Course guide
320149 - TDEP - Experimental Product Design Workshop

Last modified: 13/08/2025

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 717 - DEGD - Department of Engineering Graphics and Design.

Degree: BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Optional subject).

Academic year: 2025 **ECTS Credits:** 6.0 **Languages:** English

LECTURER

Coordinating lecturer: Lopez Martinez, Joan Antoni
Braso Vives, Enric

Others: Braso Vives, Enric
Hernandez Amaya, Javier Eduardo

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. DES: Ability to design and project in different situations, effectively and efficiently with different agents involved in the process of design and industrial development.

2. DES: Ability to take decisions related to the graphic representation of concepts.

3. DES: Ability to apply specific methods, techniques and instruments for each form of technical drawing.

4. DES: Knowledge of the types of design and products, and their presentation.

5. DES: Advanced knowledge in 3D modeling.

6. DES: Knowledge of basic animation and 3D simulation.

Transversal:
7. 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.
8. 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.
9. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.
10. SELF-DIRECTED LEARNING - Level 1. Completing set tasks within established deadlines. Working with recommended information sources according to the guidelines set by lecturers.
11. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.

TEACHING METHODOLOGY

A theoretical introduction will be given at the beginning of each session, and the progress of each practical assignment will be supervised.
During the practical sessions, both virtual and physical prototypes will be designed, including objects and experimental geometric elements.
The work will involve creating geometric elements, proposed by the teacher, specifically designed either from original and inventive ideas or to solve a known problem or evident deficiency.
Manual graphic representation tools and techniques, infographic applications, and 3D CAD software will be used to conduct research, study, analysis, and reasoning of existing designs, as well as to create a new model for each case.
Theory and practical classes will take place both in the design workshop and the computer lab.
Projects suitable to the course schedule and deadlines will be proposed, fostering commitment and responsibility.

LEARNING OBJECTIVES OF THE SUBJECT

· Stimulate inventiveness to foster innovation
· Develop, systemize and organize the creative process
· Encourage creativity and ingenuity to develop innovative objects
· Develop the ability to imagine, create and perform new product ideas
· Apply knowledge, skills and abilities acquired in the graphical representation.
· Apply graphical techniques in the transmission of ideas in the design process industry.
· Understand the design process of industrial design and implement appropriate expressive techniques
· To promote the application of skills learned in other courses
·To provide knowledge and develop skills to study the design of urban and domestic equipment
· To expand the application of eco-design
·To provide knowledge and develop skills for presenting industrial projects
· Simulate the client-design team and develop product lines

STUDY LOAD

Type	Hours	Percentage
Self study	90,0	60.00
Hours large group	30,0	20.00
Hours small group	30,0	20.00

Total learning time: 150 h

CONTENTS

Topic 1. Workshops, Craftsmanship, and Engineering

Description:
1. The workshop as a creative space
2. Craft techniques and materials
3. Experimental methodology

Specific objectives:
Introduction to methodological and technical experimentation

Related activities:
Activity 1. Experimentation with alternative materials

Full-or-part-time: 30h
Theory classes: 6h
Laboratory classes: 6h
Self study : 18h

Topic 2. Design of Articulated Assemblies

Description:
1- Geometric strategies and options
2- Graphic simulation of possibilities
3- Generation of cutting files

Specific objectives:
To develop the necessary skills to work on a project involving kinetic elements, making design and prototyping decisions

Related activities:
Activity 2: Design of a kinetic assembly

Full-or-part-time: 30h
Theory classes: 6h
Laboratory classes: 6h
Self study : 18h

Topic 3. Combination of Manufacturing Techniques

Description:
1. Definition of techniques
2. Design for digital fabrication
3. Alternative design proposals

Specific objectives:
Promote the use of manufacturing tools to apply them in product design projects

Related activities:
Activity 3: Creation of an experimental product using digital fabrication techniques

Full-or-part-time: 30h
Theory classes: 6h
Laboratory classes: 6h
Self study : 18h

Topic 4. Experimentation in Additive Manufacturing

Description:
1. Study of additive manufacturing techniques
2. Design for additive manufacturing
3. Geometric generation and printing process

Specific objectives:
To explore the possibilities and potential of digital manufacturing

Related activities:
Activity 4: Experimental additive manufacturing

Full-or-part-time: 30h
Theory classes: 6h
Laboratory classes: 6h
Self study : 18h

Topic 5. Advanced Geometric Modeling

Description:
1- Introduction and fundamentals of computational design
2- Definition of complex geometric objects
3- Development of geometry-generating algorithms

Specific objectives:
To develop the skills and knowledge necessary for the generation of advanced geometry

Related activities:
This topic provides knowledge and skills that will be applied throughout the course and across various activities and projects

Full-or-part-time: 30h
Theory classes: 6h
Laboratory classes: 6h
Self study : 18h

GRADING SYSTEM

Practical work will only be considered passed if it has been supervised by the teacher during class time.
In the assessment of knowledge, skills, and competencies, consideration will be given to the assimilation of the theoretical content of the course, individual assessment tests, practical work, and project defense.
In addition to understanding the theoretical content applied to practical work, the evaluation will also consider creativity, technical execution, presentation, and the work completed during class hours.
Weighting:
Projects and activities: 80% (4 projects 18% + 2 activities 4%)
First individual exam: 10%
Second individual exam: 10%

EXAMINATION RULES.

1. The classes will be both theoretical and practical.
2. Theoretical content will be taught and applied in both theory and practical sessions.
3. Completing all assigned exercises and attending class are essential requirements to be eligible for assessment.
4. Any work not supervised by the teacher during class time will not be eligible for approval.

BIBLIOGRAPHY

Basic:
- García Cuevas, Diego; Pugliese, Gianluca. Advanced 3D printing with Grasshopper® : Clay and FDM. [Lloc de publicació no identificat]: Independently published, april 2020. ISBN 9798635379011.
- Tedeschi, Arturo. AAD Algorithms-aided design: parametric strategies using Grasshopper. Brienza: Le Penseur, cop. 2014. ISBN 8895315308.
- Marie Shillito, Ann . Digital Crafts: Industrial Technologies for Applied Artists and Designer Makers. Bloomsbury Visual Arts, 10 octubre 2013. ISBN 1408127776.
- Bryden, Douglas. CAD and Rapid Prototyping for Product Design. 1. LAURENCE KING, 2014.

Complementary:
- Anderson, Chris. Makers: The New Industrial Revolution. Crown Business, 2012. ISBN 9780307720955.
- Barnwell, Maurice. Design, creativity and culture: an orientation to design. London: Black Dog Publishing, 2011. ISBN 9781907317408.
- Parsons, Tim. Thinking, objects: contemporary approaches to product design. Lausanne: AVA Academia, 2009. ISBN 9782940373741.
- Thompson, Rob. Manufacturing processes for design professionals. London: Thames & Hudson, 2007. ISBN 9780500513750.