changes according to the restrictions imposed by the health authorities on on-campus courses.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes

Continuous assesment in theory and problem lectures	40 %	0	0	6, 5, 2, 4, 7, 9, 3
Oral project presentation	20 %	0	0	2
Project development (report)	40 %	0	0	1, 2, 4, 7, 3, 8, 10

Bibliography

- Brockman, Jay B. *Introduction to engineering: modeling and problem solving*. John Wiley & Sons, Inc., 2009.
- Gómez, Alan G y otros. *Engineering your future: a project-based introduction to engineering*. Great Lakes Press, Inc., 2006.
- Lego Mindstorm Handbook.

Software

Lego Mindstorms