1. OVERVIEW

Subject area	Introduction to Engineering
Degree	Bachelor's Degree in Industrial Organisation Engineering
School/Faculty	Faculty of Science, Engineering and Design
Year	1º
ECTS	6
Type	Core
Language(s)	Spanish
Delivery Mode	On campus and Online
Semester	1

2. INTRODUCTION

Industrial Organisation Engineering has become one of the most in-demand fields of study in recent years. This subject deals with concepts related to engineering such as: **Engineering and science, automation and smart systems, industry 4.0, production and operations, logistics engineering, innovation management, ethics and social responsibility**. It also helps develop skills in **leadership and project management so students can apply them to group or company work in the future**. It will also present some data analysis tools geared towards providing students with a broad range of resources for dealing with problems.

This subject area aims to provide all the basic knowledge and key concepts of engineering, particularly in the business sector. Students will learn different techniques, methods and skills to serve them well in their future careers. The subject will also provide a base for other subjects in following years.

3. SKILLS AND LEARNING OUTCOMES

Basic skills (CB, by the acronym in Spanish):

- CB2 - Students can apply their knowledge to their work or vocation in a professional manner and possess the skills which are usually evident through the forming and defending of opinions and resolving problems within their study area.
- CB4 - Students can communicate information, ideas, problems and solutions to both a specialist and non-specialist audience.
- CB5 - Develop the learning skills necessary to undertake further study in a much more independent manner.

Cross-curricular skills (CT, by the acronym in Spanish):

- CT1 - Ethical values: ability to think and act in line with universal principles based on the value of a person, contributing to their development and involving commitment to certain social values.
- CT2 - Independent learning: skills for choosing strategies to search, analyse, evaluate and manage information from different sources, as well as to independently learn and put into practice what has been learnt.
- CT3 - Teamwork: ability to integrate and collaborate actively with other people, areas and/or organisations to reach common goals.
- CT4 - Written/spoken communication: ability to communicate and gather information, ideas, opinions and viewpoints to understand and be able to act, spoken through words or gestures or written through words and/or graphic elements.
- CT5 - Analysis and problem-solving: be able to critically assess information, break down complex situations, identify patterns and consider different alternatives, approaches and perspectives in order to find the best solutions and effective negotiations.
- CT6 - Adapting to change: be able to accept, consider and integrate different perspectives, adapting your own approach as required by the situation at hand, and to work effectively in ambiguous situations.
- CT8 - Entrepreneurial spirit: ability to take on and carry out activities that generate new opportunities, foresee problems or lead to improvements.

Specific skills (CE, by the acronym in Spanish):

- CE08 - Ability to use basic knowledge of production and manufacturing systems in industrial organisation processes.
- CE13 - Ability to apply design and management techniques and tools to control production and operations in industrial organisation.
- CE14 - Ability to apply knowledge of quality and environmental management systems in the field of industrial organisation engineering.
- CE18 - Ability to organise, complete and defend a project in the field of industrial organisation engineering.

Learning outcomes (RA, by the acronym in Spanish):

After passing the course the student will be able to:

- RA01: Manage the production and operations of an industrial company, recognising and classifying the key decisions to be made.
- RA02: Analyse the processes and suggest improvements to minimise faults, surplus stock, over-production and over-processing.
- RA03: Solve problems regarding optimisation, planning of demand, supply and materials management in a productive system.
- RA04: Solve assignment and transport issues, problems in the decision-making process, and manage inventories and queue management.
- RA05: Implement quality control systems and continuous development plans.
- RA06: Design and put into action engineering projects.

- RA07: Carry out environmental and social impact studies for projects and activities.
- RA08: Apply the principles of a smart and connected industry to an industrial organisation.

The following table shows how the skills developed in the subject area match up with the intended learning outcomes:

Skills	Learning outcomes (RA, by the acronym in Spanish)
CB2, CB4, CB5, CT1, CT2, CT3, CT4, CT5, CT6, CT8, CE8, CE13, CE14, CE18	**RA01, RA02, RA03, RA04, RA05, RA06, RA07, RA08**

4. CONTENTS

This subject area deals with the following topics:

- UNIT 1: What is engineering?
- UNIT 2: Industry and society. The present and future of industrial engineering.
- UNIT 3: Industry 4.0 or the Smart Industry. Trends
- UNIT 4: What being an Industrial Organisation Engineer involves. Advice for Industrial Organisation and Engineering students.
- UNIT 5: Introduction to skills, methods and tools in Industrial Organisation Engineering. Case studies.

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- Master lectures
- Collaborative learning
- Problem-based learning
- Project-based learning
- Learning based on laboratory work (laboratory, workshop and simulation environments)
- Case study
- Gamification
- Field work

6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, are as follows:

On campus:

Learning activity	Number of hours
Master lectures and practical seminars	35
Problem-solving	20
Case studies and field studies	15
Debates and discussions	8
Learning contract (definition of interests, needs and objectives)	2
On campus knowledge tests	4
Independent working	58
Tutorials	8
TOTAL	**150**

Online:

Learning activity	Number of hours
Master lectures and online lectures	26
Problem-solving	16
Case studies	7
Virtual laboratory practice and simulations	24
Online forum (debates and discussions)	8
Learning contract (definition of interests, needs and objectives)	2
Study of course content and additional documentation (independent working)	58
Online tutorials	7
On campus knowledge tests	2
TOTAL	**150**

7. ASSESSMENT

The assessment systems, plus their weighting in the final grade for the subject area, are as follows:

On campus:

Assessment system	Weighting
KNOWLEDGE TESTS On Campus tests to evaluate objectives of theory/practical learning (exam-type objective tests, written compositions, oral presentations, case studies/problem solving, debates, simulation tests)	40%
EXPERIMENTS AND INTERPRETATION Off-site tests to assess theory/practical learning (case studies/problem-solving)	40%
Attitude assessment tests (attitude assessment rubrics, class participation)	10%
Self- and co-assessment (learning contract, learning objectives)	10%

Students will not be able to pass the subject if they **do not attend at least 50% of the lectures.**

Submissions beyond the deadline (date and time given) will not be accepted unless there is a justified reason.

Students will be penalised (or even disqualified) for any work in which a **plagiarism score above 20% is found.**

Online:

Assessment system	Weighting
On Campus knowledge test	60%
Off-site activities	30%
Class participation	5%
Self-assessment	5%

On the Virtual Campus, when you open the subject area, you can see all the details of your assessment activities and the deadlines and assessment procedures for each activity.

8. BIBLIOGRAPHY

The bibliography is indicated below:

- Gabriel Baca U. et al.; Introducción a la Ingeniería Industrial. Ed. 2014

Recommended articles and bibliography (this list will be added to during the course year)

- Jorge Raul Stincer Gómez; Introducción a la Ingeniería Industrial. ISBN: ISBN 978-607- 733-077-6. Edición 2012
- Done A., "Facing up a changing world", IESE Insight, issue 12, first quarter 2012
- The thinking business Brain Tour; 6 Thinking Hats by Eduard Bono; Steven Johnson
- Match your innovation strategy to your ecosystem, Ron Adner, Harvard University Review, 2006
- Design Thinking by Tim Brown, Harvard Business Review, 2008
- Insights on creativity, Tina Seeling, 2012
- Managing Innovation via Strategic Initiatives, J. Vilà IESE, 2004
- How innovative is your company culture?, Jay Rao & Joseph Weintraub, MITSloan Management Review,2013
- Roadmapping for strategy and innovation. Robert Phaal. Center for Technology Management. Institute for Manufacturing, University of Cambridge. 2004.