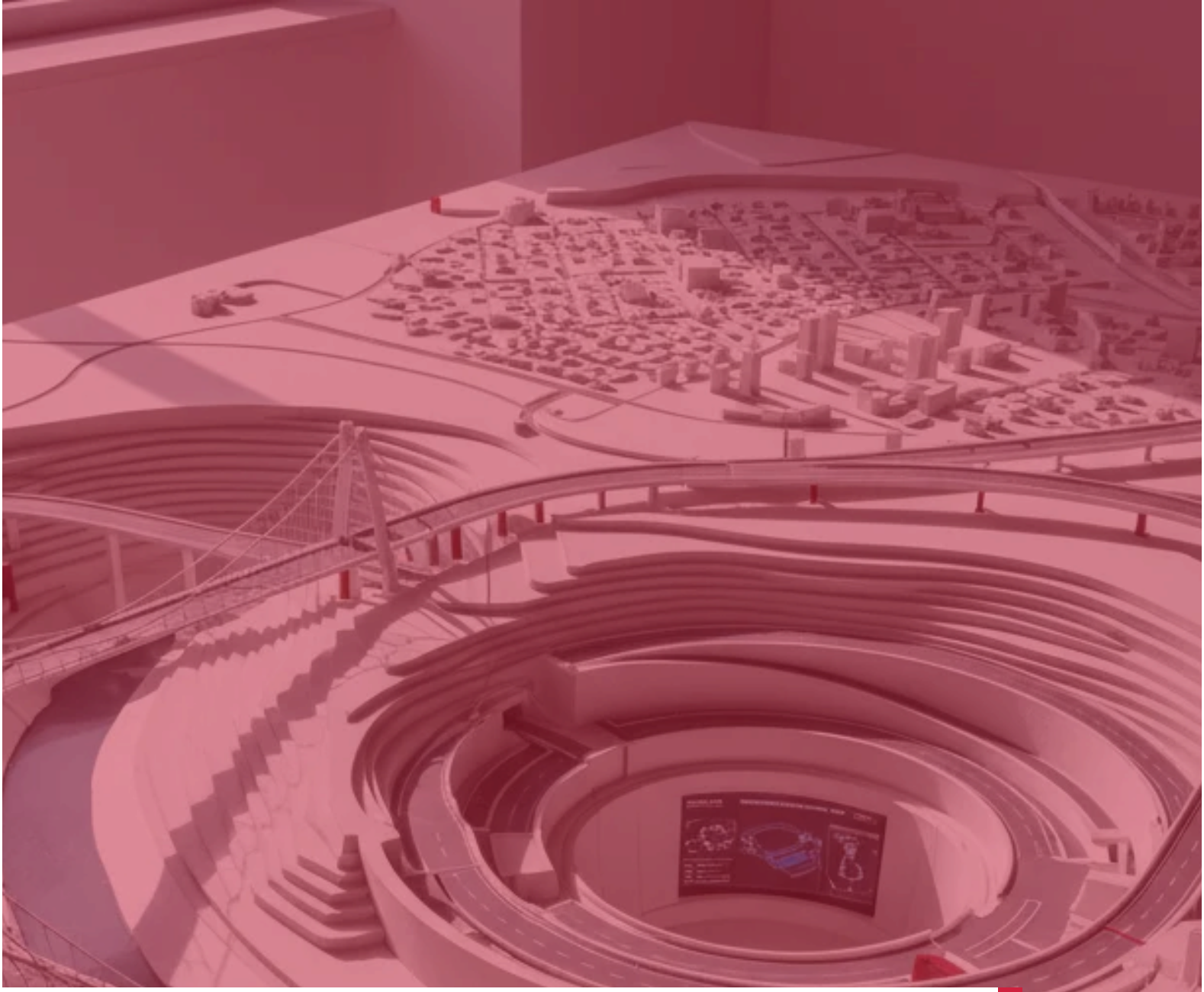


Máster online 100%

Master in Civil Infrastructure Engineering + 60 ECTS Credits

Structuralia

Máster online 100%

Master in Civil Infrastructure Engineering + 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

The Master in Civil Infrastructure Engineering offers a high-level specialization, designed for technical designers and on-site specialists who seek to optimize each phase of the life cycle of linear works. You will delve into the design and calculation essential for civil engineering, adapting knowledge to the construction reality and facilitating efficient execution. This program introduces you to advanced construction procedures, from the selection of materials such as steel, concrete and wood, to the management of complex excavations, blasting and earthworks, addressing the technical and logistical challenges inherent to each stage. You will develop a strategic vision for project planning and inspection of infrastructure in operation, proposing innovative improvements and sustainable solutions. You will address the analysis and stability of slopes, thoroughly understanding geotechnical soils and their classification, which will allow you to make critical decisions in the design and safety of foundations and containment elements, considering geological and environmental risks. With this training, you will enhance your ability to lead large-scale projects in civil infrastructure, integrating a perspective that ranges from theoretical conception to

commissioning and maintenance of tunnels and other underground structures, significantly improving the management of construction projects and their resilience.

Agenda

MODULE 1. CONSTRUCTION MATERIALS

1. DIDACTIC UNIT 1. STEEL IN CONSTRUCTION

1. Introduction: manufacturing and typology
2. Steel for concrete
3. Types of structural steels
4. Galvanized steel
5. Aluminum

2. DIDACTIC UNIT 2. CONCRETE IN CONSTRUCTION

1. Types of concrete. Special concretes
2. Mechanical properties of concrete
3. Sizing of shallow foundations
4. Sizing of short corbels
5. Cracking in reinforced concrete

3. DIDACTIC UNIT 3. WOOD IN CONSTRUCTION

1. Wood: properties and products for construction
2. Calculation of dowel-type wood joints (I): nails
3. Calculation of dowel-type wood joints (II): staples, bolts, pins and lag bolts
4. Calculation of carpentry joints: splices and without screws
5. Sizing of wood in a fire situation

4. DIDACTIC UNIT 4. OTHER MATERIALS AND SUSTAINABILITY

1. Factory works. Blocks and bricks. Typologies
2. Basis for calculating a masonry wall
3. Glasses. Typologies. Sizing
4. Synthetic polymers. Typologies. Applications
5. Reinforcement of structural elements with fiber material

MODULE 2. 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 3. SLOPE ANALYSIS AND STABILITY

1. DIDACTIC UNIT 1. GEOTECHNICAL SOILS

1. Origin of soils
2. Soil types
3. Soil properties
4. Volumetric ratios
5. Sizes and granulometry
6. Soil humidity
7. Atterberg limits
8. Geotechnical soil classifications: unified system, AASHTO classification

2. DIDACTIC UNIT 2. SOIL CLASSIFICATION

1. Introduction to soil classification
2. USDA Soil Classification System-Soil Taxonomy
3. Superficial diagnostic horizons (epipedions)
4. Subsurface diagnostic horizons

3. DIDACTIC UNIT 3. ROCK MECHANICS

1. Properties of rocks and rock masses
2. Rock mass classifications: Terzaghi, Deere's RGD, Bieniawski's CSIR, Barton's NGI, Hoek's GSI
3. Geological model
4. Geomechanical model
5. Flat, wedge and overturning of rock blocks

4. DIDACTIC UNIT 4. ROCK-FORMING PROCESSES

1. Magma and magmatic differentiation
2. Classification of magmatic rocks
3. Pegmatitic, hydrothermal and metasomatic processes
4. General concepts and types of metamorphism
5. Classification of metamorphic rocks

6. Mineralogy of metamorphic rocks
7. External agents and processes
8. Sedimentary environments
9. Classification of sedimentary rocks
10. Economic importance of sedimentary rocks

5. DIDACTIC UNIT 5. STABILITY OF HYDRAULIC SYSTEMS

1. Water collection systems
2. Design of individual wells. Analytical solutions
3. Well group design
4. Conception and construction of wellpoints
5. Well points design

6. DIDACTIC UNIT 6. PRINCIPLES AND BASES OF SLOPE STABILITY ANALYSIS

1. Basic concepts of slope stability
2. Stability analysis methods
3. Geotechnical parameters in stability analysis
4. Slope stability in soils and rocks

7. DIDACTIC UNIT 7. METHODS FOR EVALUATION OF STABILITY IN SOIL SLOPES

1. Introduction to slope stability
2. Analysis of slope stability
3. Flat break and circular break
4. Slice method and Taylor abacus

8. DIDACTIC UNIT 8. STRUCTURAL AND KINEMATIC ANALYSIS OF ROCK SLOPES

1. stereographic projection
2. Kinematic analysis of failure of a rock slope due to plane sliding
3. Kinematic analysis of failure of a rock slope by wedge
4. Kinematic analysis of failure of a rock slope due to overturning
5. Kinematic analysis of slope failure of a rock mass

9. DIDACTIC UNIT 9. DESIGN, CALCULATION AND STABILIZATION OF SLOPES AND TUNNELS IN ROCK

1. Safety factor of a rock slope due to plane sliding failure
2. Safety factor of a rock slope due to breakage by wedges
3. Safety factor of a rock slope due to overturning failure
4. Stabilizing and support measures for rock slopes
5. Finite element calculation of rock slopes

MODULE 4. 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 5. BRIDGE EXECUTION

1. DIDACTIC UNIT 1. TYPOLOGIES OF BRIDGES AND THEIR ELEMENTS

1. Typologies and classification of passage works
2. Structural typologies
3. Superstructure elements
4. Infrastructure elements
5. Foundations and functional elements

2. DIDACTIC UNIT 2. CONSTRUCTION PROCEDURES

1. Generalities and previous work
2. Foundations
3. Stirrups and Piles
4. Boards
5. Functional elements

3. DIDACTIC UNIT 3. BOARD CONSTRUCTION PROCEDURES

1. Traditional boards in situ
2. Traditional prefabricated boards
3. Boards for successive spans
4. Decks by successive and pushed cantilevers
5. Cable-stayed and suspended decks and arch bridges

4. DIDACTIC UNIT 4. CONSTRUCTION EXECUTION AND MANAGEMENT CONTROLS

1. Quality control of materials
2. Product Quality Control and Tensing Control
3. Tolerances and Load Tests
4. Work program and critical tasks
5. Environmental management, suppliers and works monitoring

MODULE 6. EXECUTION AND DESIGN OF TUNNELS

1. DIDACTIC UNIT 1. THE TUNNEL. TYPES, CHARACTERISTICS AND CONSTRUCTION METHODS

1. Brief history of the tunnel. Classification and types of tunnels.
2. Characteristics and geometric requirements of the tunnels.
3. Construction of tunnels by traditional methods.
4. Mechanized methods: tunnel boring machines
5. Particular tunnel constructions

2. DIDACTIC UNIT 2. SUPPORT AND COVERING ELEMENTS.

1. Support elements - bolts and trusses.
2. Support elements - shotcrete.
3. Reinforced concrete coating.
4. Covering by voussoirs.
5. Special support and covering elements.

3. DIDACTIC UNIT 3. TUNNELS DESIGN (I)

1. Convergence - confinement method. Ground response curves.
2. Front stability. Working pressure of tunnel boring machines.
3. Sustainability design and its elements.
4. Concrete lining design.
5. Design of the cladding with voussoirs.

4. DIDACTIC UNIT 4. TUNNELS DESIGN (II)

1. The tunnel project.
2. Ground movements and potential damage to structures
3. Auscultation and instrumentation.
4. Special conditions in tunnels.
5. Tunnel design using numerical methods: guide and recommendations.

MODULE 7. INSPECTION AND MAINTENANCE OF BRIDGES AND FACTORY WORKS

1. DIDACTIC UNIT 1. MANAGEMENT SYSTEMS & INSPECTIONS

1. Structure management systems
2. Inspection Classes
3. Basic Inspections
4. Main inspections
5. Maintenance, rehabilitation and repair

2. DIDACTIC UNIT 2. MAINTENANCE AND REPAIRS

1. Ordinary or Basic Maintenance (I)
2. Ordinary or Basic Maintenance (II)
3. Ordinary or Basic Maintenance (III)
4. Substructure Repairs
5. Superstructure Repairs

3. DIDACTIC UNIT 3. INFRASTRUCTURE PATHOLOGY

1. Structural factory works
2. Non-structural factory works
3. Structural concrete works
4. Non-structural concrete works
5. Foundations

4. DIDACTIC UNIT 4. PATHOLOGY OF SUPERSTRUCTURE AND FINISHES

1. Factory and concrete boards
2. Metal and mixed boards
3. Protection systems
4. Finishes
5. Repairs to containment systems and finishes

MODULE 8. INSPECTION AND MAINTENANCE OF TUNNELS

1. DIDACTIC UNIT 1. MAINTENANCE NEEDS

1. Introduction
2. Inspection and maintenance process
3. Examples of some regulations.
4. Underground works.
5. The construction systems and own pathologies

2. DIDACTIC UNIT 2. PATHOLOGY ANALYSIS

1. Definitions and methodology for pathology evaluation.
2. Assessment of the condition of the tunnel. General to all tunnels.
3. Assessment of the condition of the tunnel, according to construction material (I)
4. Assessment of the condition of the tunnel, according to construction material (II). Evolution over time
5. Analysis of the causes.

3. DIDACTIC UNIT 3. TUNNEL INSPECTION

1. Phases of inspection and visual inspection.
2. Detailed visual inspection.
3. Non-destructive inspection.
4. Destructive inspection.
5. Inspection analysis.

4. DIDACTIC UNIT 4. REPAIR AND AUSCULTATION ACTIONS

1. Need for intervention. Maintenance and repairs

2. Some intervention techniques. Examples of actions
3. Monitoring of tunnels in service
4. Analysis of particular cases (I)
5. Analysis of particular cases (II)

MODULE 9. BIM. DESIGN AND MODELING OF LINEAR INFRASTRUCTURES

1. DIDACTIC UNIT 1. BASIC CONCEPTS AND PROJECT START

1. Features of Civil 3D as BIM Software
2. Civil 3D interface
3. Country Kit Download
4. Collaborative work with Civil 3D
5. Smart objects

2. DIDACTIC UNIT 2. TOPOGRAPHY AND EARTH MOVEMENT

1. Working with topography: Surfaces
2. Grading tools
3. 3D modeling of earthworks
4. 3D modeling of rafts
5. 3D solids of earth movements and BIM Model

3. DIDACTIC UNIT 3. INFRASTRUCTURE MODELING (I)

1. Composition of an infrastructure model
2. Plant design and modeling
3. Cants
4. Longitudinal terrain profile
5. Viewing the profile and grade of the infrastructure

4. DIDACTIC UNIT 4. INFRASTRUCTURE MODELING (II)

1. Design and modeling of cross sections
2. Introduction to Subassembly Composser
3. Three-dimensional composition: Linear work
4. Particular actions: Bridges and Intersections
5. BIM model

MODULE 10. TFM. MASTER IN CIVIL INFRASTRUCTURES

Qualification

University Degree in Master of Lifelong Training in Civil Infrastructure Engineering issued by the Antonio de Nebrija University with 60 ECTS University Credits. Teachings not leading to obtaining an official qualification

Objectives

- • Direct the conception and execution of linear works projects, integrating advanced design, calculation and construction. • Develop innovative strategies for the optimization of construction processes, considering materials such as steel, concrete and wood. • Effectively manage the excavation, blasting and earthwork phases, applying advanced techniques and selection of machinery. • Analyze the stability of slopes and foundations, applying geotechnical principles for structural safety and durability. • Apply advanced technical solutions for the inspection and maintenance of infrastructures in operation. • Formulate substantial improvements in the design and calculation of structures, foundations and containment elements, based on current regulations and best practices in the sector. • Integrate project management tools and digital technologies to optimize the planning and execution of civil infrastructure. • Evaluate and manage the risks associated with infrastructure projects, guaranteeing safety and technical and economic viability.

What does it prepare you for?

This program prepares you to lead the transformation in the management of infrastructure engineering projects. You will acquire a multidisciplinary and specialized knowledge base, allowing you to master advanced design and calculation, as well as the planning and execution of complex linear works. You will develop the ability to integrate a comprehensive vision in each phase of the project, from conception to inspection and optimization. You will be able to design innovative strategies for the execution of roads, structures and tunnels, managing equipment and resources with a technical and strategic perspective. The Master in Civil Infrastructure Engineering trains you to optimize construction processes, guaranteeing the viability and sustainability of infrastructures. It equips you to make informed and strategic decisions, providing distinctive value to any infrastructure construction project.

Who is it addressed to?

This Master is aimed at professionals in the civil engineering and construction sector, including linear infrastructure designer technicians and on-site specialists. If you work in the design, calculation, planning or execution of linear works, such as structures, foundations or tunnels, and are looking for an in-depth update and high-level specialization, this program offers you the strategic and technical vision you need to advance in your career. It is ideal for those who want to optimize project execution, improve existing infrastructure inspection processes and provide innovative and sustainable solutions in the field of infrastructure construction.

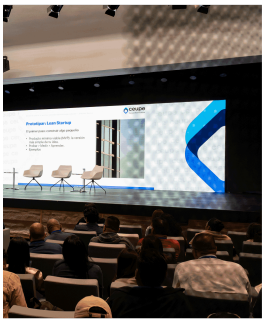
Official Character

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 civil infrastructure engineering positions you to assume highly responsible and leadership roles in the construction and consulting sector. You will be able to work as a Civil Infrastructure Project Director, managing multidisciplinary teams and supervising the execution of large linear works, from roads and bridges to complex underground systems. It will also open the doors to being Technical Office Manager in construction companies, directing the planning, design and optimization of large-scale projects, ensuring efficiency and regulatory compliance. Another path is that of Senior Specialist in Design and Calculation of Structures and Foundations, providing your advanced technical expertise in critical and highly complex projects. Finally, you will be able to work as a Geotechnical Engineering Consultant for Large Projects, offering expert advice on the viability, safety and sustainability of foundations and tunnels.







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.



+350.000

Students have gone through our virtual classrooms



+20 years

Experience in the training sector



5 stars

QS ranking in online education

EDUCA EDTECH
Group

Educa Edtech GROUP

When you enroll in a course or master's degree, you will get a free subscription to MyLXP while your training lasts. You will have access to more than 400 key courses (soft skills, languages, digital skills, etc.) and other surprises. Sign up and see how MyLXP improves your learning.

EDUCA LXP Methodology

The comprehensive tailored online education experience

EDUCA LXP is more than a methodology, it is a completely educational experience personalized thanks to all the possibilities offered by artificial intelligence. Now the content adapts to you, your needs and preferences, while offering you access to updated and practical content that really makes a difference in the labor market.

Flexibility

100% online learning adapted to your schedule: study from any device wherever, whenever and however you want.

Personalization

Contents and training itineraries adapted to your needs, thanks to AI.

Innovation

Constantly evolving technological developments driven by AI through the Learning Experience Platform.

Artificial intelligence

Discover PHIA, your learning assistant that will help you every step of the way.

Teaching support

Human empathy and academic guidance from a specialized teaching team.

Educational Experience

Didactic approach oriented to work by competencies, which favors practical and meaningful learning.

MY LXP

When you enroll in a course or master's degree, you will get a free subscription to MyLXP while your training lasts

You will have access to more than 400 key courses (soft skills, languages, competencies digital, etc.) and other surprises. Sign up and see how MyLXP improves your learning.

Meet PHIA, your personalized learning assistant

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

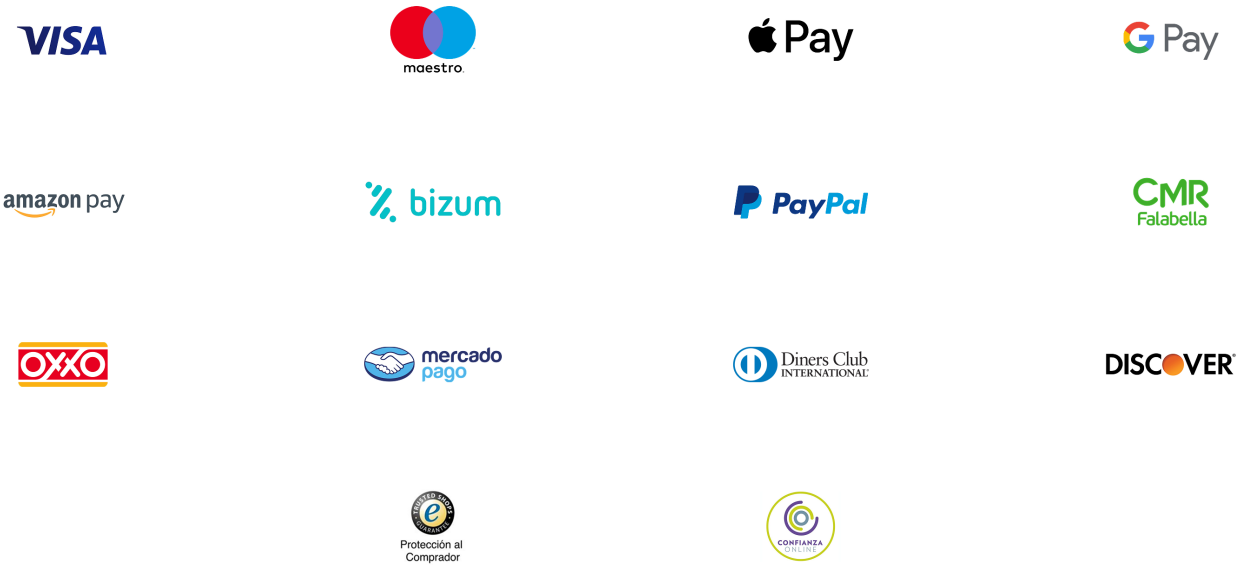
EDUCA EDTECH Group leads the digital revolution in education, promoting the continuous learning and technological transformation. The group is made up of recognized training institutions and its mission is to democratize access to education, promote the transfer of knowledge, technological development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



Discover all the payment facilities

We adapt to all international payment methods.



Funding and scholarships

Finance your course or master's degree and enjoy the available scholarships. Contact our expert team to know which one best suits your profile.

25%
Alumni Scholarship

15%
Scholarship recommended

20%
Functional Diversity Scholarship

20%
Unemployment scholarship

15%
GROUP Scholarship

20%
Scholarship for Professionals, Healthcare, members

15%
Entrepreneurship Scholarship

20%
Large Family Scholarship