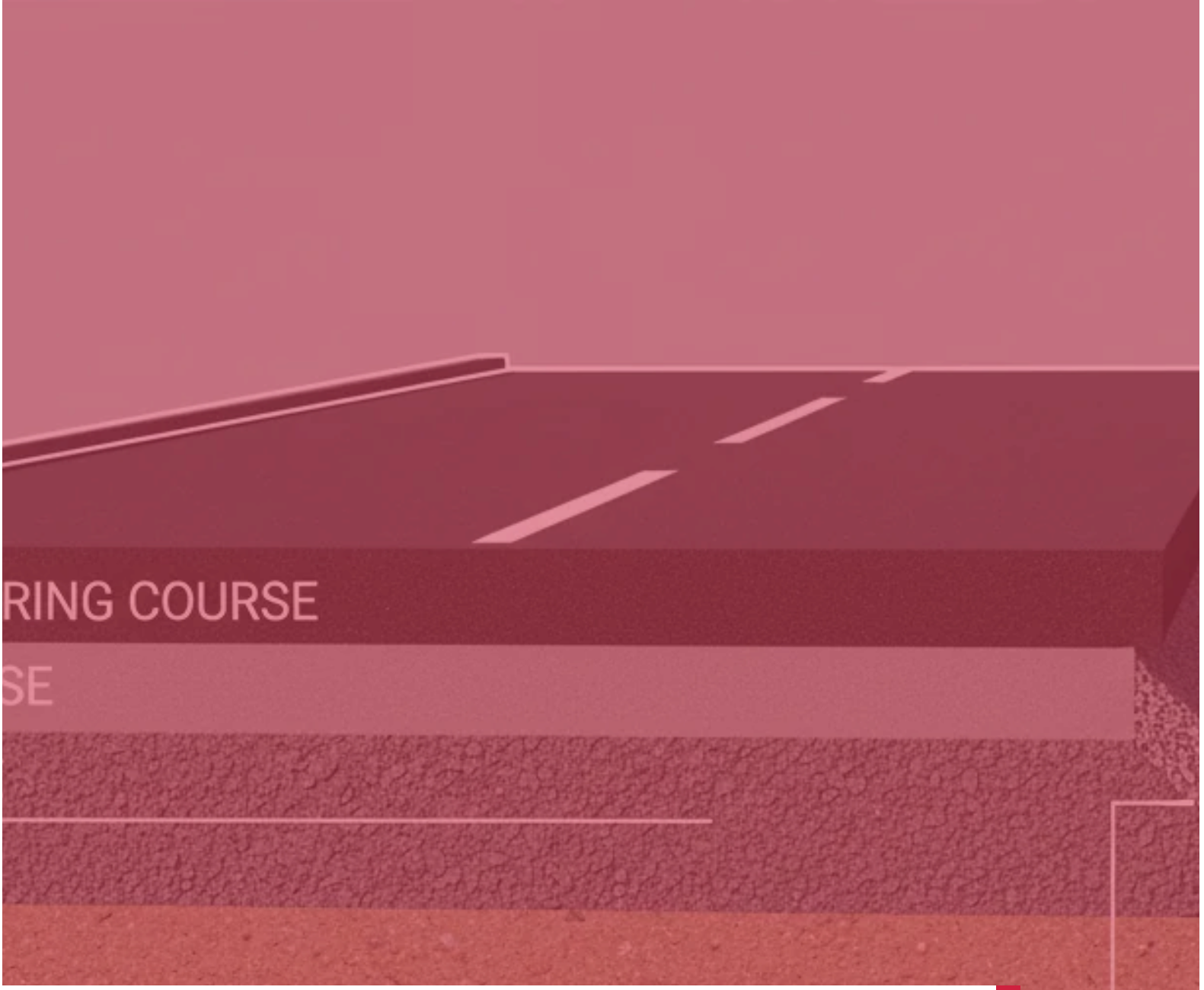


Máster online 100%

Master in Construction and Maintenance of Highways and Roads + 60 ECTS Credits

Structuralia

Máster online 100%

Master in Construction and Maintenance of Highways and Roads + 60 ECTS Credits

Modality
Online

Languages
Español

Duration
1500 hours (60 ECTS)

No Limit
AI Assistant

Does it include practices?
NO

Educational Institutions

Structuralia Engineering eLearning

UNIVERSIDAD NEBRIJA

Summary

This program addresses the technical and strategic complexities that define highway construction and linear works management, from earthworks planning and blasting design, to the implementation of advanced drainage systems and the calculation of prestressed concrete structures. You will understand the technical and economic relevance of each phase, from initial conception to long-term maintenance, delving into the most innovative methodologies and emerging technologies. You will develop a global vision that will allow you to make informed decisions, optimize resources and guarantee the durability and functionality of road infrastructure. You will prepare to lead large-scale projects, applying engineering solutions that respond to the current demands of the sector, equipping yourself with the tools to face complex challenges in the field of transportation

infrastructure. The training integrates a full life cycle perspective, from conceptual design to operational management and rehabilitation, ensuring a deep understanding of all critical factors.

Agenda

MODULE 1. EXCAVATIONS, BLASTING AND EARTH MOVEMENT

1. DIDACTIC UNIT 1. EARTH MOVEMENTS

1. Classification of earthworks
2. Geotechnical materials and earthworks
3. The excavability of the materials
4. Excavation evaluation
5. Environmental impact and health and safety

2. DIDACTIC UNIT 2. EARTHMOVING MACHINERY AND EQUIPMENT

1. Excavation means
2. Loading and transportation of material
3. Spreading, leveling and compaction
4. Performance of machinery and equipment
5. Excavations below the water table

3. DIDACTIC UNIT 3. EXCAVATIONS THROUGH BLASTING

1. Blasting Basics
2. Hole drilling
3. Explosives
4. Breakage mechanism
5. Vibrations and their control

4. DIDACTIC UNIT 4. BLASTING DESIGN

1. Outdoor blasting: variables involved
2. Outdoor blasting: blasting design
3. Blasting in tunnels: general aspects
4. Blasting in tunnels: blasting design
5. Practical aspects and most common defects.

MODULE 2. DRAINAGE OF LINEAR WORKS

1. DIDACTIC UNIT 1. HYDROLOGY IN LINEAR WORKS.

1. General concepts.
2. Definitions.
3. Maximum daily precipitation.
4. Physical characteristics and rainfall intensity Runoff and flood flow calculation methods.
5. Application of GIS to hydrology.

2. DIDACTIC UNIT 2. CROSS DRAINAGE

1. Definitions Cross drainage works.
2. Design criteria and calculation methodology.
3. Energy dissipators.

4. Erosion and sedimentation in the transverse drainage.

3. DIDACTIC UNIT 3. PLATFORM DRAINAGE AND MARGINS.

1. General concepts.
2. Definitions Drainage in clearings.
3. Drainage in embankments.
4. Pavement drainage, structures, tunnels and sustainable drainage.
5. Design and sizing criteria.

4. DIDACTIC UNIT 4. HYDRAULICS OF BRIDGES AND VIADUCTS.

1. General concepts.
2. Definition 1D hydraulic modeling.
3. 2D hydraulic modeling.
4. Erosion and protection of foundations.
5. Channels and protections.

MODULE 3. CALCULATION OF TYPE STRUCTURES OF CIVIL WORKS

1. DIDACTIC UNIT 1. PRESTRESSED CONCRETE

1. Introduction.
2. Materials.
3. Tensing force. Instantaneous prestress losses.
4. Delayed prestress losses.
5. Calculation of prestressing forces in hyperstatic structures.

2. DIDACTIC UNIT 2. UNDERPASSAGE OR BURIED WORKS.

1. Underpass works (I). Typologies
2. Underpass works (II). Acting loads
3. Cylindrical sheets. Concepts and behavior.
4. Pre-sizing of cylindrical sheets (I). Concept and calculation.
5. Pre-sizing of cylindrical sheets (II). spandrels and edge beams.

3. DIDACTIC UNIT 3. CONCRETE TANKS.

1. Calculation elements in deposits.
2. Design elements in tanks. Principles of calculation of rectangular reinforced concrete tanks.
3. Example of calculating the wall of a rectangular reinforced concrete tank.
4. Principles of calculation of cylindrical reinforced concrete tanks.
5. Principles for the analysis of the slab of a reinforced concrete tank. Example of calculating the slab of a rectangular reinforced concrete tank.

4. DIDACTIC UNIT 4. METAL TANKS

1. Introduction. Design codes.
2. Types of tanks. Materials, joints and welds.
3. Design and calculation. Bottom and body.
4. Calculation of fixed ceilings.
5. Calculation by manometric pressure.

MODULE 4. SURFACE, PAVEMENTS AND BITUMINOUS MIXTURES. BASIC CONCEPTS

1. DIDACTIC UNIT 1. INTRODUCTION TO THE THEME OF SURFACE AND PAVEMENTS

1. Definition of road surface and pavement and types of road surfaces.
2. Main layers and materials that make up the pavement.
3. Basic design of a road surface according to Standard 6.1-IC.
4. Influence of the pavement on the environment.
5. Management systems.

2. DIDACTIC UNIT 2. MATERIALS THAT COMPOSE THE SURFACE

1. Bitumens and emulsions.
2. Arid.
3. granular layers.
4. Layers treated with lime and cement.
5. Concrete.

3. DIDACTIC UNIT 3. BIUMINOUS MIXTURES AND SURFACE TREATMENTS

1. Bituminous mixtures: classification and characteristics.
2. Design, testing and characterization of bituminous mixtures.
3. Manufacture and installation of hot bituminous mixes.
4. Cold bituminous mixtures and surface treatments.
5. Functional and structural properties - auscultations.

4. DIDACTIC UNIT 4. NEW PAVEMENT TECHNOLOGIES

1. Mixtures with rubber.
2. Semi-hot and warm.
3. Ultrathin.
4. SMA.
5. Photocatalytic firms.

MODULE 5. QUALITY CONTROL IN DESIGN AND WORK

1. DIDACTIC UNIT 1. RISKS, THE DESIGN PROCESS AND INTRODUCTION TO PLANNING THE QUALITY OF THE EXECUTION OF WORK.

1. Introduction.
2. Didactic risks and opportunities of work execution projects.
3. Quality control of the design and development of an execution project.
4. Planning the quality of the work.

2. DIDACTIC UNIT 2. QUALITY PLANNING IN DETAIL AND ITS APPLICATION DURING EXECUTION.

1. Organization of resources for execution.
2. Preparation of specifications, methods and templates.
3. Purchase control.
4. Control of suppliers and subcontractors.

5. Execution and monitoring and measurement on site.

3. DIDACTIC UNIT 3. QUALITY IN URBANIZATION AND BUILDING

1. Quality control in urbanization and urban works.
2. Quality control in residential construction.
3. Quality control in non-residential building for social use.
4. Quality control in non-residential buildings for industrial use.
5. Quality control in water treatment facility projects.

4. DIDACTIC UNIT 4. QUALITY IN CIVIL WORKS.

1. Quality control in dams.
2. Quality control on roads and airports.
3. Quality control in railway.
4. Quality control in ports and maritime works.
5. Quality control of crossing works: Bridges, viaducts and level crossings.
6. Quality control in passage works: tunnels.

MODULE 6. GENERAL SCHEME OF CONSERVATION

1. DIDACTIC UNIT 1. INTRODUCTION AND OBJECTIVES.

1. General concepts.
2. Helps with roads.
3. Ordinary maintenance or conservation activities.
4. Activities to improve functional conditions and safety.
5. Highway use and defense activities.

2. DIDACTIC UNIT 2. MAIN CONSERVATION ACTIONS.

1. Mowing, pruning and clearing.
2. Plantation maintenance.
3. Cleaning of roads and shoulders.
4. Road safety.
5. Drain cleaning and repair.

3. DIDACTIC UNIT 3. GROUPS OF OPERATIONS.

1. The management of conservation activities.
2. Road and exploitation operations.
3. Ordinary conservation operations (I.
4. Ordinary conservation operations (II).
5. Machinery.

4. DIDACTIC UNIT 4. OPERATIONAL, ENERGY AND ENVIRONMENTAL EFFICIENCY.

1. Efficiency of heavy conservation vehicles.
2. Tunnel lighting.
3. Control and management system for tunnel facilities.
4. Environmental management in comprehensive conservation Indicators and exploitation.

MODULE 7. ROAD SAFETY. ROAD OPERATION

1. DIDACTIC UNIT 1. ACCIDENTS ON ROAD NETWORKS.

1. Concurrent factors.
2. Accident rates.
3. Road safety programs. Audits and inspections.
4. "In situ" accident analysis. Restriction on mobility
5. Traffic engineering (I).
6. Traffic engineering (II).

2. DIDACTIC UNIT 2. HIGHWAY EXPLOITATION.

1. Legislation. Public domain.
2. Advertising. Authorizations and other elements.
3. Access
4. Violations and sanctions.
5. Arterial networks, crossings and urban sections.

3. DIDACTIC UNIT 3. SIGNAGE OF FIXED WORKS.

1. Function and object
2. Elements
3. Circulation planning. Example manual
4. Installation and removal of construction signs.
5. Special cases, conservation, errors and evolution.

4. DIDACTIC UNIT 4. SIGNALING OF MOBILE WORKS

1. Function and object.
2. Procedure.
3. Equipment and marking of vehicles.
4. Conservation work with mobile signage.
5. Examples manual. Evolution of the technique

MODULE 8. CONSERVATION OF ROAD ELEMENTS (I)

1. DIDACTIC UNIT 1. FIRM (I).

1. Firm classification.
2. Auscultation of pavements.
3. Surface rehabilitation of pavements.
4. Deep rehabilitation of pavements (I).
5. Deep rehabilitation of pavements (II).

2. DIDACTIC UNIT 2. FIRM (II).

1. Firm management.
2. Maintenance activities.
3. Studies on the evolution of a road surface.
4. Operational efficiency in pavement conservation.
5. Software for road management and maintenance.

3. DIDACTIC UNIT 3. LANDS AND STRUCTURES (I).

1. Structure inspection.

2. Structure monitoring.
3. Maintenance plan.
4. Typology of damage to a structure.
5. Repair catalog.

4. DIDACTIC UNIT 4. LANDS AND STRUCTURES (II).

1. Slope inspection.
2. Anchors and guiding meshes on slopes.
3. Screens against landslides.
4. Protection ditches.
5. Control and monitoring of slopes.

MODULE 9. CONSERVATION OF ROAD ELEMENTS (II)

1. DIDACTIC UNIT 1. SIGNALING

1. Definition, design and characteristics of vertical signage.
2. Retroreflection and criteria for the implementation of vertical signage.
3. Vertical signaling operations.
4. Definition, purpose and characteristics of horizontal signage.
5. Materials, selection criteria and application of horizontal signage.

2. DIDACTIC UNIT 2. BEACONS AND DEFENSES.

1. Definition, classification and beacon elements.
2. Installation and operations of beacons
3. Enclosing fences.
4. Vehicle containment systems. Safety barriers and parapets.
5. Arrangement of barriers and parapets. Other vehicle containment systems.

3. DIDACTIC UNIT 3. TUNNEL INSTALLATIONS

1. Facility diagnosis.
2. Diagnosis and intervention of tunnels.
3. Tunnels-Facilities.
4. Tunnels-Structural elements.
5. Tunnels-State of the linings.

4. DIDACTIC UNIT 4. WINTER ROADS.

1. General aspects.
2. Organization of winter road work.
3. Fluxes and machinery.
4. Acting techniques.
5. Meteorology and management systems.

MODULE 10. TFM. MASTER IN CONSTRUCTION, MAINTENANCE AND OPERATION OF ROADS

Qualification

University Degree in Master of Lifelong Training in Construction and Maintenance of Highways and Roads issued by the Antonio de Nebrija University with 60 ECTS University Credits. Teachings not leading to obtaining an official qualification

Objectives

- • Direct the planning and execution of earthworks and blasting in transportation infrastructure projects. • Manage the selection and optimization of machinery and equipment for earthmoving operations, maximizing operational efficiency. • Design complex blasting plans, ensuring efficiency and safety in large-scale excavations. • Evaluate and apply hydrology principles for the design of drainage systems in linear works, preventing pathologies on roads. • Implement transverse and platform drainage solutions to ensure the stability and durability of the roads. • Analyze the hydraulics of bridges and viaducts to integrate effective drainage systems in large civil engineering structures. • Apply advanced methodologies for the calculation and design of prestressed concrete structures, optimizing their performance and useful life.

What does it prepare you for?

This program prepares you to lead the execution and management of road infrastructure projects with an advanced strategic and technical vision. You will develop the ability to design innovative strategies for road construction, from the planning of earthworks and blasting to the implementation of drainage systems and the calculation of civil works structures. You will evaluate the impact of technical and economic decisions on the useful life of infrastructure. You will effectively manage road conservation, applying advanced methodologies to ensure their functionality and safety. You will make decisions based on quality control and resource optimization, integrating a global perspective on the life cycle of vials. Thus, you will transform your way of directing and deciding in the field of road project management.

Who is it addressed to?

Aimed at professionals in the civil engineering and construction sector, including civil engineers, architects and qualified technicians, who seek to update and specialize their knowledge in transportation infrastructure. Those who already work in the field of linear works and wish to delve deeper into the execution, conservation and exploitation of these infrastructures will find in this training an opportunity to enhance their career. The program is designed for those profiles aimed at acquiring a strategic vision in the construction and maintenance of roads, facing the growing technical complexity and demands of the sector with innovative solutions.

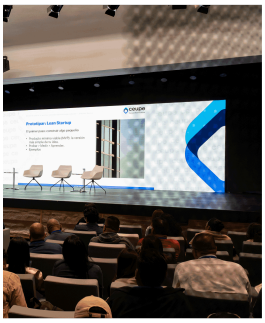
Official Character

This training is not included within the scope of official regulated training (Early Childhood Education, Primary Education, Secondary Education, Official Vocational Training FP, Baccalaureate, University Degree, Master University Officer and Doctorate). It is therefore a complementary and/or specialization training, aimed at the acquisition of certain competencies, skills or aptitudes of a professional nature, which can be assessed as merit in job boards and/or competitive examinations, always within the section of Complementary Training and/or Continuous Training. It is always essential to review the specific grading requirements of the specific public job boards to which we wish to apply.

Professional Outings

- Specialization in the field of road infrastructure engineering positions you to assume highly responsible roles in the construction and maintenance sector. Allows you to serve as Director of Road Construction Projects, leading multidisciplinary teams in the execution of new roads and the improvement of existing ones. Facilitates progression to Road Maintenance and Conservation Manager, optimizing the useful life and safety of existing networks through advanced strategies. As a Senior Linear Works Engineer, you will oversee critical technical aspects such as earthworks, drainage and structural calculations. In addition, it is positioned to act as a Specialized Consultant in Highway Engineering, offering innovative solutions in the planning and management of complex projects. This training enables you to direct large-scale operations, from the design phase to operation, guaranteeing the functionality and sustainability of transportation infrastructures.







Live Madrid

Live the International Week

As an additional complement to your training, you can be part of the SIM: Week International in Madrid. A unique meeting that brings together students from all over the world. For seven days you can live an academic and cultural experience in the heart of Europe, culminating with the graduation ceremony in Madrid.

- Conferences and workshops with international experts
- Visits to companies and reference organizations
- Networking with students from different countries
- Cultural activities and discovery of Madrid
- graduation ceremony

Structural

Structuralia is a leading educational institution in postgraduate and highly specialized online training, focused on the fields of engineering, architecture, construction, energy, technology and digital transformation.

Founded in 2001 with a strong industrial DNA, the result of collaboration between large companies in the sector and the Universitat Politècnica de Catalunya (UPC), for more than 25 years we have accompanied technical professionals in their academic and professional development through practical, flexible training aligned with the reality of the labor market.

Our training proposal connects advanced technical knowledge, real employability and international projection, acting as key support in the professional evolution of those seeking to specialize, grow professionally and generate impact in their sector, with a firm commitment to the democratization of access to technical excellence.



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Meet PHIA, your personalized learning assistant

Use all the possibilities of artificial intelligence to get the most out of it match to your training

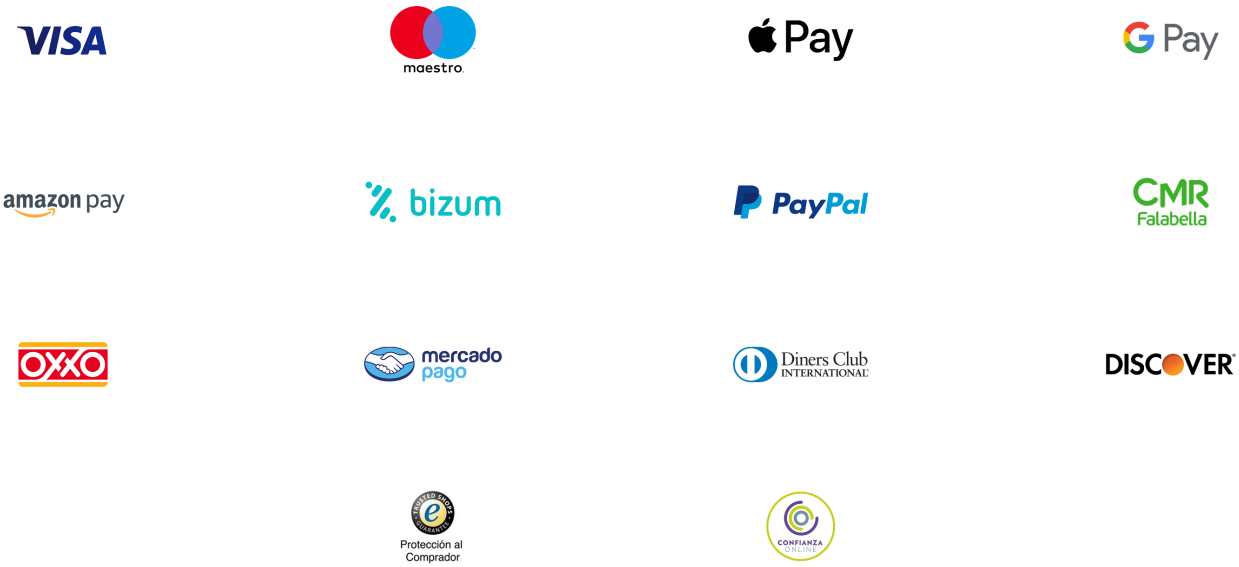
EDUCA EDTECH Group leads the digital revolution in education, promoting the continuous learning and technological transformation. The group is made up of recognized training institutions and its mission is to democratize access to education, promote the transfer of knowledge, technological development and research.

With the experience accumulated over more than 20 years, we have perfected our learning platform EDUCA LXP (Learning Experience Platform), the basis of our educational methodology, which provides students with online training practical and meaningful.



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