Course guide
240773 - 240773 - Project Management

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Unit in charge: Barcelona School of Industrial Engineering
Teaching unit: 758 - EPC - Department of Project and Construction Engineering.

Degree: BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGIES AND ECONOMIC ANALYSIS (Syllabus 2018). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 4.5 **Languages:** English

LECTURER

Coordinating lecturer: Canals Casals, Lluc

Others:

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEGTI14. (ENG) Coneixements i capacitats per organitzar i gestionar projectes. Conèixer l'estructura organitzativa i les funcions d'una oficina de projectes.

Generical:
CGGTI 1. (ENG) Capacitat per a la redacció i desenvolupament de projectes en l'àmbit de la Ingeniera Industrial que tinguin per objecte, d'acord amb els coneixements adquirits segons la formació rebuda en tecnologies específiques, la construcció, reforma, reparació conservació, demolició, fabricació, instal.lació, muntatge o explotació de: estructures, equips mecànics, instal.lacions energètiques, instal.lacions elèctriques i electròniques, instal.lacions i plantes industrials i/o processos de fabricació i automatització.
CGGTI 2. (ENG) Capacitat per a la participació en la direcció de les activitats pbjecte dels projectes d'Enginyeria Industrial.
CGGTI 4. (ENG) Capacitat pe resoldre problemes amb iniciativa, presa de decisions, creativitat, raonament crític i de comunicar i transmetre coneixements, habilitats i destreses en el camp de l'Enginyeria Industrial.
CGGTI12. (ENG) Gestió de projectes: ser capaç de realitzar i gestionar projectes d'Enginyeria Tècnica Industrial, mitjançant l'aplicació de coneixements científics i tecnològics, actituds i procediments, un cop identificats o valorats els condicionants.
CGGTI10. (ENG) Capacitat de treballar en un entorn multilingüe i multidisciplinar.
CGGTI 5. (ENG) Coneixements per a la realització de medicions, càlculs, valoracions, tasacions, peritacions, estudis, informes, plans de treball i altres treballs similars.
CGGTI 8. (ENG) Capacitat per aplicar els principis i mètodes de qualitat.

Transversal:
CT4. (ENG) TREBALL EN EQUIP: Ser capaç de treballar com a membre d'un equip interdisciplinar, ja sigui com un membre més, o realitzant tasques de direcció, amb la finalitat de contribuir a desenvolupar projectes amb pragmatisme i sentit de la responsabilitat, assumint compromisos tenint en compte els recursos disponibles.
CT3. (ENG) COMUNICACIÓ EFICAÇ ORAL I ESCRITA: Comunicar-se de forma oral i escrita amb altres persones sobre els resultats de l'aprenentatge, de l'elaboració del pensament i de la presa de decisions; participar en debats sobre temes de la pròpia especialitat.
CT7. (ENG) TERCERA LLENGUA: Conèixer una tercera llengua, preferentment l'anglès, amb un nivell adequat oral i escrit, i en consonància amb les necessitats que indran els titultats i titulades.
CT6. (ENG) APRENENTATGE AUTÒNOM: Detectar mancances en el propi coneixement i superar-les mitjançant la reflexió crítica i l'elecció de la millor actuació per ampliar aquest coneixement.
CT2. (ENG) SOSTENIBILITAT I COMPROMÍS SOCIAL: Conèixer i comprendre la complexitat dels fenòmens econòmics i socials típics de la socitat del benestar; tenir capacitat per relacionar el benestar amb la globalització i la sostenibilitat; aconseguir habilitats per usar de forma equilibrada i compatible la tècnica, la tecnologia, l'economia i la sostenibilitat.
CT5. (ENG) ÚS SOLVENT DELS RECURSOS D'INFORMACIÓ: Gestionar l'adquisició, l'estructuració, l'anàlisi i la visualització de dades i informacions en l'àmbit d'especialitat i valorar de forma crítica els resultats d'aquesta gestió.

Basic:
CBGTI4. (ENG) Que els estudiants puguin transmetre informació, idees, problemes i solucions a un públic tant especialitzat, com no especialitzat.
CBGTI2. (ENG) Que els estudiants sàpiguen aplicar els seus coneixements al seu treball o vocació d'una forma professional i tinguin les comptències que se solen demostrar mitjançant l'elaboració i defensa d'argumnets i la resolució de problemes dins de la sera àrea d'estudi.
CBGTI5. (ENG) Que els estudiants hagin desenvolupat aquelles habilitats d'aprenentatge necessàries pe emprendre estudis posteriors amb un alt grau d'autonomia.
CBGTI3. (ENG) Que els estudiants tinguin la capacitat de reunir i intepretar dades rellevants (normalment dins de la seva àrea d'estudi) per emetre judicis que incloguin una reflexió sobre temes rellevants d'índole social, científica o ètica.

TEACHING METHODOLOGY

FACE-TO-FACE TEACHING:
The face-to-face sessions are divided into two main concepts: Master class of the main concepts (with current examples) given by the teacher and practical sessions that will work on aspects such as:
- Teamwork
- Exercises in class to consolidate concepts
- Exhibitions of the work done so far (by students)
-Monitoring the progress of the work of each group and solving doubts

AUTONOMOUS LEARNING:
This subject is eminently practical, encouraging group work in a collaborative and cooperative way with the aim of learning how to identify, define and choose the best solution to a problem with project tools.
To this end, the degree of autonomous work is remarkable (60%) and it will have the following proposals:
- Participation in debates
- Occasional exercises of specific concepts (some of them not-mandatory)
- Teamwork (Deliverables and presentations)
o Definition of the problem
o Research and analysis of technical, market and regulatory information
o Selection of alternatives
o Final presentation.
- Peer evaluation of the work of classmates
- Use of project management and monitoring tools to carry out teamwork
- Reading of teaching and complementary material

LEARNING OBJECTIVES OF THE SUBJECT

*** General goal:
Students should be able to propose, carry out and direct industrial engineering projects through the application of scientific and technical knowledge (concepts and principles), attitudes and procedures, once the conditions have been identified and assessed.

*** Specific goals:
Gain a basic knowledge of:
· The activities in projects,
· The key points of project methodology and management,
· The functional specifications of the results that will serve as terms of reference for further applications of projects, as for example, in the Final Degree Project.

STUDY LOAD

Type	Hours	Percentage
Hours medium group	45,0	100.00

Total learning time: 45 h

CONTENTS

Projects and their phases

Description:
• The concept of Project.
• Project methodology and types of projects.
• Repetitive project and particular or R&D project.
• Morphology of the project. Stages of rational doing. Classic phases of projects. Project activities matrix.
• The life cycle of the project.
• Creative phases of the project:
o Phase of order of magnitude.
o Preliminary study phase or feasibility study.
o Draft-project phase or basic design.
o Project phase or detailed design.
• Construction phase and project management.
• Other phases of the project.

Specific objectives:
- Distinguish different types of projects.
- Know the different phases of projects and see the need to work in phases.
- Define the objective of the project, differentiating the purpose, purpose and scope of projects.

Related activities:
Open questions in the classroom.
Divide the students into subgroups and assign a project topic to each subgroup.
Debates at Atenea

Full-or-part-time: 15h
Theory classes: 1h 30m
Practical classes: 9h
Self study : 4h 30m

Problem definition and analysis of needs

Description:
· Project approach. Goals.
· Variables, restrictions and evaluation criteria.
· Machines and people: Definition and characteristics of the system: person-artifact-environment.
· User types and their different needs due to their position in the project.
· Identification of user needs. Maslow's pyramid.
· The user "operator" of a system. Physical environment and human performance.
· The ergonomic conditioning factors of well-being.
· Technical specifications.
· Information search. Available information sources.

Specific objectives:
- Identify the variables for solving the problem, the restrictions and the evaluation criteria, in order to apply them on the group's projects.
- Understand the importance of applying ergonomics as a source of well-being and safety.
- Have the ability to see the user as the reason for being of a product.
- Being able to assess the level of satisfaction that the project gives the user.
- Master the search for specific information in databases, technical journals, legislation, textbooks.
- Information management. Bibliographic records. Information selection capacity

Related activities:
Follow-up of the work in groups
Apply the group's projects to identify, altogether, the most relevant Techincal requirements. (PBL)
Gamification to learn about users of the project.

Full-or-part-time: 15h
Theory classes: 1h 30m
Practical classes: 4h 30m
Self study : 9h

Technical and conceptual design

Description:
· The engineering design process.
· Creativity techniques. Conceptual design. Brainstorming.
· Functional analysis. Abstraction in general and specific functions.
· Value Analysis. Analysis of the functions of a product. Assessment of the functions by the user. Associated cost per function. Analysis of the value of each function.
· Preliminary and detailed design. Design for X. Economical design. Robust design
· Safety in design: stupid-proof design.
· Technological reliability, human reliability, risk and uncertainty. Risk management.

Specific objectives:
- Distinguish the difference between need, idea and objective
- Build and use function trees
- Know the types of existing design
- Learn the concepts of risk and reliability

Related activities:
Follow-up of the work in groups
Apply creativity techniques to the group's projects to identify, altogether, different alternative solutions. (PBL)
Gamification and videos to present situations.

Full-or-part-time: 31h 15m
Theory classes: 2h 30m
Practical classes: 10h
Self study : 18h 45m

Project Feasibility

Description:
• Technical, economic, environmental and social viability of a project.
• The capital investment and operating budget.
• Study of profitability and temporary value of money.
• Sensitivity and uncertainty analysis.
• Entrepreneurial activity.
• Concept of sustainable development.
• Prevention of pollution in the design phase. Environmental Impact Assessment (EIA).
• Intellectual property.
• Analysis of alternatives. Methods of evaluation and selection of projects

Specific objectives:
- To be able to make an economic evaluation both quantitative and qualitative.
- To know the different types of profitability analysis and be able to decide if a project will be economically viable or not.
- To apply the concept of sustainable development in projects.
- To know the environmental legislation and current regulations and know how to apply them.
- To know the existence and handle information on patents.
- To know methods to evaluate alternatives in a project and make decisions

Related activities:
Gamification
Follow-up of the work in groups
Resources on videos

Full-or-part-time: 22h
Theory classes: 1h 30m
Practical classes: 7h
Self study : 13h 30m

AGILE Project Management

Description:
First contact with SCRUM, the origin of AGILE project management

Specific objectives:
To understand the basic concepts and the methodology of SCRUM:
- Motivations
- Directives
- Key figures
- Necessary steps (iteration)

Related activities:
- Use of Trello as a methodology of team work.
- Session for the fabrication of paper airplanes

Full-or-part-time: 3h
Theory classes: 1h
Self study : 2h

Project Management

Description:
• Processes in each phase of the project: initiation, planning, execution, monitoring and control, and closing.
• Task Breakdown Structure (EDT).
• Organization, planning, programming and control of the project:
o Agreement and reconsideration of dates and durations.
o Determination of critical and non-critical activities.
o Determination of the critical path.
o Definition and characteristics of the different means of programming.
o Quality in projects
o Risk analysis
• Organization in functional units, in project teams and matrix.
• Monitoring of the project during its implementation phase. Control reports.
• Coordination manual.
• The project manager. Project management.

Specific objectives:
- To know and differentiate the different organizational schemes.
- To know the processes that take place during a project or phase of it.
- To be able to represent a project through the different types of diagrams.
- To be able to propose corrective actions during the control of the project.
- To know the qualities that a good manager or negotiator should have.

Related activities:
Group work monitoring
Exercises for creating an EDP
Risk identification exercises

Full-or-part-time: 15h
Theory classes: 1h 30m
Practical classes: 5h
Self study : 8h 30m

Communication in Projects

Description:
· Importance and planning of communication in projects.
· Project classes. Public utility projects. Private initiative projects. TFG.
· Project documents and content in relation to the project phases.
· Classic documentation: Report, Plans, Specifications and Budget.
· Oral and written communication techniques (work throughout the course).
· Multiculturalism and new technologies.

Specific objectives:
- Know and distinguish the different types of documents that make up a project
- Improve both oral and written communication of the student
- Be able to write the memory of the project that we have been working on throughout the course.

Related activities:
- Group work monitoring
- templates and key points
- Peer review
- Gamification

Full-or-part-time: 11h 15m
Theory classes: 0h 30m
Practical classes: 4h
Self study : 6h 45m

GRADING SYSTEM

The final grade of each student will consist of the weighted sum of the following grades:
- NIP: Partial reports + oral presentation (30%) . In general, this note will be common to the subgroup, except in particular cases in the opinion of the teacher. Group grade.
- NIF: Report + Final oral presentation (20%). Group grade.
- NE: Written exam (35%). Individual grade.
- NC: Participation in the face-to-face and non-face-to-face proposals of the subject, note of the punctual exercises, functions inside the work in team (presidency and secretary), notes of the meetings ... (15%). Individual grade.

NF = 0.3 NIP + 0.2 NIF + 0.35 NE* + 0.15 NC

The following criteria will be considered when evaluating the works (NIP and NIF):
- Professionalism of the document (Spelling, References, Format, cited figures ...) (20%)
- Order, clarity and coherence (20%)
- Use of tools in the course (20%)
- Goodness of the results (40%)

Punctuality in the delivery of homeworks will have an impact in the individual grade.

Participants (students) who, at the end of the course, have failed the subject and opt for a re-evaluation exam, the grade of the re-evaluation exam will replace the grade of the final exam.

BIBLIOGRAPHY

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Complementary:

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- Ulrich, K. T. ; Steven D. Eppinger ; Maria C. Yang. Product design and development. 7th ed.. New York, NY: McGraw-Hill, 2019. ISBN 9781260566437.
- Rigby, Darrell ; Sarah Elk ; Steve Berez. Doing Agile Right: Transformation without chaos [on line]. Boston: Harvard Business Review Press, 2020 [Consultation: 12/01/2024]. Available on: https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=5821043. ISBN 9781633698703.
- Keller, Gary ; Jay Papasan. Sólo una cosa : detrás de cualquier éxito se encuentra una sencilla y sorprendente verdad: enfócate en lo único. Mexico: Penguin Random House, 2015. ISBN 9786071136961.
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