

## Course guide

### 480USE012 - 480USE012 - Sustainable Design

**Last modified:** 12/06/2026

**Unit in charge:** Barcelona School of Civil Engineering  
**Teaching unit:** 729 - MF - Department of Fluid Mechanics.

**Degree:** MASTER'S DEGREE IN SUSTAINABILITY AND STRATEGIES FOR A JUST GLOBAL TRANSITION (Syllabus 2026). (Optional subject).

**Academic year:** 2026    **ECTS Credits:** 5.0    **Languages:** English

#### LECTURER

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**Coordinating lecturer:** Segalas Coral, Jordi

**Others:**

#### PRIOR SKILLS

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C1 Level of English language.

## TEACHING METHODOLOGY

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The following teaching methods will be used in the development of the course:

Lecture or conference (EXP): Sharing knowledge through lectures by professors or by external guest speakers .

Problem solving and case studies (RP): group decision exercises, debates and group dynamics, with the teacher and students in the classroom; class presentation of an activity carried out individually or in small groups

Theoretical/practical supervised work (TD): classroom activity or exercise of theoretical or practical contents, carried out individually or in small groups, with the advice and supervision of the teacher

Extensive project (PA): learning based in the design, planning and realisation in groups of a complex or extensive project or piece of work, applying and extending knowledge and writing a report on this approach and the results and conclusions

Evaluation Activities (EV)

Training activities:

The following training activities will be used in the development of the course :

Face-to-face

Theoretical classes and conferences (CTC): knowledge, understanding and synthesis of contents presented by the lecturer (professor) or by guest speakers .

Practical classes (CP): participation in group exercises, as well as discussions and group dynamics, with the teacher and other students in the classroom.

Presentations (PS): class presentations of an activity carried out individually or in small groups.

Theoretical/practical work tutorials (TD): carry out in the class an activity or exercise, theoretical or practical in nature, individually or in small groups, with the advice of the professor.

Remote

Carry out an extensive project or piece of work (PA): design, plan and conduct individually or in groups, a complex or extensive project or piece of work, applying and extending knowledge and writing a report on this approach and the results and conclusions.

Autonomous study (EA): study or development of the subject individually or in groups, understanding, assimilating, analysing and synthesising knowledge.

## LEARNING OBJECTIVES OF THE SUBJECT

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The course aims to familiarize students with the concept of sustainable value in design, as well as with the main approaches, strategies, and tools of sustainable design, placing particular emphasis on environmental and social dimensions. It promotes a systemic, critical, and applied understanding of design as a lever for transformation towards more sustainable models.

Upon completion of the course, students will be able to:

- Recognize the impacts of economic and productive activities on the environment and society from a sustainability perspective.
- Identify methodologies and techniques that facilitate the implementation of strategies for sustainable transitions across different sectors.
- Discuss innovative approaches to resource management and sustainable production within planetary boundaries.
- Apply methodologies for the analysis and sustainable management of natural resources.
- Implement innovative solutions to optimize resource use across different sectors.
- Evaluate the environmental and social impacts of production processes and business models.
- Assess strategies to mitigate environmental impacts across different sectors and support adaptation to them.

## STUDY LOAD

| Type               | Hours | Percentage |
|--------------------|-------|------------|
| Hours medium group | 11,4  | 9.11       |
| Hours small group  | 11,0  | 8.79       |
| Hours large group  | 22,7  | 18.15      |
| Self study         | 80,0  | 63.95      |

**Total learning time:** 125.1 h

## CONTENTS

### Unit 1: Introduction to Design for Sustainability.

#### Description:

Introduction to the concepts of sustainable design and design for sustainability. Understanding the role played by different sustainable design strategies in the transition towards a sustainable society model through two analytical dimensions: Technology–Society and Specific–Systemic.

#### Related activities:

Flipped classroom exercise in which students analyze a sustainable design strategy and introduce its fundamental principles to their classmates.

#### Full-or-part-time: 7h

Theory classes: 1h

Guided activities: 1h

Self study : 5h

### 2. Project Methodology

#### Description:

Project-based methodology grounded in the analysis of an intervention or initiative (a potential solution to a sustainability challenge) through the lens of sustainability dimensions. The methodology is organized into five phases:

1. Definition of the problem and the objectives of the intervention.
2. Systematic stakeholder analysis.
3. Objective assessment of available information across six analytical dimensions: materials, energy, legislation, society, economics, and design.
4. Integration and subjective evaluation of the results obtained in the previous phase in relation to the core dimensions of sustainability: social capital, environmental capital, and financial capital.
5. Final reflection on how the proposed intervention contributes to achieving short-, medium-, and long-term objectives, and incorporation of design strategies aimed at improving its effectiveness and efficiency.

#### Related activities:

PROJ - Development of a project throughout the course in groups of 3-4 students, applying the project methodology. For each phase of the project, students will present their results in the form of a presentation, where the progress of the project will be analyzed and feedback will be provided to ensure that the process is carried out appropriately.

#### Full-or-part-time: 71h

Theory classes: 2h

Guided activities: 14h

Self study : 55h

### 3. Design tools and methodologies

**Description:**

A range of design tools will be introduced and applied throughout the project, including: Design Thinking, Persona, User Journey, Circular Business Model Canvas, Service Business Model Canvas, and CES EduPack.

**Related activities:**

Practical exercises associated with the various design tools introduced throughout the course.

**Full-or-part-time:** 11h

Theory classes: 3h

Guided activities: 3h

Self study : 5h

### 4. Strategy 1 . Ecodesign

**Description:**

Introduction to Ecodesign

**Related activities:**

AC1 – Reflection on ecodesign methodologies and tools as a sustainable design strategy, together with the development of a learning portfolio.

**Full-or-part-time:** 6h

Theory classes: 1h

Guided activities: 2h

Self study : 3h

### 5. Strategy 2 - Cradle to Cradle

**Description:**

Introduction to Cradle to Cradle

**Related activities:**

AC2 – Reflection on Cradle to Cradle methodologies and tools as a sustainable design strategy, together with the development of a learning portfolio.

**Full-or-part-time:** 5h

Theory classes: 1h

Guided activities: 2h

Self study : 2h

### 6. Strategy 3 - Biomimicry

**Description:**

Introduction to biomimicry

**Related activities:**

AC3 – Reflection on biomimicry methodologies and tools as a sustainable design strategy, together with the development of a learning portfolio.

**Full-or-part-time:** 5h

Theory classes: 1h

Guided activities: 2h

Self study : 2h

## 7. Strategy 4 - Product Service Systems

**Description:**

Introduction to Product Service Systems

**Related activities:**

AC4 – Reflection on Product Service Systems methodologies and tools as a sustainable design strategy, together with the development of a learning portfolio.

**Full-or-part-time:** 5h

Theory classes: 1h

Guided activities: 2h

Self study : 2h

## 8. Strategia 5 - Sistemic Design

**Description:**

Introduction to Systemic Design

**Related activities:**

AC5 – Reflection on Systemic Design methodologies and tools as a sustainable design strategy, together with the development of a learning portfolio.

**Full-or-part-time:** 5h

Theory classes: 1h

Guided activities: 2h

Self study : 2h

## 9. Strategy 6 - Socially Responsible Design

**Description:**

Introduction to Socially Responsible Design

**Related activities:**

AC5 – Reflection on Socially Responsible Design methodologies and tools as a sustainable design strategy, together with the development of a learning portfolio.

**Full-or-part-time:** 5h

Theory classes: 1h

Guided activities: 2h

Self study : 2h

## 10. Strategy 7 - Design for Sustainable Behaviour

**Description:**

Introduction to design for sustainable behaviour

**Related activities:**

AC7 – Reflection on design for sustainable behaviour methodologies and tools as a sustainable design strategy, together with the development of a learning portfolio.

**Full-or-part-time:** 5h

Theory classes: 1h

Guided activities: 2h

Self study : 2h



## ACTIVITIES

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### name english

**Description:**

AC1 – Reflection on ecodesign methodologies and tools as a sustainable design strategy, together with the development of a learning portfolio.

**Material:**

Lecture presentations, scientific articles available on ATENEA, and the activity submission template.

**Delivery:**

Report

**Full-or-part-time:** 2h

Guided activities: 1h

Self study: 1h

### AC2- Cradle to Cradle

**Description:**

Reflection on Cradle to Cradle methodologies and tools as a sustainable design strategy, together with the development of a learning portfolio.

**Material:**

Lecture presentations, scientific articles available on ATENEA, and the activity submission template.

**Delivery:**

Report

**Full-or-part-time:** 2h

Guided activities: 1h

Self study: 1h

### AC3- Biomimicry

**Description:**

Reflection on biomimicry methodologies and tools as a sustainable design strategy, together with the development of a learning portfolio.

**Material:**

Lecture presentations, scientific articles available on ATENEA, and the activity submission template.

**Delivery:**

Report

**Full-or-part-time:** 2h

Guided activities: 1h

Self study: 1h

#### AC4- Product Service Systems

**Description:**

Reflection on servitization methodologies and tools as a sustainable design strategy, together with the development of a learning portfolio.

**Material:**

Lecture presentations, scientific articles available on ATENEA, and the activity submission template.

**Delivery:**

Report

**Full-or-part-time:** 2h

Guided activities: 1h

Self study: 1h

#### AC5- Systemic Design

**Description:**

Reflection on ecodesign methodologies and tools as a sustainable design strategy, together with the development of a learning portfolio.

**Material:**

Lecture presentations, scientific articles available on ATENEA, and the activity submission template.

**Delivery:**

Report

**Full-or-part-time:** 2h

Guided activities: 1h

Self study: 1h

#### AC6- Socially responsible design

**Description:**

Reflection on socially responsible design methodologies and tools as a sustainable design strategy, together with the development of a learning portfolio.

**Material:**

Lecture presentations, scientific articles available on ATENEA, and the activity submission template.

**Delivery:**

Report

**Full-or-part-time:** 2h

Guided activities: 1h

Self study: 1h

### AC7- Design for Sustainable Behaviour

**Description:**

Reflection on design for sustainable behaviour methodologies and tools as a sustainable design strategy, together with the development of a learning portfolio.

**Material:**

Lecture presentations, scientific articles available on ATENEA, and the activity submission template.

**Delivery:**

Report

**Full-or-part-time:** 2h

Guided activities: 1h

Self study: 1h

## GRADING SYSTEM

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EV1: Written test (PE). 0%

EV2: Oral test (PO). 10%

EV3: Individual or group coursework (TR). This includes results and reports and their oral presentation. 30%

EV4: Class and laboratory attendance and participation (AP). 0%

EV5: Performance and quality of group work (TG). 60%

## EXAMINATION RULES.

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All activities will be uploaded to the ATENEA platform.

The project will be defended and discussed with all students.

## BIBLIOGRAPHY

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**Basic:**

- Ashby, M.F.; Ferrer-Balas, D.; Segalàs, J.. Materials and Sustainable Development. 2015. ISBN 13: 978-0081001769.

- McLennan, J.F.. The philosophy of sustainable design. ISBN 9780974903309.

- Fabrizio Ceschin, Àdíl Gaziulusoy. Design for Sustainability A Multi-level Framework from Products to Socio-technical Systems. ISBN 9780429456510.

## RESOURCES

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**Hyperlink:**

- Projecte Circular Design. Project Circular Design

**Other resources:**

<https://circulardesigneurope.eu/>