



## Study Plan

**School:** School of Sciences and Technology  
**Degree:** \*\*\* TRANSLATE ME: Pós-Graduação \*\*\*  
**Course:** Environment, Sustainability and Education (cód. 375)

### 1st Year - 1st Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
<b>Group of Options</b>					
Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PAO10041O	Ecology, Standards and Processes	Environment and Ecology Sciences	6	Semester	156
FIL10042O	Conceptions of Nature, Environment and Landscape	Philosophy	3	Semester	78
FIL10043O	Aesthetics of Landscape and Nature	Landscape Architecture	6	Semester	156
PAO10047O	Habitats: Management and Conservation	Environment and Ecology Sciences	6	Semester	156
INF10048O	Introduction to e-learning and collaborative tools	Informatics	3	Semester	78

### 1st Year - 2nd Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
<b>Group of Options</b>					
Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PAO10040O	Sustainability: a transdisciplinary approach	Environment and Ecology Sciences	6	Semester	156
PAO10044O	Nature, Society and Ideology	Environment and Ecology Sciences	6	Semester	156
PAO10045O	Education for the Environment: from fundamentals to action	Environment and Ecology Sciences	6	Semester	156
PAO10046O	Urban Landscape	Landscape Architecture	3	Semester	78
FIS10049O	Light and Colour in Nature	Physics	3	Semester	78

### Conditions for obtaining the Degree:

\*\*\* TRANSLATE ME: Para aprovação na componente curricular é necessário a aprovação (através de avaliação ou creditação) de 30 ects em optativas. \*\*\*

## Program Contents



[Back](#)

### **Ecology, Standards and Processes (PAO10041O)**

1. Ecology, ecologies
2. Levels of organization of the living systems. from the cellular organite to ecosphere. Concept of system and its importance in the life sciences.
3. Main actors and drivers. Matter and energy. Thermodynamics, work, production, efficiency. Energy to circulate matter and control entropy. Matter circulation - cycles, phases, rates.
4. The program of the living systems. Changing to persist in a changing world. Adaptation.
5. Organisms and environment. Environmental factors, distribution and abundance
6. Populations. Interactions and temporal dynamics. Competition - where evolution meets ecology. Competition and specialization. Strategies, responses to pressures, resistance and resilience. Mecanismos of regulation.
7. Communities. Complexity and its factors. Complexity and stability. Stochasticity versus determinism.
8. Ecosystems and Succession. Persistence and transformation. Do ecosystems evolve towards equilibrium ? The ecosystems die ? Aquatic systems vs. terrestrial systems. How to make an ecosystem regress to immaturity.
9. Order, equilibrium and chaos. The myth of the balanced, harmonious and perfect Nature. Teleology.

[Back](#)

### **Conceptions of Nature, Environment and Landscape (FIL10042O)**

- 1: Amplitude, ambivalence and complexity of the notions of "nature" and "environment". The "medial" function of "landscape." The philosophical question of the relationships between the natural and the cultural, the spontaneous and the artificial.
2. The notion of nature supposed in the conceptualization of the environment. The concepts of physis and natura and the modern understanding of nature; the emergence of the mechanism and vitalism. The notions of evolution and ecology. The formulation of a "science of the environment."
3. The constitution of the notion of environment. Environment, natural environment and ecosystem. The biotic and a-biotic factors, ecological and ethological aspects. The cultural transformation of nature. The question of technique. The psycho-sociological dimension of environment. The aesthetic significance of "atmosphere."
4. The interdisciplinary dimension and the notion of multifunctional landscape. The origins of landscape concepts, in China and Europe. "Artialization" and formalizing the notion of landscape.
- 5: The diversity of the anthropological implications of nature, environment and landscape. The "disappearance" of the contemporary notion of nature. Elements for a philosophy of sustainability.

[Back](#)

### **Aesthetics of Landscape and Nature (FIL10043O)**

- introduction to the aesthetical theory and experience: painting and landscape in the cinema (Kurosawa) – Phenomenological conceptions of the aesthetical perception and of the work of art (Merleau-Ponty, José Gil)
- Phenomenological reexposition of Kant's aesthetics
- The nature/culture relation and the ethical dimension of Aesthetics (Adorno, Descola, Kac)
- introduction to a philosophy and aesthetics of nature (Merleau-Ponty, Adorno)
- the different landscape theory perspectives and the contemporary debates: Assunto, Roger, Kessler, Berleant, Carlson, Brady, Saito
- Nature and landscape in the visual arts: from the dutch landscape painters to the thematic organization of this domain in the contemporary museum

[Back](#)

### **Habitats: Management and Conservation (PAO10047O)**

Revision of basic concepts in ecology. Historical perspective on nature conservation. Notions of Bioclimatology and Biogeography. Characterization of priority habitats for conservation: Forests, Matos, coastal habits and halophyte vegetation, marine and continental dunes, freshwater habitats, natural grasslands and semi-natural mires and bogs and rocky habitats and caves. Characterization of species of interest to the conservation chorological, Ecology and Net Asset Value: Key factors that threaten natural habitats and species of interest for conservation. Conservation and management measures.



[Back](#)

### **Introduction to e-learning and colaborative tools (INF100480)**

Introduction to e-learning  
Platform Learning Management Systems (LMS)  
Advanced features in Moodle  
Open Educational Resources (OER)  
Tools for the production of educational content  
Synchronous and asynchronous communication tools  
Web Conferencing Systems

[Back](#)

### **Sustainability: a transdisciplinary approach (PAO100400)**

Introduction to sustainability  
-Sustainable development and sustainability: a complex issue  
-Introduction to the thought of complexity - from the mechanistic approaches to systemic approaches  
-Interdisciplinarity and transdisciplinarity - the transdisciplinary approach  
-The paradigm of sustainable development - causes and landmarks  
- Criticisms of the concept of sustainable development

Dimensions of the problem  
-Environmental degradation, loss of biodiversity and natural ecosystems  
-Depletion/over-exploitation of resources  
-Consumerism and the increasing number of consumers

Contributions to the approach of sustainability  
-Territory, landscape and sustainability  
-Socio-economy - transformations for a sustainable future  
-Demographics - the problems of population explosion and implosion  
-Energy and sustainability - Green Physics  
-Chemistry and sustainability - Green Chemistry  
-Product Design and Architecture  
-ICT and sustainability

Future prospects  
-A new attitude towards the world  
-Other habits, another daily routine - lifestyle changes



[Back](#)

### **Nature, Society and Ideology (PAO100440)**

#### 1. The human species - nature relationship.

Visions and attitudes of man towards nature.

The evolution of the development paradigms in relation to the environment

The New Ecological Paradigm and the phases of the "great narrative"

Arguments for the nature conservation

The experience of nature in its multiple levels - from comfort to transcendence. Nature and emotional experience.

Thoreau, Emerson, Muir. Biophilia.

#### 2. Valuing the natural elements

Concept of value, criteria

Goods and ecological services, tangible and intangible, with and without market value

Methods used in Ecological Economics

Rethinking methods and value setting criteria

#### 3. Symbolics of landscape

Symbols, myths, memories

The poetics of landscape. Landscape, visual culture and literature.

#### 4. Ethics

Ethics of life, animal ethics, environmental ethics, eco-ethics

Aldo Leopold and the land ethic, Arne Naess and Deep Ecology.

Religion and ethics: despotism vs. custodia

Case studies. Difficulties, dilemmas, pragmatism

#### 5. Nature and Ideology

New appreciations of Nature. Science and ideology

The ideology of natural and green, the greenophilia, eco-fetichism, environmental radicalisms, green in advertisement and politics, eco-socialism, eco-feminism

Environmentalism and religion. The sacred nature. The new religions of nature, neo-paganism.



[Back](#)

### **Education for the Environment: from fundamentals to action (PAO100450)**

Environment concept: Genesis and evolution:

- 1.1. The students' environment conceptions and Environment Law, as bottom line to current environment concept understanding;
- 1.2. Earth as global and complex system, the human intervention role in the system.
2. The Environment concept importance to the actual Environmental Education goals.
  - 2.1. Environmental evolution key dates on environmental awareness and worldwide growing importance relationship to formal and informal environmental education,;
  - 2.2. Environmental education aims, goals and strategies and relationship with it ethical conceptual and methodological foundations;
  - 2.3. Sustainable development as a global strategy, at short, medium and long term, the eco-development, concept genesis and its importance today,;
  - 2.4. Education for sustainability as holistic perspective in the Environmental Education field
3. Some environmental problems questions, for an Environmental Education approach.
  - 3.1. Addressing environmental issues and some major problems associated:
    - 3.1.1. Climate change;
    - 3.1.2. Water and the environment;
    - 3.1.3. Biodiversity
    - 3.1.4. Human activity and waste production.
  - 3.2. Environmental problems and environmental education, education for the reduction of production and consumption, to reuse and recycling.
4. The understanding of the landscape as the basis of the Project on Environmental Education.
  - 4.1. The biophysical factors: analysis, constraints and variability:
    - 4.1.1. Geology and soils;
    - 4.1.2. Climate;
    - 4.1.3. Biocoenosis;
    - 4.1.4. Antropozoogenic and anthropogenic activity.
  - 4.2. Landscape as integrated biosystem.
    - 4.2.1. Flora and vegetation: types, dynamics and analysis levels;
    - 4.2.2. National landscape types;
    - 4.2.3. Semi-natural and natural habitats.
  - 4.3. Threats versus current management and conservation: the educator role
    - 4.3.1. Main threats;
    - 4.3.2. What to keep and preserve: some clues.
5. Resources and Environmental Education projects.
  - 5.1. The local and regional organizations resources with an emphasis on environmental education and environmental protection, the study visits role;
  - 5.2. The environmental education projects, development with particular emphasis on interventions in kindergarten



[Back](#)

### **Urban Landscape (PAO100460)**

Module 1 - The city as a community. The importance of the site location in the city. The Mediterranean city as a paradigm of sustainability where the relationship between landscape and urban space are the protagonists. The landscape in the well defined and compressed city.

Module 2 - The loss of unity in the city. The loss of multifunctionality of the landscape in urban space and hence its sustainability. The intellectual thought of the utopians of the nineteenth century. The “Beautiful City” of Olmsted. The “garden city” of Ebenezer Howard. The “Broadacre City” of Frank Lloyd Wright.

Module 3 - The fragmented city. The technological and social changes. The new landscape of the consumer society of the metropolis (economic processes, globalization, mobility, speed). Energy issues and sustainable development. The need for sustainability in urban space. The demand of multifunctionality of the landscape in urban space.

Module 4 - The new urban realities and challenges: the reinvention of the multifunctionality of the landscape in urban space. The landscape as an urban infrastructure.

[Back](#)

### **Light and Colour in Nature (FIS100490)**

1 – Are the colours in the light? Revisiting the polemics generated by Goethe, against Newton, about the origin of colours in Nature.

2 - The Atmospheric Optics. The Optical Atmospheric Phenomena. Cloud classification.

3 - Description of some optical phenomena. The electromagnetic spectrum and the visible light. . The phenomena of light reflexion, refraction, diffusion, diffraction and polarization.

4 - The solar radiation and the Earth Atmosphere: composition and vertical structure of the earth atmosphere. Propagation, depletion and absorption of the solar radiation in the atmosphere. The phenomena of reflexion, refraction, diffusion and diffraction, as the main physical mechanisms of interaction of the light with the atmosphere.

5 - Interpretation of the Optical Atmospheric Phenomena: sky colours, cloud colours, rainbows, mirages, halos, coronas, green ray, etc