Universidad Zaragoza

Academic Year/course: 2024/25

29969 - Technology, ecology and biodiversity

Syllabus Information

Academic year: 2024/25
Subject: 29969 - Technology, ecology and biodiversity
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 558 - Bachelor's Degree in Industrial Design and Product Development Engineering
ECTS: 4.0
Year: 4
Semester: Second semester
Subject type: Optional
Module:

1. General information

Technical development has made it possible for humans to transform the Earth at an exponential rate. These changes that have occurred on a global scale have affected both the conditions in which we live and the rest of biology with which we coexist. How humans conceive and construct the cultural concept of nature has also changed. **This implies a rethinking of how we socially relate to the environment**.

Global changes caused by human action have affected the functioning of ecosystems. These changes -climate, pollution, habitat, land use, resource exploitation, urbanization- have one of their most harmful consequences: **the irreversible loss of biodiversity**. This is the result of understanding technology as a means of modifying the environment to adapt it to a specific human concept of development and well-being. This power to transform the earth has not been accompanied by a capacity to reflect on its consequences.

The obvious problems associated with this development, such as climate change and biodiversity loss, have developed new notions and concepts with which we relate to the environment. Depth Ecology, Biophilia ( ) or Sympoiesis (Donna Haraway), propose that humans are just another part of natural systems, and therefore , their theories imply other ways of relating to the rest of the species.

Biodiversity conservation and management, in addition to being an ethical imperative (Arne Naess and Aldo Leopold), is a priority objective . It is also an indicator of the depth of the changes produced. Technology can be thought of as a system capable of modifying the Earth, but also of providing us with a better understanding of how the Earth works.

The subject proposes that future engineers and architects overcome a conception of technique as a tool to dominate and subdue nature, understood as a complex system. A space for reflection on the role of the human being in nature, from a plundering and property point of view to a relational and symbiotic one, is proposed . From a construction of a clearly human ethics, to another biospheric or biophilic (Edward O. Wilson). It introduces the student to the concepts of "complex systems", "biodiversity" and the functioning of "ecosystems"..

These approaches and goals are aligned with the SDGs of the 2030 Agenda, especially with 7, 9, 11, 13 but especially with 15, Life of Terrestrial Ecosystems.

2. Learning results

In order to develop these approaches, the learning results of the subject are the following:

- Know what technique is.
- Understand the differences between ecology and deep ecology.
- Understand what biodiversity is. Know what a key indicator of sustainable development is
- Is aware of the impact that their actions and decisions as engineers and architects have on society, the economy and the environment.
- Understands environmental processes in connection with culture and societies.
- Develops a deep environmental ethic that promotes environmental protection from a technical perspective and shared responsibility.
- Is capable of reflecting and finding alternatives to develop their profession with reduced use and not based on extractive and economic criteria of natural and energy resources.
- Knows the means to develop more sustainable engineering and architectural projects, and adapts and applies selection criteria to them
- Understands the interaction of biological, technical, architectural, and industrial processes in society, economy and culture as well as in ecology
- Develops critical thinking, forming informed opinions through analysis, interpretation and evaluation of information
- Is able to understand the transformations in society and culture implicit in the processes of automation, artificial intelligence, digitization, bit-data and the internet
- Knows and analyses the implications of technical transformations on the environment.
- Knows what a complex system is. Is able to conceptualize the earth as a complex system.
- Is aware of their ability to intervene in problem solving and to propose alternatives, in different socio-cultural contexts

and rapidly changing environments

3. Syllabus

1. Basic questions:
    1. What is the concept of "nature"?
    2. What is technical and industrial development?
    3. What is deep ecology. Implications for engineering and architecture.
    4. What is biodiversity and ecosystems. Influence of human beings and their technical actions.
4. Consequences of technical and industrial development: climate change, loss of biodiversity and ecosystems.
5. The Earth as a Complex System. What is a complex system.
6. Biophilia, biophilic design and biomimicy: new forms of integrated design for engineers and architects.
7. The processes of automation, artificial intelligence, digitalization, bit-data and the internet and their implications on the environment and culture.

4. Academic activities

1. Master classes, 20 h
2. Problem solving and case studies, 10 h
3. Practices, 10 h
4. Autonomous development of practical application or research, 36 h
5. Personalized tutoring teacher-student, 2 h
6. Presentation of papers, 2 h
7. Elaboration of the work related to the Learning Portfolio and final project, 20 h

5. Assessment system

The teaching-learning process requires an assessment approach that allows the student's learning to be evaluated in a global and continuous manner:

1. Evaluation topics: Portfolio (5 points)
2. Evaluation of the case study proposed by the student (5 points):

The evaluation criteria will be:

Participation and identification of the needs of the assigned role: 30%, Ability to generate solutions and alternatives: 40%, Analysis of the implications of their proposals in relation to the issues addressed: 30%.

Following the regulations of the University of Zaragoza in this regard, a global evaluation test will also be scheduled, representative of 100% of the grade, for those students who decide to opt for this second system of final evaluation

6. Sustainable Development Goals

11 - Sustainable Cities and Communities
13 - Climate Action
15 - Life on Land