Course guide
480042 - TCTS - Research-Action Workshop on Sustainability Science and Technologies

Unit in charge: Barcelona School of Civil Engineering
Teaching unit: 729 - MF - Department of Fluid Mechanics.
724 - MMT - Department of Heat Engines.
751 - DECA - Department of Civil and Environmental Engineering.
Degree: MASTER'S DEGREE IN SUSTAINABILITY SCIENCE AND TECHNOLOGY (Syllabus 2013). (Compulsory subject).
Academic year: 2022 ECTS Credits: 5.0 Languages: English

LECTURER
Coordinating lecturer: JORDI SEGALAS CORAL
Others: Segalas Coral, Jordi
Rosas Casals, Marti
Villares Junyent, Miriam

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. The ability to critically analyse and assess theories, strategies and policies on development and sustainability; perspectives on the sustainability paradigm, discussions within the field and its environmental, social, cultural and economic implications; the particularities of and differences between environmental and ecological economics; and the problems of valuing goods, services, resources and externalities economically.

CE11. The ability to develop advanced approaches to analysing and assessing the sustainability of the built environment, including buildings, infrastructure and transport, which minimise their impact, and to choose the most appropriate options in agreement with one or more of the economic, social and environmental principles of sustainability.

Generical:
CG03. The ability to analyze, evaluate and synthesize, critically, new and complex ideas and promote, within academic and professional, scientific, technological, social or cultural knowledge society contexts.
CG04. Describe, resolve, prevent and / or alleviate the problems and dysfunctions associated with the processes of development of environmental socio-economic systems with their own approaches to science and technologies of sustainability.

Transversal:
3. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.

2. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.

Basic:
CB6. Knowledge and understanding to provide a basis or opportunity for originality in developing and app ideas, often within a research context.
CB7. That students can apply their knowledge and ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field d'study.
TEACHING METHODOLOGY

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.

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)

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

At the end of this module, the student will:

Be aware of, and critically analyse, the organisations, strategies, local, national, European and International policies on sustainability and sustainable social development.

Understanding of sustainable development in the long-term and the role of technology systemically.

Capacity to apply foresight, forecasting and backcasting to scenario analysis.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>30,0</td>
<td>24.00</td>
</tr>
<tr>
<td>Self study</td>
<td>80,0</td>
<td>64.00</td>
</tr>
<tr>
<td>Guided activities</td>
<td>15,0</td>
<td>12.00</td>
</tr>
</tbody>
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Total learning time: 125 h
CONTENTS

**Topic 1- Research concepts and tools - action in socio-economic and ecological systems.**

**Description:**
Introduction to research paradigms and to the action research methodology

**Full-or-part-time:** 9h
Theory classes: 9h

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**Topic 2- Qualitative and quantitative research tools for action research projects**

**Description:**
Lecture and application of qualitative and quantitative research tools for action research projects

**Specific objectives:**
Learn on how to use the tools

**Full-or-part-time:** 9h
Theory classes: 9h

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**3. Action Research Project**

**Description:**
Service Learning Project with local entity applying action research methodology and research tools

**Specific objectives:**
Learn how to apply the action research methodology in a real project

**Related competencies:**
- CG03. The ability to analyze, evaluate and synthesize, critically, new and complex ideas and promote, within academic and professional, scientific, technological, social or cultural knowledge society contexts.
- CG04. Describe, resolve, prevent and/or alleviate the problems and dysfunctions associated with the processes of development of environmental socio-economic systems with their own approaches to science and technologies of sustainability.
- CE11. The ability to develop advanced approaches to analyzing and assessing the sustainability of the built environment, including buildings, infrastructure and transport, which minimize their impact, and to choose the most appropriate options in agreement with one or more of the economic, social and environmental principles of sustainability.
- CE01. The ability to critically analyze and assess theories, strategies and policies on development and sustainability; perspectives on the sustainability paradigm, discussions within the field and its environmental, social, cultural and economic implications; the particularities of and differences between environmental and ecological economics; and the problems of valuing goods, services, resources and externalities economically.
- CT3. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.
- CT5. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.

- CB6. Knowledge and understanding to provide a basis or opportunity for originality in developing and app ideas, often within a research context.
- CB7. That students can apply their knowledge and ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study.

**Full-or-part-time:** 24h
Guided activities: 24h
ACTIVITIES

A1. CARRYING OUT A TRANSDISCIPLINARY PROJECT IN THE FIELD OF SOCIO-TECHNICAL SUSTAINABILITY SCIENCE.

Specific objectives:
The ability to critically analyse and assess theories, strategies and policies on development and sustainability; perspectives on the sustainability paradigm, discussions within the field and its environmental, social, cultural and economic implications; the particularities of and differences between environmental and ecological economics; and the problems of valuing goods, services, resources and externalities economically.

Delivery:
Project and defense.

GRADING SYSTEM

EV1 Project report 60%
EV2 Participation during the course and individual assignments 20%

BIBLIOGRAPHY

Basic: