



## Study Plan

**School:** School of Sciences and Technology

**Degree:** Bachelor

**Course:** Landscape Architecture (cód. 639)

### 1st Year - 1st Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PAO2073	Introduction to Landscape Architecture	Landscape Arts and Techniques	5	Semester	130
PAO2074	Introduction to Ecology	Environment and Ecology Sciences	5	Semester	130
PAO2075	Drawing I	Visual Arts	6	Semester	156
ARQ2076	Geometry and Architectural Drawing	Architecture	5	Semester	130
GEO12324	Physical Geography I	Geography	5	Semester	130
ERU12325	Surveying	Rural Engineering	4	Semester	104

### 1st Year - 2nd Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PAO2077	Landscape Theory and Design I	Landscape Arts and Techniques	5	Semester	130
BIO2078	Applied Phytodiversity	Biological Sciences	6	Semester	156
GEO12326	Physical Geography II	Geography	5	Semester	130
PAO2079	Drawing II	Visual Arts	4	Semester	104
HIS2080	History of Art	History of the Art	5	Semester	130
PAO2081	Terrestrial and Aquatic Ecosystems	Environment and Ecology Sciences	5	Semester	130

### 2nd Year - 3rd Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PAO2082	Theory and Landscape Design II	Landscape Arts and Techniques	9	Semester	234
PAO2083	Landscape Interpretation I	Landscape Arts and Techniques	12	Semester	312
PAO2084	Landscape and Garden Art	Landscape Arts and Techniques	4	Semester	104

### Mandatory alternatives

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PAO2086	Training Period I	Landscape Arts and Techniques	5	Semester	130



### 2nd Year - 3rd Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
<b>Options</b>					
Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PAO12327	Techniques of digital expression and representation in landscape architecture.	Landscape Arts and Techniques	2.5	Semester	65
PAO12328	Techniques of construction and management of green spaces	Landscape Arts and Techniques	2.5	Semester	65
PAO2176	Landscape Architecture in Portugal	Landscape Arts and Techniques	2.5	Semester	65
PAO2177	Introduction to Soil and Water Bioengineering	Landscape Arts and Techniques	2.5	Semester	65
PAO2175	Construction Techniques with Vegetation	Landscape Arts and Techniques	2.5	Semester	65

### 2nd Year - 4th Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PAO2085	Theory and Landscape Design III	Landscape Arts and Techniques	14	Semester	364
PAO2087	Landscape Interpretation II	Landscape Arts and Techniques	11	Semester	286
<b>Mandatory alternatives</b>					
Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PAO2086	Training Period I	Landscape Arts and Techniques	5	Semester	130
<b>Options</b>					
Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PAO12327	Techniques of digital expression and representation in landscape architecture.	Landscape Arts and Techniques	2.5	Semester	65
PAO12328	Techniques of construction and management of green spaces	Landscape Arts and Techniques	2.5	Semester	65
PAO2176	Landscape Architecture in Portugal	Landscape Arts and Techniques	2.5	Semester	65
PAO2177	Introduction to Soil and Water Bioengineering	Landscape Arts and Techniques	2.5	Semester	65
PAO2175	Construction Techniques with Vegetation	Landscape Arts and Techniques	2.5	Semester	65

### 3rd Year - 5th Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PAO2089	Theory and Landscape Design IV	Landscape Arts and Techniques	12.5	Semester	325
PAO2091	Landscape Characterization and Assessment I	Landscape Arts and Techniques	12.5	Semester	325
<b>Mandatory alternatives</b>					
Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PAO2088	Training Period II	Landscape Arts and Techniques	5	Semester	130



### 3rd Year - 5th Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
<b>Options</b>					
Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PAO12327	Techniques of digital expression and representation in landscape architecture.	Landscape Arts and Techniques	2.5	Semester	65
PAO12328	Techniques of construction and management of green spaces	Landscape Arts and Techniques	2.5	Semester	65
PAO2176	Landscape Architecture in Portugal	Landscape Arts and Techniques	2.5	Semester	65
PAO2177	Introduction to Soil and Water Bioengineering	Landscape Arts and Techniques	2.5	Semester	65
PAO2175	Construction Techniques with Vegetation	Landscape Arts and Techniques	2.5	Semester	65

### 3rd Year - 6th Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PAO2090	Theory and Landscape Design V	Landscape Arts and Techniques	10	Semester	260
PAO2092	Landscape Characterization and Assessment II	Landscape Arts and Techniques	12.5	Semester	325
SOC2093	Elements of Sociology	Sociology	2.5	Semester	65
<b>Mandatory alternatives</b>					
Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PAO2088	Training Period II	Landscape Arts and Techniques	5	Semester	130
<b>Options</b>					
Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PAO12327	Techniques of digital expression and representation in landscape architecture.	Landscape Arts and Techniques	2.5	Semester	65
PAO12328	Techniques of construction and management of green spaces	Landscape Arts and Techniques	2.5	Semester	65
PAO2176	Landscape Architecture in Portugal	Landscape Arts and Techniques	2.5	Semester	65
PAO2177	Introduction to Soil and Water Bioengineering	Landscape Arts and Techniques	2.5	Semester	65
PAO2175	Construction Techniques with Vegetation	Landscape Arts and Techniques	2.5	Semester	65



## Conditions for obtaining the Degree:

\*\*\* TRANSLATE ME: Para obtenção do grau de licenciado em Arquitetura Paisagista, é necessário obter aprovação a 170 ECTS em unidades curriculares obrigatórias e 10 ECTS em unidades curriculares optativas, distribuídas da seguinte forma:

1º Ano

1º Semestre:

6 UC Obrigatórias num total de 30 ECTS

2º Semestre

6 UC Obrigatórias num total de 30 ECTS

2º Ano

3º Semestre

3 UC Obrigatórias num total de 25 ECTS

Estágio I ou UC optativa a escolher do "Quadro das UC's optativas por área científica" num total de 5 ECTS

4º Semestre

2 UC Obrigatórias num total de 25 ECTS

Estágio I no caso de não ter optado por o realizar no 3º semestre ou UC optativa a escolher do "Quadro das UC's optativas por área científica" num total de 5 ECTS

3º Ano

5º Semestre

2 UC Obrigatórias num total de 25 ECTS

Estágio II ou UC optativa a escolher do "Quadro das UC's optativas por área científica" num total de 5 ECTS

6º Semestre

3 UC Obrigatórias num total de 25 ECTS

Estágio II no caso de não ter optado por o realizar no 5º semestre ou UC optativa a escolher do "Quadro das UC's optativas por área científica" num total de 5 ECTS

Quadro das UC Optativas por área científica:

Áreas científicas

Sigla

Créditos

Artes e Técnicas da Paisagem (optativas do plano do curso)

ATP

2,5

Ciências Sociais e Humanas (optativas livres - UC's de outros cursos nesta Área Científica)



## Program Contents

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### **Introduction to Landscape Architecture (PAO2073)**

- Landscape architecture as art and science.
- From the garden design to landscape design.
- The landscape architecture object of study of: the landscape.
- The concept of landscape.
- The landscape as a process, system and structure.
- Biophysical Structure: morphological and ecological systems of cultural landscape.
- Visual structure of landscape: aesthetic and poetic components components
- Philosophy and main concepts of intervention in the landscape: character of the place, Continuum naturale, Global Landscape

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### **Introduction to Ecology (PAO2074)**

Structure and function of ecosystems: circulation of matter and energy

Biogeochemical cycles and impacts of human activities

Laws of limiting factors and interpretation of the species' distribution and of the landscape structure. Factors of production and decomposition

Production and trophic structure: factors of production and distribution and ecological efficiencies.

Population: characteristics and vital rates. Models of growth. Selection strategies r and K.

Predator-prey interactions, population cycles. Competitive interactions and niche

Population regulation

Community: Structure, stability, diversity and environmental quality

Island Biogeography Theory, urban green structure and conservation areas

Resistance and resilience

Succession: Primary and secondary. Natural and Cultural. Climax theories

Man-nature relationship in its multiple dimensions

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### **Drawing I (PAO2075)**

- Introduction to Drawing

- The materials and techniques of drawing

- Representing through drawing

- Conducting exercises in drawing from observation and perception.

- Exploration of different representation techniques. Capacity development for synthesis.

- Draw organic shapes, everyday objects, and parts of the human body as a model

- Designing interior spaces and exterior

- Look and analyze: the drawings of other authors.

- Critical analysis and interpretation of technical aspects and visual representation.

- The Daily Graphic Journal as daily exercise: Students must maintain throughout the school year a notebook or book that accompanies them, and in which recorded sketches, diagrams, notes. This book aims to develop the student and encourage daily exercise chart recording, drawing, and implementation of ideas. It is mandatory to bring the journal to every class.

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### **Geometry and Architectural Drawing (ARQ2076)**



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### **Physical Geography I (GEO12324)**

The lighting of the terrestrial sphere: annual and diurnal variation of the height of the Sun; variation of the Earth illumination rhythms with latitude. The climate system. Solar radiation. Insolation over the globe, world latitude zones. The Atmosphere (composition and structure). Solar radiation and temperature. The long wave radiation. The global radiation budget. Annual cycle of air temperature. Land and oceans temperature contrasts. Atmospheric pressure and winds. Air masses and cyclone storms. Cold and warm fronts. Global distribution of surface pressure systems. Regional pressure systems and winds. Atmospheric moisture and precipitation. Condensation and the adiabatic processes. The hydrologic cycle and the soil-water balance. The distribution and diversity climatic zones of the Earth; the Köppen climate classification. The extreme climatic events and the natural hazards. Climatic global changes, prediction and mitigation.

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### **Surveying (ERU12325)**

The main programmatic lines are:

A-Reviews (scales, angular units and it's conversions; elementary trigonometry);

B-Introduction to the concepts of geoid, ellipsoid, geographic coordinates, map projection systems, geodetic datum, geodetic network; rectangular plane coordinates (distance and direction calculations, coordinates transportation, orientation), introduction to notions of altimetry and planimetry for the interpretation and use of topographic maps, terrain cross sections and longitudinal cross sections, calculation of cut and fill volumes;

C-surveying: with optical level (geometric), with a theodolite (trigonometric) and topographic GPS (DGPS).

D-Introduction to Surveying software (Autodesk LandDesktop).

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### **Landscape Theory and Design I (PAO2077)**

Exploration of plastic components, with gradual introduction of other conceptual components associated with the architectural and landscape design process (cultural, ecological and ethical components), throughout a sequence of exercises (abstract or focus on a specific place) to student experience the design process.

- Formal components and attributes: basic elements and change agents;
- To promote the pleasure of working with the plastic forms, allowing student to discover the conceptual process (subjective and artistic) as well as give students methods to think, express and realize their ideas through three-dimensional models;
- The design process: concepts, characteristics, knowledge, skills and tools;
- The design process in landscape architecture: specificities, concepts and values;
- The construction of space in landscape architecture: basic elements linked with the landscape design;
- Fundamental skills and competences of the landscape architect.

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### **Applied Phytodiversity (BIO2078)**

The basic anatomy of higher plants

Flow of water, nutrients and carbon in the plants

Plant growth

The perception of the environment

Plant adaptations to environmental stress

Morphological diversity of Spermatophytæ and the interpretation of adaptations to the environment

The botanical nomenclatural rules

The characteristics and evolutionary lines of the major taxonomic categories of Spermatophytæ

Acquisition of techniques for handling plant material

Factors affecting the geographic distribution of plants



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### **Physical Geography II (GEO12326)**

Theoretic

Tectonic provinces at the World (shields, platforms, continental basin, orogens).

Plate tectonics. Volcanism, the global pattern of volcanism, earthquakes and tectonic landforms. Folds and faults. Landforms and rock structure. The ocean currents. The hydrologic cycle. Runoff, streams and ground water. Landform made by running water and river systems. Marine erosion of coast. Main type of coastlines. The sea level oscillations. Process and forms of glacier erosion and deposition. The ice age. Fundamental causes of glaciations. Erosion of the wind. Landforms maid by wind erosion and deposition.

Practical

Contours and topographic maps. Geographic and cartographic coordinates. Map scale. Relationship between scales and areas. Contour interval and slope. Topographic profiles. Longitudinal river profiles. Hipsographic curve, hipsometric curve. Geologic maps and structure sections.

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### **Drawing II (PAO2079)**

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### **History of Art (HIS2080)**

Art from the perspective of the use and representation of space and nature.

The arts of Pre-History, Proto-History and first civilizations. The Greek world and the Roman Art. From the Late Antiquity to the Middle Ages. The Romanesque. The Gothic and the Late Gothic.

Renaissance and Mannerism. The new social status of the artist and the treatises emergence. The classic ideal paradigm and its overcoming in architecture and sculpture. The individual, the nature, the experience, the science and the space of representation. Baroque and Rococo.

The 19th century: tradition, transgression, revolution and progress. Neoclassicism and Romanticism. From Realism to the Post-Impressionism. Symbolism and Expressionism. Arts and Crafts, Art Nouveau and Art Deco. The Chicago School.

Avant-Gardes and the new architectonic international tendencies.

From the Post-War to the beginning of the 21st century. The return to the Figuration. The New Abstraction. Conceptual Art. Technology and Mega-structures.

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### **Terrestrial and Aquatic Ecosystems (PAO2081)**

Aquatic vs. Terrestrial Ecosystems. Strategies and types of producers. Limiting factors of production.

Terrestrial Ecosystems: The humanization of space - historical analysis of the large human impacts. Species adaptation to the terrestrial Mediterranean environment and peculiarities of the Iberian species. Energy flow and matter recycling in the terrestrial ecosystems. Diversity assessment in the Iberian communities regarding the soil, vegetation and animal subsystems. World distribution of the main ecosystem types.

Aquatic Ecosystems: Lentic systems: factors of primary production; eutrophication; thermal stratification. Lotic systems: the three linkages - longitudinal, lateral, vertical; zonation and distribution of species; floods and riparian corridors; persistent and temporary rivers. Estuaries: types; hydrology and communities; flocculation, nutrient trap, nurseries; coastal lagoons. Ocean: zonation; productivity, upwelling; dynamics of the coastal sediment processes.

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### **Theory and Landscape Design II (PAO2082)**



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### **Landscape Interpretation I (PAO2083)**

Interpretation of a landscape on local scale. Principles and concepts towards landscape reading. Mosaics. Corridors. Fragmentation. Ager. Saltus. Silva. Atlantic and Mediterranean landscapes. Evolution of landscapes - memory, challenges and prospects. Landform: Hypsometry; physiography, slopes, slopes exposure and physiographic synthesis. Soil - Profile, horizons and materials. Constituents of soil. Chemical properties and nutrient cycles. Physical Properties. Introduction to the classification of soils. Soil maps. Use of vegetation in rural areas and definition of types. Selection of species according to soil and climate. Distribution of the main species of the genus *Quercus* in Portugal. Native species of dry and wet systems. Ecological theory and landscape. Landscape and landscape ecology. Characteristics of the landscape. Methods of approach to landscape heterogeneity.

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### **Landscape and Garden Art (PAO2084)**

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### **Training Period I (PAO2086)**

The training period will have a minimum of 130h in public or private institutions or companies which are developing activities in landscape architecture and where it is possible to ensure an interesting guidance for the students. The themes of the training can be varied depending on the nature of the entity in which it is developed. They should always have a direct relationship with the practice of landscape architecture including companies of studies and projects, central government or municipal institutions, research centres, companies of construction and/or maintenance of green spaces. In addition the students must prepare a report that exceeds the simple record, including a personal reflection about their experience.

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### **Techniques of digital expression and representation in landscape architecture. (PAO12327)**

Introduction to the development of the first skills to use: Photoshop, Illustrator and CAD.

Essays the use of digital tools at different stages of the creative process:

- development of ideas (jumps) perspective of study;
- contribution in the production of the technical drawing;
- 3D modeling, rendering, manipulation of images and production of final perspectives;
- printing and / or viewing.

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### **Techniques of construction and management of green spaces (PAO12328)**

- Planting and establishment of different kind of plant material
- Transplantation of large specimens
- Selection of plant material according to the specificity of the technical plans (planting design and technical specifications)
- Landscape maintenance schedule according to the specificity of the areas
- To evaluate the stability of arboreal specimens-diagnostic techniques
- Determining the patrimonial value of the arboreal species-Norma of Granada
- Management plans applied to studies case





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### **Landscape Architecture in Portugal (PAO2176)**

The concept of landscape in Portuguese culture.

- The design and construction of landscapes
- The emergence of the school of landscape architecture in the first half of the 20th century
- The concept of landscape in the point of view of landscape architecture: the landscape as cultural, aesthetic and ecological reality.
- The uniqueness of the landscape architecture in Portugal:-presentation and analysis of case studies (different epochs, scales and authors)

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### **Introduction to Soil and Water Bioengineering (PAO2177)**

- 1 - Introduction to the Bioengineering
- 2 - Application Domains
- 3 - Functions and effects
- 4 - Positive and negative characteristics
- 5 - Vegetation in Bioengineering - technical, ecological, biological and esthetic functions
- 6 - Intervention typologies - coerture, stabilization, drainage, combined
- 7 - Planting, sowing and other vegetation techniques
- 8 - Building systems typologies - soil and water bioengineering
- 9 - Building procedures and maintenance

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### **Construction Techniques with Vegetation (PAO2175)**

Application of theoretical concepts to practical cases:

- Planting operations of trees, shrubs and herbaceous;
- Maintenance schedule are adapted to the type of vegetation: weeding, hoeing, replacements of plants, pruning, replacement of stakes, pruning hedges,, fertilizing, mowing and improving soil aeration; Cleaning water features and cleaning of pavements.
- Main propagation techniques (seeding and cutting)
- Elimination of invasive plants
- Planting Plans

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### **Theory and Landscape Design III (PAO2085)**

Landscape design in open urban public space: Proceeding on the study about the relationship between the functional organization, physical setting and urban structure. The framework of the intervention according to urban management instruments; Instruments of design: freehand sketch as an expressive language for the developing the skills, technical draw, maquette, oral communication and presentation panel.

The open space and its importance in the city design along its construction process. The interventions of the landscape architect in urban space. Urban morphology. The open space in the urban design

The building systems in Landscape Architecture: masonry, concrete, wood elements, metals, revetments and workmanship. Their use in structures or building elements-walls, stairs, ramps, yard-guards, shadowing structures, water elements.

Turf establishment. seeding, sodding and planting stolons. Pruning of ornamental trees. Maintenance practices.



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### **Landscape Interpretation II (PAO2087)**

Holistic approach to landscape reading. Nature conservation in rural landscapes: forests and hedges. Dunes, wetlands and urban fringes. Ecological foundations of landscape planning.

Water cycle. Water basin. Precipitation and surface runoff measurement and evaluation. Evapotranspiration. Water in the soil. Water balance. Floods and droughts.

Comparative Agriculture. Differences in agricultural land. Agricultural evolution. Systems of land use. Regionalization of agrarian landscape. Environment and agricultural production. Rotations and crop rotation. Land preparation; seed and sowing; equipment. Evolution of the Portuguese forest. Structure and functioning of trees and forests. Forestry and "Multiresource Forest Management". Modern trends in European forestry. Forest production. Fields of activity. The forestry production systems. The concept of sustained yield. Afforestation and forest ecosystem. The main production systems in Portugal.

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### **Theory and Landscape Design IV (PAO2089)**

Exploration and discussion of concepts of urban space, urban morphology and urban design. Elaboration of different projects of rehabilitation of open spaces in the urban fabric consolidated as well as in the urban peripheries. Interventions at the level of the urbanization plan and detail plan

Introduction to basic commands of AutoCAD with application to the project; creation and file management, viewing and manipulating a file). Bi-dimensional design (organization and selection of entities, entity manipulation, and export files for other programs, thematic layers, editing commands, and introduction of coordinate systems).

Approach to different topics relevant to the intervention in open space: Irrigation, drainage and lighting. The implementation and application of these themes to the technical aspects of the project.

The principles and the practice of design with plants (ecological, functional and aesthetic). Application of this information to planting design.

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### **Landscape Characterization and Assessment I (PAO2091)**

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### **Training Period II (PAO2088)**

The training period will have a minimum of 130h in public or private institutions or companies which are developing activities in landscape architecture and where it is possible to ensure an interesting guidance for the students. The themes of the training can be varied depending on the nature of the entity in which it is developed. They should always have a direct relationship with the practice of landscape architecture including companies of studies and projects, central government institutions or municipal, research centres, companies of construction and/or maintenance of green spaces. The theme chosen for this second training period must be different from the "Training I", so as to broaden student's perspectives on the professional reality. In addition the students must prepare a report that exceeds the simple record, including a personal reflection about their experience.

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### **Theory and Landscape Design V (PAO2090)**

Project of an urban ecological structure. Functional, structural, aesthetic and socio-cultural aspects and its relation to the use of space. Recreational, ecological and educational functions. Recognition and preservation of referential elements (morphological, historical, cultural, symbolic, poetic) of genius loci.

Value of Nature. Man and nature. Evolution of paradigms of development on the environment. The experience of nature. Environmental Ethics. Symbolic reading of landscape. Nature and Ideology. Human Ecology, current crisis and prospects.

Anthropology of Space: concepts, models and theories. Space, Culture and Society.

Representations and perceptions of space. Space designed living space: case studies.

Multifunctionality of the landscape and urbanism, Urban Peripheries and interstitial spaces. Urban Agriculture: urban vegetable gardens; cpuls; urban field. Urban agriculture and landscape urbanism. Urban agriculture as a new approach to landscape design in urban areas.



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## **Landscape Characterization and Assessment II (PAO2092)**

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### **Elements of Sociology (SOC2093)**

#### **1. INTRODUCTION**

- The emergence of sociology.
- Principal authors of classical sociology.
- Sociology as science (the study object and epistemological issues).
- Paradigms of Sociology.

#### **2. SOCIETY, CULTURE AND PERSON**

- Unstructured Collectivities: social categories and aggregates
- Structured collectivities: groups and global society
- Types of companies
- Models of Social Behavior;
- Role, status and social position
- Socialization (primary and secondary)
- Culture, cultural diversity, cultural identity and ethnocentrism
- Major social institutions: family; Work and economic life; Government and political power; education; religion

#### **3. PERSON AND CHANGE INTEGRATION SOCIOCULTURAL**

- Stratification and social mobility
- Social values
- Control and social deviation
- Sociocultural Change