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| **Name of the module (English):**<br>Concepts and Strategies for Sustainability | | | | | |
| **Module code (UP):**<br>M11 (provisional) | | **Name of the module (Portuguese):**<br>Conceitos e Estratégias para a Sustentabilidade | | | |
| **Module code (THM):**<br>IMTM (provisional) | | **Name of the module (German):**<br>Konzepte und Strategien für Nachhaltigkeit | | | |
| **Module code (UC):**<br>M11 (provisional) | | **Name of the module (Spanish):**<br>Conceptos y estrategias para la sostenibilidad | | | |
| **Credits:**<br>6 ECTS | **Module status:**<br>Obligatory | **Duration:**<br>1 semester | **Semester:**<br>2 | **Year:**<br>1 | **Frequency:**<br>Every year |
| **Type of tuition:**<br>Classroom-based | | **Workload:**<br>180 h | **Attendance time:**<br>60 h | **Self-study time:**<br>120 h | |
| **Usability:**<br>Master<br>(Degree in Sustainable Design, Construction and Management of the Built Environment) | | | **Classification:**<br>Engineering / Architecture | **Teaching language:**<br>English | |
| **Module responsibility:**<br>Maria Helena Póvoas Corvacho<br>(FEUP) | | **Lecturers:**<br>n/a | | | |

**Description / Observations:**
The main concepts of sustainability will be transmitted within a solid and grounded framework, in the various levels of approach. Starting with the most general concepts, students will be able to understand their meaning in a broader sense, then going into the detail for the construction sector. In this context, they will have the opportunity to meet, discuss and consolidate the main questions that relate to urban interventions, the built environment, construction processes and finally in-service buildings. Once the concepts are mastered, sustainability strategies will be presented, first in a theoretical way and then applied to case studies.

**Recommended Requirements**
Basic knowledge about sustainable concepts in design, construction and managements of buildings and infrastructures.

**Basic competences:**

- Possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context.
- Students are able to apply their acquired knowledge and problem-solving skills in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.
- Students are able to integrate knowledge and deal with the complexity of making judgments based on information that is incomplete or limited, including reflections on the social and ethical responsibilities associated with applying their knowledge and judgments.
- Students are able to communicate their findings and the ultimate knowledge and reasons behind them to specialist and non-specialist audiences in a clear and unambiguous manner.

Students possess the learning skills to enable them to continue studying in a largely self-directed or autonomous manner.

**Transverse competences:**

- It is intended that students master the main concepts of sustainability and identify the best strategies related to the construction sector. For this it is necessary to transmit this knowledge in a way which is dully framed, organized and applied wherever possible. The lectures and discussions aim at this goal. With the learning and especially with the application of the sustainability concepts and strategies to case studies, students will be able to identify the most sustainable solutions and learn how to apply them in projects that they may perform in the future.

**Specific competences:**
To know and be able to evaluate the best sustainable technical solutions in a building and be able to apply them in a feasibility study.

**Learning outcomes:**

On successful completion of this module, the students will be able:

- To master the main concepts of sustainability and to understand the various possible levels of approach.
- To be acquainted with the Sustainable Development Goals (SDG) and how they impact on the construction sector, leading to the definition of strategies.

To identify the most sustainable solutions and to learn how to apply them in a project.

- **Content:**

1. What is Sustainability? The three pillars: environmental, economic and social sustainability.
2. The evolution of concepts and strategies over time.
3. The emergency of climate change. Implications.
4. Depletion of natural resources.
5. Sustainable Development Goals SDG.
6. The implementation of SDGs. Impact on the construction sector.
7. Legislative and regulatory framework.
8. Principles of a sustainable urban management.
9. Sustainability in construction: LCA fundamentals.
10. Strategies for a circular economy.
11. Case studies.

**Teaching methodology:**

In the first part of the course, where the transmission of knowledge is the main concern, the classes will be mainly of an expository nature but, wherever possible, debate will be encouraged based on practical examples presented to the students.

In a second phase, students should develop a practical assignment, applying the acquired concepts and strategies to case studies. This assignment, developed in class and completed in dedicated study hours, will be one of the evaluation components, complemented with a final exam.

**Training activities:**

| | Number of hours | % Attendance |
|---|---|---|
| Theory | 30 | 100 |
| Classroom practice | 30 | 100 |
| Tutorials | 5 | 100 |
| Evaluation | 5 | 100 |
| Group work | 30 | 0 |
| Self-directed work | 50 | 0 |

**Assessment Method:**

| | Minimum weighting | Maximum weight |
|---|---|---|
| Continuous classroom evaluation | 0% | 10% |
| Final written work | 25% | 40% |
| Oral presentation | 0% | 10% |
| Theoretical exam | 0% | 25% |
| Practical exercises | 40% | 50% |

**Grading system:**

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U.PORTO | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | ... | 0 |
| Portugal | Very Good with distinction | | | Good with distinction | | Good | | Sufficient | | | | Fail | | |
| U.CANTABRIA | 10.0 | 9.9 | 9.0 | 8.9 | ... | | 7.0 | 6.9 | ... | | 5.0 | 4.9 | ... | 0.0 |
| Spain | Sobresaliente | | | Notable | | | | Aprobado | | | | Suspenso | | |
| THM | 100 | ... | 88 | 87 | 73 | 72 | 58 | 57 | ... | | 50 | 49 | ... | 0 |
| Germany | Excellent | | | Good with distinction | | Satisfactory | | Sufficient | | | | Fail | | |

**Bibliography:**

World Commission on Environment and Development (1987). **Our Common Future** (aka Brundtland Report). UN.

World Bank Group (2017). **Atlas of Sustainable Development Goals 2017, From World Development Indicators**. US.

European Commission (2015). **Closing the loop - An EU Action Plan for the Circular Economy.** Brussels, December 2015

European Commission (2017). **Report on the Implementation of the Circular Economy Action Plan**. Brussels, January 2017.

Pacheco-Torgal, F., Cabeza, L.F., Labrincha, J., & Magalhães, A. De (Eds.) (2014). **Eco-efficient construction and building materials**. Cambridge: Woodhead Publishing Limited.

Current Status: 20200717