Course guide
820015 - PE - Engineering Design

Last modified: 02/03/2026

Unit in charge: Barcelona East School of Engineering
Teaching unit: 717 - DEGD - Department of Engineering Graphics and Design.

Degree: BACHELOR'S DEGREE IN BIOMEDICAL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN ENERGY ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Compulsory subject).

Academic year: 2025 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish, English

LECTURER

Coordinating lecturer: FRANCISCO ALPISTE PENALBA

Others: Primer quadrimestre:
JUAN CARLOS MARCILLO DELGADO - Grup: M11, Grup: M12, Grup: M13, Grup: M23, Grup: T11, Grup: T12
ALFONSO RODRIGUEZ DONO - Grup: M31, Grup: M32
JAVIER RODRIGUEZ GALDEANO - Grup: M21, Grup: M22, Grup: M23
ANDRES SUAREZ DEL CASTILLO - Grup: T21, Grup: T22

Segon quadrimestre:
JUAN CARLOS MARCILLO DELGADO - Grup: T11, Grup: T12
ALFONSO RODRIGUEZ DONO - Grup: M11, Grup: M12, Grup: T21, Grup: T22
ANDRES SUAREZ DEL CASTILLO - Grup: T31, Grup: T32

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. Understand the organisational structure and functions of project management offices.

Transversal:
2. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.
3. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 1. Identifying information needs. Using collections, premises and services that are available for designing and executing simple searches that are suited to the topic.
4. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 1. Planning oral communication, answering questions properly and writing straightforward texts that are spelt correctly and are grammatically coherent.
5. SELF-DIRECTED LEARNING - Level 1. Completing set tasks within established deadlines. Working with recommended information sources according to the guidelines set by lecturers.

TEACHING METHODOLOGY

The course uses the methodology of lecture in 15%, individual work by 30%, work in groups by 15% and project-based learning by 40%.
Teaching methodology:

MD1. Participatory and expository class with theoretical and practical content
MD2. Active methodologies in the classroom (Project-Based Learning, PBL)
MD3. Practice of case studies resolution and exercises related to the contents of the subject with the participation of students
MD5. Student activities led by teacher
MD8.Teamwork
MD9. Self-work

LEARNING OBJECTIVES OF THE SUBJECT

1. Using techniques and tools for managing engineering projects, including planning, development and implementation.
2. Knowing and applying specifications, regulations and standards.
3. Drafting texts with the appropriate structure to the communication objectives.
4. Introducing the text to an audience with the strategies and appropriate means.
5. Knowing and implementing the way and the dynamics of teamwork.
6. Identifying information needs and using collections, spaces and services available to design and implement suited searches to the topic.
7. Taking the work entrusted from the guidelines set by the teacher, deciding the time to be used in each section, including personal contributions and expanding the information sources indicated.
8. Taking initiatives that create opportunities with a vision of process implementation and market.
9. Applying sustainability criteria and professional codes of the profession.

STUDY LOAD

Type	Hours	Percentage
Guided activities	15,0	10.00
Hours large group	30,0	20.00
Hours small group	15,0	10.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

PMO. Project Management Office

Description:
Understanding the functioning of technical office and engineering companies.

Related competencies :
CEI-18. Understand the organisational structure and functions of project management offices.

Full-or-part-time: 8h
Theory classes: 4h
Self study : 4h

Product Design

Description:
Introducing product design that includes: the market (user needs), specifications for product design, conceptual design, detailed design, manufacturing and sales. Incorporating quality design tools

Related competencies :
CEI-18. Understand the organisational structure and functions of project management offices.

Full-or-part-time: 12h
Theory classes: 6h
Self study : 6h

Project Development

Description:
Application of the concepts of engineering projects to develop a project through the methodology PBLE (Project based learning engineering).

Related competencies :
CEI-18. Understand the organisational structure and functions of project management offices.
04 COE N1. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 1. Planning oral communication, answering questions properly and writing straightforward texts that are spelt correctly and are grammatically coherent.
06 URI N1. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 1. Identifying information needs. Using collections, premises and services that are available for designing and executing simple searches that are suited to the topic.
05 TEQ N1. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.
07 AAT N1. SELF-DIRECTED LEARNING - Level 1. Completing set tasks within established deadlines. Working with recommended information sources according to the guidelines set by lecturers.

Full-or-part-time: 90h
Practical classes: 15h
Guided activities: 15h
Self study : 60h

Project Management

Description:
Knowing the basics of project management.

Related competencies :
CEI-18. Understand the organisational structure and functions of project management offices.

Full-or-part-time: 16h
Theory classes: 8h
Self study : 8h

Viability

Description:
Studying technical and socioeconomic feasibility of the project submitted.

Related competencies :
CEI-18. Understand the organisational structure and functions of project management offices.

Full-or-part-time: 16h
Theory classes: 8h
Self study : 8h

Design Engineer. Freelance engineer

Description:
Learning professional alternatives: working as freelance or hired in a technical office oriented to facilities or to product design.

Related competencies :
CEI-18. Understand the organisational structure and functions of project management offices.

Full-or-part-time: 8h
Theory classes: 4h
Self study : 4h

ACTIVITIES

PARTICIPATORY CLASS/ LECTURE

Description:
Mainly expository, but by engaging the student with short-term activities. The teacher is the protagonist, sets the task and sets the pace of activity.

Hours: 2h/week
In class (Big group): 1h
Self study: 1h

Delivery:
Similar exercises to the examples solved by the teacher to be made by each student.

Related competencies :
CEI-18. Understand the organisational structure and functions of project management offices.

Full-or-part-time: 30h
Theory classes: 15h
Self study: 15h

PROBLEM/PROJECT-BASED LEARNING

Description:
The method is based on the approach to problems by the teacher that the student must meet or developing a project at a time.

Hours: 6h/week
Practical classes (half group): 1h
Guided study: 1h
Self study: 4h

Specific objectives:
Developing a PROJECT, Workgroups

Delivery:
PROJECT

Related competencies :
CEI-18. Understand the organisational structure and functions of project management offices.
06 URI N1. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 1. Identifying information needs. Using collections, premises and services that are available for designing and executing simple searches that are suited to the topic.
05 TEQ N1. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.
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07 AAT N1. SELF-DIRECTED LEARNING - Level 1. Completing set tasks within established deadlines. Working with recommended information sources according to the guidelines set by lecturers.

Full-or-part-time: 90h
Practical classes: 15h
Guided activities: 15h
Self study: 60h

PRACTICE OF CASE STUDIES RESOLUTION AND EXERCISES

Description:
Practice of case studies resolution and exercises related to the contents of the subject with the participation of students.

Hours: 2h/week
In class (Big group): 1h
Self study: 1h

Delivery:
Similar exercises to the examples solved by the teacher to be made by each student.

Related competencies :
CEI-18. Understand the organisational structure and functions of project management offices.
06 URI N1. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 1. Identifying information needs. Using collections, premises and services that are available for designing and executing simple searches that are suited to the topic.
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05 TEQ N1. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.

Full-or-part-time: 30h
Theory classes: 15h
Self study: 15h

GRADING SYSTEM

(EV1, EV4) Exams of project theory 25%
(EV1, EV4) Exams of problems 25%
(EV3) Deliverables 20%
(EV2) Project: 30%

EV1 Written or oral tests to monitor individual knowledge
EV2 Evaluation of practical work by delivering reports (project)
EV3 Attendance and participation in theoretical and practical sessions. Delivering exercises and problems
EV4 Evaluation of individual work

The final evaluation includes the generic competence tested in the subject : CT4. Teamwork.
This Teamwork mark constitutes the 20% of the project qualification. It's calculated by the contributions made by each student in the development of the project from the professor assessment and the other students point of view.

Projectes d'Enginyeria" (Engineering design) has not RE-EVALUATION exam.

Constraints
It is necessary to pass the course the delivery of a project developed specifically as an activity of the subject.

EXAMINATION RULES.

Exam of theory without consulting learning materials
Exam of problems consulting learning materials

BIBLIOGRAPHY

Complementary:
- Brusola Simon, Fernando. Oficina técnica y proyectos. Valencia: Universidad Politécnica de Valencia, 1999. ISBN 9788477217831.
- Santos Sabrás, Fernando. Ingeniería de proyectos. 2ª ed. Pamplona: Eunsa, 2002. ISBN 9788431317232.
- Companys Pascual, Ramón; Corominas Subías, Albert. Planificación y rentabilidad de proyectos industriales. Planificación y rentabilidad de proyectos industriales. Barcelona: Marcombo Boixerau Editores, 1988. ISBN 8426707173.
- Nicolás, Pere. Elaboración y control de presupuestos. Barcelona: Ediciones Gestión 2000, SA, 1999. ISBN 848088343X.
- Pahl, Gerhard ... [et al.]. Engineering design [on line]. 3rd ed. London: Springer London, 2007 [Consultation: 06/10/2016]. Available on: http://dx.doi.org/10.1007/978-1-84628-319-2. ISBN 9781846283192.
- Pugh, Stuart. Total design : integrated methods for successful product engineering. Wokingham, England [etc.]: Addison-Wesley Pub. Co., cop. 1990. ISBN 0201416395.
- Romero López, Carlos. Técnicas de programación y control de proyectos. Madrid: Piramide, 1997. ISBN 9788436811513.
- Stevenson, Susan; Whitmore, Steve. Strategies for engineering communication. New York [etc.]: John Wiley & Sons, cop. 2002. ISBN 0471128171.
- Zaïdi, A. QFD : despliegue de la función de calidad. Madrid: Díaz de Santos, 1993. ISBN 8479780606.
- A Guide to the project management body of knowledge (PMBOK® Guide) [on line]. 6th ed. Newtown Square, Pa.: Project Management Institute, 2017 [Consultation: 09/06/2020]. Available on: https://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?docID=5180849. ISBN 9781628253900.

RESOURCES

Hyperlink:
- ATENEA. http://atenea.upc.edu/moodle/

Other resources:
Learning material published in the virtual learning environment.