# 69756 - Design for Circular Economy

## Syllabus Information

**Academic year:** 2023/24
**Subject:** 69756 - Design for Circular Economy
**Faculty / School:** 100 - Facultad de Ciencias
**Degree:** 627 - Master's Degree in Circular Economy
**ECTS:** 6.0
**Year:** 01
**Semester:** Second semester
**Subject type:** Optional
**Module:**

## 1. General information

The *Design for Circular Economy* subject is designed to propose the main features of eco-design for processes and products of industrial interest. It is designed for students who have studied science or engineering degrees since it will allow them to propose the main ecodesign features for processes and products of industrial interest. The subject is taught at the Public University of Navarra.

It is aligned with Sustainable Development Goal (SDG) No. 12 (Responsible Production and Consumption) of the United Nations 2030 Agenda(https://www.un.org/sustainabledevelopment/es/), so that the acquisition of its learning results provides training and competence to contribute to some extent to the achievement of the Goal.

## 2. Learning results

- To be able to redesign activities to meet needs through services while minimizing the use of products.
- To know and be able to quantify, from an environmental point of view, the integral process of manufacturing, distribution, consumption and recovery of a product, its raw materials and energy consumption, the generation of waste and pollutants, the tools for their determination and the methodologies for their reduction.

## 3. Syllabus

Sustainability and manufacturing. Concept of sustainability in the processes. Product life cycle. Sustainability considerations. Indicators and qualitative information. Environmental and circularity indicators.

Voluntary systems. Environmental Management Systems EMAS, ISO 14001. Energy management systems, ISO 50001. Product label, European Ecolabel, Blue Angel, White Swan labels. Product carbon footprint, PAS 2050, ISO 14068. Water footprint. Ecolabels.

3. Practical analysis. Process wastes. Emissions to water and production. Atmospheric emissions and production. Atmospheric emissions and greenhouse gases. Greenhouse gases and polluting potential. Carbon footprint.

4. Life cycle analysis. Concept. Product life cycle modelling. LCA and DB software. OpenLCA.

5. Ecodesign. Product and process design for circular economy. Designed to last, repair, remanufacture and share. Packaging.

6. Examples and case study.

## 4. Academic activities

**Master classes:** 16 hours

Sessions of 50 minutes each for the entire group. Teachers explain the theoretical contents and solve representative applied problems. Teaching materials are available in Moodle.

**Problem solving and case studies:** 44 hours of student work, including 8 face-to-face hours.

Students must prepare a report and a seminar.

**Study:** 84 hours

Students must study theory, read supplementary readings and prepare for the final test.

**Assessment tests: 6 hours.**

Students take a final written exam in the form of a test, short answer, long answer and/or open-ended questions exam.

## 5. Assessment system

The subject is assessed using two evaluation methods: continuous and global. For this purpose, the grades obtained in the following tests will be used:

- A report (rated I). It consists of a report on a topic related to the subject or the critical analysis of a research or popularization article.
- One seminar (graded S). Development of a specific project for each student or group of students related to the subject after discussion of the chosen topic with the professors of the subject. Each student or group of students is guided in the development of the project, explaining the particularities of each case individually. The part of the seminar related to the presentation is not recoverable, i.e., the oral presentation cannot be repeated.
- Final short answer, long answer and/or open-ended question test (graded F).

The grades obtained by each student in the above assessment activities are weighted according to the following formulas:

Formula 1:

Final grade: $0.2 \times I + 0.6 \times S + 0.2 \times F$

Formula 2:

Final grade: F

The final grade is calculated as the best grade obtained between those obtained with formulas 1 and 2.