

Course guide

340072 - TAD1 - Design Workshop I

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Unit in charge: Vilanova i la Geltrú School of Engineering
Teaching unit: 717 - DEGD - Department of Engineering Graphics and Design.
732 - OE - Department of Management.
712 - EM - Department of Mechanical Engineering.
737 - RMEE - Department of Strength of Materials and Structural Engineering.
702 - CEM - Department of Materials Science and Engineering.

Degree: BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Optional subject).

Academic year: 2026 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: MANUEL LOPEZ MEMBRILLA

Others: Primer quadrimestre:
ANTONI ANDREU TORRAS - D3011, D3012, D3021, D3111, D3112
JOAN VICENT CASTELL BALAGUER - D3011, D3012, D3021, D3111, D3112
JOSE MARIA COLOMER MUR - D3011, D3012, D3021, D3111, D3112
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MARIA ALBA TORRAS SENDRA - D3011, D3012, D3021, D3111, D3112

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Transversal:

1. 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.
2. SELF-DIRECTED LEARNING - Level 1. Completing set tasks within established deadlines. Working with recommended information sources according to the guidelines set by lecturers.
3. EFFECTIVE USE OF INFORMATION 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. 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.
5. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.

TEACHING METHODOLOGY

It is TAD1, the first of the different Design Workshops that are part of the Product Design and Development Engineering Degree, following a Methodology called Total Product Design and attributing to TAD1, what this Methodology calls: the Workshop CONCEPTUAL DESIGN.

The Methodology involves defining the proposed Projects (the Project being the Problem to be solved and developed) in this first TAD1 basic aspects such as:

Problem, Problem Definition, Problem Components, Data collection, Data Analysis, among others with the Proposal Initial and final creative, both at individual and group level.

REGARDING THE FOLLOW-UP METHODOLOGICAL PROCESS:

- In the different Sessions of Design Workshops1 (TAD1) with the use of the methodological tool, the contents will be exposed and the basic theoretical concepts will be introduced and above all the practical Project content (base of the Methodology) of the different Subjects linked to the different Departments that make up and integrate the subject of TAD1, with practical applications and convenient examples to facilitate their understanding. The student must be able to develop at an individual level the different activities linked to all the Subjects that make up the Project or proposed needs, then integrating them into the work group, called the Workshop Group (GT).

-The Methodology used involves the use of the concept of co -Design and Circular Design as a result of Group Collaboration Work (Workshop Groups - GT-) with the personal contributions of each student on each Specific Subject (corresponding to each Department) to define a Project in common among all members of the WG, not the division or inhibition of these Mataries by students in the WG. It is necessary to enrich the Project and define it with the best of the contribution of each student member of the GT based on the established Methodology.

- The final result of the GT Project is the compendium of all the Specific Subjects of the activities analyzed and agreed upon in the GT based on the synthesis of all the individual Activities of each student on the different Subjects covered in the proposed Project.

- This result in the WG Project contemplates and implies a very important part in the development of the student's Personal Activities, as well as those at group level of the WG. On the other hand, the aforementioned result must also reflect, and no less important, the very Management of the Project to be developed by the GT with its own planning and monitoring activities for the good development of the Project to be defined based on the established Methodology.

- It must be kept in mind that the Activity Developed by each student in the different Specific Subjects is the main indicator of assessment and evaluation by the different Departments, these activities are defined in different written documents (a Report in the most technical or basic definition within engineering); which will contain text, images, graphics... among others, it will never be the same as images or just photos.

SESSIONS IN THE DESIGN WORKSHOP 1 (TAD1).

Based on the Project statement published on the Digital Campus (Athenea) with the corresponding Development Guidelines for each Department and corresponding Specific Subject:

Specific Subject in each Department:

1) Individual Study and Analysis with the Activity of each student on the different Subjects of the Project. Main indicator of monitoring and entrepreneurship of the subject. Individual Basic Activity.

2) Group Study and Analysis in each Workshop Group (WG) to define the best proposed solution for the Project. The Group Decision.

3) Preparation of the corresponding Documentation. The Justified Technical Documentation.

4) Elaboration and definition of the final Model of the Project. Formal Volumetric Proposal of the WG.

- The practice sessions involve the active participation of all the students who are members of the WG through the exhibition and debate of the individual activities developed and of the final group project with the proposed solution.

- The professors will make global or specific comments, both in the Plenary Sessions and in the Workshop Sessions so that the students can develop the activities corresponding to the proposed projects, as well as a guided or tutored follow-up in each GT to achieve a specific result.

Continued attendance at the Design Workshops 1 is of vital importance and significance in order to achieve a good follow-up, development and final result of the Project, both at individual and group level.

The non-face-to-face autonomous learning is aimed at assimilating and developing the specific contents of the different Subjects of the subject, as well as the Project Presentation, information research..., among others.

LEARNING OBJECTIVES OF THE SUBJECT

The general objective of the subject is to provide students with the knowledge that will enable the application of engineering studies carried out in the development and definition of a basic Conceptual Project as it corresponds to TAD1.

- Acquire a general basic conceptual training on a Basic Project from some social, technical, human requirements ... among others on a product, as well as become familiar with and know the different parts that make it up (modules and components).
- Enhance the skill, ingenuity and ability to analyze, manipulate and contextualize a industrial product. As well as its own content in the definition and management of a Design or Product Engineering Project.
- That they develop a minimum technical capacity that allows to solve the Proposed projects and the ideas they generate themselves.
- Interpret the process and Methodology in the development of the product from knowledge theoretical and functional basics of the different Subjects that make up the Design Workshop.
- To interpret the process and Methodology in the development of the Product at individual and group level and the importance of the relationship with the user and the environment (H-O-E).
- Product Overview. Product and its life cycle.
- To develop a critical and self-critical attitude towards their own activities and those of activities and work of colleagues in the working group or Workshop Group (WG).

STUDY LOAD

Type	Hours	Percentage
Hours small group	30,0	15.15
Self study	138,0	69.70
Hours large group	30,0	15.15

Total learning time: 198 h

CONTENTS

1. INTRODUCTION TO THE DESIGN WORKSHOP PROJECT. DEFINITION.

Description:

- Introduction to the Basic Project in Design Engineering and its projection in the Product Design Workshop.
- Structure and Typologies of existing Projects of practical application in Design Engineering.
- The importance of the Project Methodology to follow; documentary base, data search, data analysis, synthesis and decision making.

Specific objectives:

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Full-or-part-time: 5h

Theory classes: 5h

2. Components Analysis: Conception of Volum and Form.

Description:

- Product Morphology.
- Basic primitive shapes of 2D and 3D geometry.
- The definition of the basic shapes that make up the objects or Products.
- Volume, Space and Environment.

Full-or-part-time: 5h

Theory classes: 5h

3. Product Analysis: Form, Function and Aesthetics.

Description:

- Analyze the existing and binding intrinsic relationship between Form and Function (F/F) in the Products.
- The link of Geometric Shapes in the Products:
 - . In its physical or structural definition
 - . In its definition in the concept of Formal or Aesthetic Appearance
 - . Linked to the Product Language.

Full-or-part-time: 5h

Theory classes: 5h

4. Product and Materials. Product and Resistance.

Description:

- Identify the different possibilities between the Materials and the Models to be developed
- Conceptualize the Models, Material and Resistance thereof.
- Build and deconstruct the different Models obtained to obtain the best solution as an individual proposal or as a final group proposal.
- Use different Materials, if necessary, in the definition of the Model.

Full-or-part-time: 5h

Theory classes: 5h

5. Construction Techniques. Processes.

Description:

- Study different Construction Techniques to:
 - Identify the construction and possible means to define the different Models worked.
 - Identify the basic Processes associated with the developed Model.
- Use of different media and basic machinery existing in the Design Workshop.

Full-or-part-time: 5h

Theory classes: 5h

6. Market Demand Analysis. Types of Clients.

Description:

- Preliminary analysis of the Product and Market. Legal framework and environment.
- Research of: Product, Market and Competition. Benchmarking.
- User Research. Needs and requirements.

Full-or-part-time: 5h

Theory classes: 5h

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Description:

- They will propose Conceptual Designs with solutions to the Proposed Projects. Graphics Language is the main tool to visualize, conceptualize and define ideas in Design.
- Individual Volumetric Mockups. Basic of the different Individual Conceptual Designs and the corresponding Individual Final Proposal (PFI) for a Volumetric Model.
- Final Model of the GT that more realistically identifies and represents the proposed Final Solution. Defined with basic and manual construction processes with use and means available in the Design Workshop (without the use of 3D printing or laser cutting).
- The project in digital format with a Report and Presentation. They will justify the proposals in their process and the Final Proposal adopted by the WG.
- The teachers in the Design Workshop will complement with global or specific comments so that the students can develop the proposed Projects.

Full-or-part-time: 30h

Laboratory classes: 30h

title english

Description:

- Students according to the established study plan have a few hours per week, outside of those established in person with the teachers in the Design Workshop.
- During these hours of autonomous learning, students can use the Design Workshops to continue developing the Project with the corresponding models or mockups associated with it. To do this, they will use all means of utensils, materials and machinery.
- The non-face-to-face autonomous learning is also aimed at assimilating and developing the specific content of the different Subjects of the subject, as well as Project Presentation, information research..., among others.

Full-or-part-time: 90h

Self study : 90h

GRADING SYSTEM

The evaluations of the different Departments with their Specific Subjects that make up the subject of TAD1 are linked to the corresponding percentages on the proposed Projects corresponding to the final mark of the subject:

BUSINESS ORGANIZATION -OE 35%
GRAPHIC AND DESIGN ENGINEERING -EG 35%
MECHANICAL ENGINEERING -EM 10%
ELASTICITY and RESISTANCE OF MATERIALS -RM by 10%
MATERIALS SCIENCE and ENGINEERING -CM 10%

The Departments that are part of the subject of TAD1 will assess the different Parts that define the Projects proposed and developed by the Workshop Group and linked to the corresponding individual Activities of each student and group, depending on the two blocks or sections of Notes below:

NOTE A. EVALUATION in the Definition and Content of the Project.

- Workshop Group Project Report.....10%.
- Presentation and Technical Exhibition of the Project..20%.
- Specific Subject Developed 35%.
- Definition of the Final Model of the GT..... 35%

NOTE B. EVALUATION in Project Management and Monitoring.

- In this section, the follow-up and good planning and management by the Workshop Group (GT) and the students who form it will be assessed. Not having an entrepreneurial attitude in the Management and monitoring of the Project can penalize the Note A (Definition and Content of the Project) up to 20% less, considered this based on their individual activity, as well as the group one. This Grade B affects the final grade of the Project and consequently the overall grade of the subject. The main indicator of this assessment, among others, is the one established in the Rules and Guidelines for the implementation and monitoring of the different Activities.

The individual activity developed in each specific subject by each student of the WG is the main basis for their evaluation, this activity is projected on the project and other activities of the WG, thus obtaining the individual and final grade.

Continuous attendance by the student in the Laboratory or Design Workshops is a necessary condition to pass the subject.

The re-Evaluation according to the academic regulations for Bachelor's and Master's studies of the EPSEVG, in this project-based subject, it is not appropriate to do it.

For the proper functioning and monitoring of the subject, it is necessary to keep in mind the various publications made by the subject manager, as well as by the teachers of the various Specific Subjects of TAD1 on the digital campus (Athenea).

EXAMINATION RULES.

It is mandatory to attend and actively participate in the Design Workshop and have a respectful, critical and active attitude to improve the results obtained.

- To define the Activity and its content (Note A) and its Follow-up based on the Entrepreneurial attitude (Note B) of each student, (the main indicator in the personal evaluation) as well as that of the rest of the students of the Workshop Group (GT) , in each Project it is necessary to do:

- 1) The Weekly Monitoring Act (AS).
- 2) The Global Monitoring Act (GA).
- 3) The corresponding documentation.

The Projects or Works will be delivered according to the Guidelines and Format established in the Digital Campus (Athenea).

BIBLIOGRAPHY

Basic:

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- Kalpakjian, Serop; Schmid, Steven R. Manufacturing engineering and technology. 8th ed. Harlow: Pearson Education Limited, 2023. ISBN 9781292422244.
- Ashby, M. F.; Johnson, Kara. Materials and design : the art and science of material selection in product design [on line]. 2nd ed. Amsterdam [etc.]: Elsevier Butterworth Heinemann, 2010 [Consultation: 20/02/2024]. Available on: <https://www.sciencedirect-com.recursos.biblioteca.upc.edu/book/9781856174978/materials-and-design>. ISBN 9781856174978.
- Earle, James H. Diseño gráfico en ingeniería. Bogotá [etc.]: Fondo Educativo Interamericano, 1976.

Complementary:

- Budynas, Richard G.; Nisbett, J. Keith. Diseño en ingeniería mecánica de Shigley [on line]. 10a ed. Ciudad de México: McGraw-Hill, 2018 [Consultation: 14/02/2024]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=5485813>. ISBN 9781456262112.
- Quarante, Danielle. Diseño industrial, vol. 1, Elementos introductorios. Barcelona: CEAC Barcelona, 1992. ISBN 8432956171.
- Calero Pérez, Roque; Carta Gonzalez, José Antonio. Fundamentos de mecanismos y máquinas para ingenieros. Madrid [etc.]: McGraw-Hill, 1999. ISBN 844812099X.