Course guide
220028 - PROJ - Projects

Last modified: 19/04/2023

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 758 - EPC - Department of Project and Construction Engineering.

Degree: BACHELOR'S DEGREE IN AEROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Compulsory subject).
BACHELOR'S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** English

LECTURER

Coordinating lecturer: Gonçalves Ageitos, Maria

Others: Pardo Bosch, Francesc
Huguenet, Pierre Antoine Nessim
Llargues Montaña, Joan
Nualart Nieto, Pau
Perez Llera, Luis Manuel

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
4. GrETA/GrEVA - Applied knowledge of materials science and technology; mechanics and thermodynamics; fluid mechanics; aerodynamics and flight mechanics; navigation systems and air traffic; aerospace technology; structural theory; economy and production; projects; environmental impact.
CE12-GRETA. An understanding of manufacturing processes

Generical:
1. THE ABILITY TO ANALYSE AND SYNTHESISE: The ability to think abstractly about the fundamental concepts of a text or exposition and to intelligibly present the result of one's work.

Transversal:
2. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.
3. TEAMWORK - Level 3. Managing and making work groups effective. Resolving possible conflicts, valuing working with others, assessing the effectiveness of a team and presenting the final results.

Basic:
CB03-GRETA. That students have the ability to gather and interpret relevant data (typically within their field of study) to make judgments that include reflection on socially, scientifically, or ethically relevant issues.

TEACHING METHODOLOGY

The teaching methodology will consist in:
· In-class sessions for the exposition of the contents
· In-class practical work (exercises and problems)
· Autonomous work for the development of the project.
· Collaborative work in groups.
· Autonomous study.

LEARNING OBJECTIVES OF THE SUBJECT

Introduce the theoretical and practical knowledge that is needed so the student can aboard the fulfilment of any kind of project in the field of aeronautics engineering. In this subject, it is remarked the intention that the student acquire the knowledge and the ability of using the necessary tools for: the defining and concept of the project, the management of the project, the study of alternatives and making decisions taking environmental issues into account.
The fundamental objectives are:
· Comprehension of the basic concepts that surround a project
· Application of work methodologies, both in group and individually, that are need for the development of projects (project management)
· Promotion of the student creativity.
· Analysis of the problems to be solved and the conditions that a project involve.
· Synthesis of the alternatives of the solution of the project
· Evaluation of the solution taken and of the work carried out during the development of the project.
· Develop of the basic engineering of the proposed solution.

STUDY LOAD

Type	Hours	Percentage
Hours small group	28,0	18.67
Self study	90,0	60.00
Hours large group	32,0	21.33

Total learning time: 150 h

CONTENTS

Module 1. The engineering project.

Description:
1.1 - The engineering project. The problem solving methodology: the concept of an engineering project. The project process. Basic Concepts. Requirements. Scope. Aim. Justification. Project phases. Project life cycle.
1.2 - The engineering project: a team effort. Project complexity. Multidisciplinariety. Project roles and stakeholders. Teamwork advantages and challenges. Formal project documents. Format and standards for deliverables.

Related activities:
Activity 1: Theory sessions and discussion.
Activity 2: In-class exercises.
Activity 3: Project development practice.

Full-or-part-time: 18h
Theory classes: 4h
Laboratory classes: 4h
Self study : 10h

Module 2. Analysis and synthesis in projects.

Description:
2.1 - The horizontal and vertical decomposition in projects. Hierarchy. Problem solving techniques and tools. Work Breakdown Structure.
2.2 - Decision making in projects. Criteria and requirements. Technical, economic, environmental and safety factors in projects.

Related activities:
Activity 1: Theory sessions and discussion.
Activity 2: In-class exercises.
Activity 3: Project development practice.

Full-or-part-time: 36h
Theory classes: 8h
Laboratory classes: 8h
Self study : 20h

Module 3. Project planning and scheduling.

Description:
3.1 - Concept and relevance of planning and scheduling: Identification of activities. Precedences. Relevance of time management in projects. Relationship cost-time. Scheduling. Basic scheduling concepts. Tools and methods for scheduling.
3.2 - Tasks classification and dependences. Methodologies to define tasks effort and duration. The project calendar. Assigining and optimizing resources. Resources conflicts. Levelling.
3.3 - Project control: Schedule control. Time control. Scheduling updates.

Related activities:
Activity 1: Theory sessions and discussion.
Activity 2: In-class exercises.
Activity 3: Project development practice.

Full-or-part-time: 27h
Theory classes: 6h
Laboratory classes: 6h
Self study : 15h

Module 4. Cost estimation and economic feasibility analyses.

Description:
4.1 - Costs definition and classfication. Investment and operating costs. Cost estimates: methods and associated uncertainty.
4.2 - Economic feasibility concept. Parameter for the economic feasibility analysis and their interpretation.

Related activities:
Activity 1: Theory sessions and discussion.
Activity 2: In-class exercises.
Activity 3: Project development practice.

Full-or-part-time: 27h
Theory classes: 6h
Laboratory classes: 6h
Self study : 15h

Module 5. Project phases and basic documentation.

Description:
5.1 - Preliminary study: Goal. Contents. Stages for the development. Market analysis. Feasibility analysis.
5.2 - Basic engineering: Goal. Contents. Stages for the development.
5.3 - Development phases: detailed engineering, procurements management, control and monitoring, execution and commissioning of the project.
5.4 - Basic documentation: Report. Drawings/blueprints. Budget. Technical sheets.

Related activities:
Activity 1: Theory sessions and discussion.
Activity 2: In-class exercises.
Activity 3: Project development practice.
Activity 4: Final exam.
Activity 5: Project evaluation. Oral presentation.

Full-or-part-time: 42h
Theory classes: 8h
Laboratory classes: 4h
Self study : 30h

ACTIVITIES

ACTIVITY 1: THEORY SESSIONS

Full-or-part-time: 22h
Theory classes: 14h
Self study: 8h

ACTIVITY 2: EXERCISES THEORY SESSIONS

Full-or-part-time: 20h
Theory classes: 14h
Self study: 6h

ACTIVITY 3: PROJECT DEVELOPMENT PRACTICE

Full-or-part-time: 84h
Laboratory classes: 28h
Self study: 56h

ACTIVITY 4: FINAL EXAM

Full-or-part-time: 14h
Theory classes: 2h
Self study: 12h

ACTIVITY 5: PROJECT EVALUATION. ORAL PRESENTATION

Full-or-part-time: 10h
Theory classes: 2h
Self study: 8h

GRADING SYSTEM

The Final Mark of this subject will be calculated as the weighted average of the following marks:
Final exam 30%
Theory exercises 20%
Project documents 10%
Oral presentation of the project 5%
Individual work in the project 35%

One of the parameters considered to assess the student work in the laboratory is his/her participation on the weekly follow-up sessions. As such, the laboratory sessions are considered as evaluation activities, therefore the non-justified absence to any of the laboratory sessions will involve a qualification of ABSENT (NO PRESENTAT). The session devoted to the final project presentation constitutes also an evaluation activity, the non-attendance to this session will also involve a qualification of ABSENT (NO PRESENTAT).

The in-class exercises mark is obtained from the activities and work developed in class related to the concepts introduced in each session and its substitution by alternative activities cannot be requested.

The assessment of the project documents will consider their content and formal aspects.

EXAMINATION RULES.

Activity 3. Project Development
Students will get organized in collaborative teams in order to develop the project work. Team members have to choose a representative that will act as group coordinator.
The contribution of each student to the team work will be assessed by the team supervisor. In order to do so, each team should develop for each laboratory session an agenda with the topics to discuss in the next meeting, and the minutes of the meeting including the topics dealt with and the agreements reached.

The presence of the student in the laboratory sessions is considered as an evaluation activity, therefore attendance to laboratory sessions is mandatory for all team members. Attendance to laboratory sessions constitutes a requirement to be able to pass the subject. At the beginning of each laboratory session, the team supervisor will hand over a signatures sheet for the students to formally register their attendance to the meeting.

The virtual collaborative environment BSCW must be used to develop the project work. All the project information, both generated and used by the team, must be uploaded to the BSCW folder structure. For evaluation purposes, the professors will exclusively consider the information uploaded to the BSCW.

The contents and format of the documentation to be delivered during the project development will be defined early in the semester. All documents have to be available in the corresponding folder of the BSCW environment. Works delivered later than the agreed deadlines will not be admitted for evaluation. Teams not delivering their work will get a qualification of ABSENT (NO PRESENTAT).

Activity 4. Final theory exam
The written evaluation may consist or include a multiple-choice test with four possible answers. In this case, each wrong answer will reduce the mark by 0.5 points, while a blank answer will not affect the mark. In addition, the written exam may involve solving practical exercises.

Activity 5. Project Assessment. Oral Presentation.
The last week of the semester each team will perform a project presentation of around 20-25 minutes. To develop the presentation computer media will be available. The oral presentation will be assessed by Department professors, who will ask any question they might consider relevant and they will assess different aspects of the presentation, such as: structure, clarity, dynamics, answers to the questions, media used, etc.

BIBLIOGRAPHY

Basic:
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- Cos Castillo, M. Teoría general del proyecto, vol. 1, Dirección de proyectos. Madrid: Síntesis, 1995. ISBN 8477383324.
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- Romero López, C. Técnicas de programación y control de proyectos. Madrid: Pirámide, 1997. ISBN 8436811518.
- Humphreys, K.K.; Wellman, P. Basic cost engineering. 3rd ed. New York: Marcel Dekker, 1996. ISBN 0824796705.

Complementary:
- Pahl, Gerhard [et al.]. Engineering design: a systematic approach [on line]. 3rd ed. London: Springer, 2007 [Consultation: 17/06/2022]. Available on: https://link-springer-com.recursos.biblioteca.upc.edu/book/10.1007/978-1-84628-319-2. ISBN 781846283185.
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- Pugh, Stuart. Total design: integrated methods for successful product design. Wokingham: Addison Wesley, 1990. ISBN 0201416395.
- Goldenberg, J.; Mazursky, D. Creativity in product innovation. Cambridge: Cambridge University Press, 2002. ISBN 0521002494.
- Kerzner, Harold. Project management: a systems approach to planning, scheduling and controlling. 10th ed. Hoboken: John Wiley & Sons, 2009. ISBN 9780470278703.
- Stevenson, S.; Whitmore, S. Strategies for engineering communication. New York: John Wiley & Sons, 2002. ISBN 0471128171.

RESOURCES

Other resources:
Notes developed by the Department professors.