

## 62955 - Design for sustainability

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 62955 - Design for sustainability

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 562 - Master's in Product Development Engineering

**ECTS:** 4.5

**Year:** 1

**Semester:** Second semester

**Subject type:** Optional

**Module:**

### 1. General information

The subject "Design for Sustainability" is an eminently practical elective that aims to apply aspects related to sustainability to product design, an aspect of growing importance that is already mandatory in some companies. Aspects such as sustainable product design criteria, methodologies and tools for environmental impact assessment and circular economy will be discussed in depth.

These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>) specifically, the learning activities planned in this subject will contribute to the achievement of Objective 7.2 of Goal 7, Objective 8.4 of Goal 8, Objective 9.4 of Goal 9, Objective 11.6 of Goal 11, Objectives 12.5 and 12.8 of Goal 12, Objective 13.3 of Goal 13, Objective 14.1 of Goal 14, and Objective 17.7 of Goal 17.

### 2. Learning results

- To know the current situation of the relationship between design and the associated ecological aspects, the actors involved and the regulations and legislation in force.
- To identify the design decisions that influence the Life Cycle Analysis of a product.
- To know and apply the most common methods and tools as well as the newest ones related to Life Cycle Analysis.
- To understand the relationship between product structure/configuration and its environmental impact.
- To know and differentiate calculation methodologies such as Carbon Footprint, Water Footprint, ReCiPe, CML...
- To be critical with existing designs and to suggest modifications and redesigns in order to optimize them from a Life Cycle Assessment point of view.
- To be able to generate new designs that integrate sustainable aspects related to environmental impact as a design criterion.
- To know the influence of the so-called "critical materials"
- To propose improvements related to circular economy: recyclability, reparability...
- To analyse product durability scenarios
- To know the Sustainable Development Goals

### 3. Syllabus

- Topic 1. Methodology for the identification and evaluation of sustainable aspects in the design process
- Topic 2. Life Cycle Analysis Methods and Environmental Impact Categories.
- Topic 3. Life Cycle Assessment Tools (SIMAPRO, ECOINVENT, ECOCAD, ECOTOOL)
- Topic 4.- Sustainable design criteria
- Topic 5.- Design criteria considering the presence of critical materials
- Topic 6.- Design with reuse and end of life in mind.
- Topic 7. Design for the circular economy and the Sustainable Development Goals
- Topic 8.- Design with consumption and maintenance in mind. Durability scenarios
- Topic 9.- Geographical factors
- Topic 10.- Ecodesign of food packaging

### 4. Academic activities

The subject has 4,5 credits, which is equivalent to 112,5 hours of student work, assigned as follows:

Lectures: sessions with the teacher in which the subject's syllabus will be explained: 30 hours

Laboratory practices: 15 hours

Work: 20.25 hours

Study of the material; preparation of classes; practical activities: 45 hours

Assessment tests: 2.25 hours

### 5. Assessment system

The subject is eminently practical and is evaluated on a continuous basis, mainly through the monitoring of the student's activities and practical work. Continuous assessment is distributed as follows:

70% Practical work (including presentation to the class)  
30% Continuous assessment of the practical sessions.

Following the regulations of the University of Zaragoza, a global assessment test will also be scheduled in each call, to be held on the date set by the centre, for those students who do not opt for this continuous assessment system. The test will be structured in a similar way with a 30% theoretical-practical evaluation in a written exercise and an 70% evaluation of the practical application of the methodologies and tools used during the term.