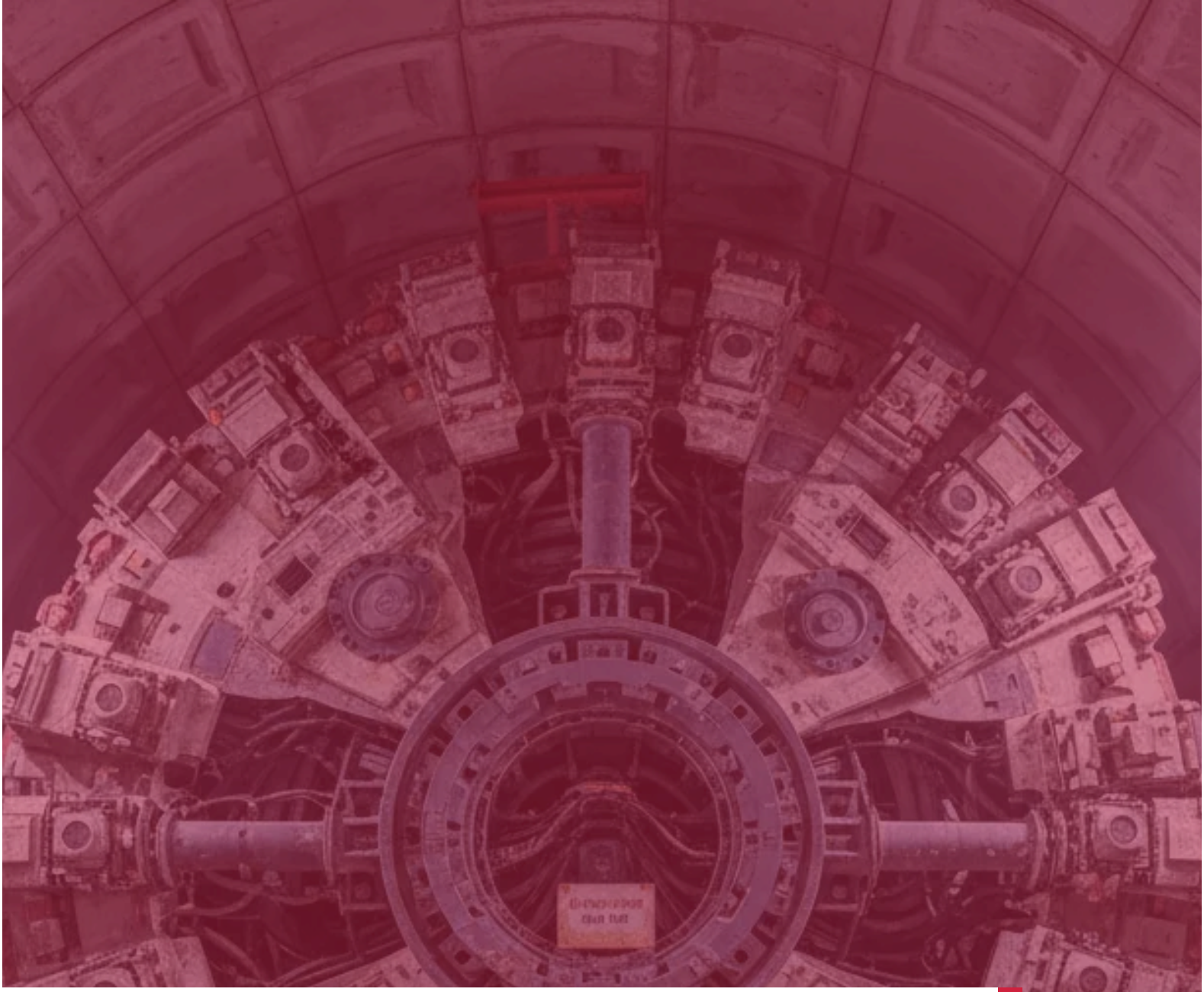


Máster online 100%

Master in Project, Construction and Maintenance of Infrastructure and Facilities on Railway Lines. Metropolitan Railways Specialty + 60 ECTS Credits

Structuralia

Máster online 100%

Master in Project, Construction and Maintenance of Infrastructure and Facilities on Railway Lines. Metropolitan Railways Specialty + 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 Project, Construction and Maintenance of Infrastructures and Facilities on Railway Lines. Metropolitan Railways Specialty is a highly specialized program for professionals in the engineering and construction sector of railway transportation systems who seek to update and deepen their knowledge in the complete life cycle of these systems. You will address the challenges of modern society to have more efficient, safe and sustainable transportation systems, where railway engineering plays a strategic role. This program, promoted by Structuralia and the Isabel I University, introduces you to the complexity of the railway life cycle, from the conception of the project to its construction and maintenance of the railway infrastructure, offering you a high-level specialization. You will delve into the design and construction of infrastructure, including the comprehensive management of railway projects, intermodality, and the technical aspects of platforms, tunnels, bridges and viaducts. You will analyze the superstructure, from the layout and track materials to its assembly and operating facilities, such as terminals. Additionally, you will explore energy subsystems, crucial for the operation and sustainability of rail transportation systems. You will prepare to lead the modernization of lines and the development of new infrastructure, integrating current regulations and technological innovations. This master's degree will equip you with a global vision and advanced tools to make strategic decisions in the engineering and

management of railway projects, facing the technical and management complexities that define the future of the railway field.

Agenda

MODULE 1. DESIGN AND CONSTRUCTION OF THE INFRASTRUCTURE SUBSYSTEM

1. DIDACTIC UNIT 1. RAILWAY PROJECTS AND INTEGRAL MANAGEMENT. INTERMODALITY

1. railway projects
2. Quality management in railway projects
3. Environmental management in railway projects
4. Health and safety management in railway projects
5. Intermodality

2. DIDACTIC UNIT 2. PLATFORM AND EARTH WORKS

1. Geological and geotechnical phases
2. Constitution of the platform
3. Protective layers of the platform. Seat layers
4. Clearings and embankments
5. factory works

3. DIDACTIC UNIT 3. TUNNELS

1. The tunnel project
2. Tunnel excavation
3. Traditional excavation methods
4. Drill and blast
5. Mechanized excavation methods. roadheaders and tunnel boring machines

4. DIDACTIC UNIT 4. BRIDGES AND VIADUCTS

1. The project of a viaduct
2. Regulations and charges
3. Typologies
4. The construction of a viaduct
5. Reception of the viaduct

MODULE 2. DESIGN AND CONSTRUCTION OF THE SUPERSTRUCTURE SUBSYSTEM

1. DIDACTIC UNIT 1. PLAN LAYOUT AND ROAD ELEVATION

1. Layout components
2. Cant
3. Transition curves
4. Tracing transition curves
5. Other transition curves

2. DIDACTIC UNIT 2. ROAD MATERIALS

1. The ballast. Introduction

2. sleepers
3. Fastening system
4. Rail and welds
5. Track devices and railway facilities

3. DIDACTIC UNIT 3. TRACK ASSEMBLY

1. First track assembly operations
2. Track assembly operations (I)
3. Track assembly operations (II)
4. Track apparatus assembly operations
5. Track assembly methods

4. DIDACTIC UNIT 4. FACILITIES FOR THE OPERATION OF THE RAILWAY. TERMINALS

1. Infrastructure work and coordination with the exploitation
2. Commissioning of new infrastructure
3. Passenger terminals
4. Freight terminals
5. civil protection

MODULE 3. DESIGN AND CONSTRUCTION OF THE ENERGY SUBSYSTEM

1. DIDACTIC UNIT 1. RAILWAY ELECTRIC TRACTION

1. Electric railway traction
2. Railway electrification systems
3. Electric traction power systems
4. Components of the railway power system by overhead contact line
5. Reference regulations and Energy ETI

2. DIDACTIC UNIT 2. THE AIRLINE OF CONTACT

1. Geometric characteristics of the Overhead Contact Line
2. Mechanical characteristics of the Overhead Contact Line
3. Electrical characteristics of the Overhead Contact Line
4. Dynamic characteristics of the Overhead Contact Line
5. Conditions in the design of the Overhead Contact Line

3. DIDACTIC UNIT 3. SUBSTATIONS

1. Concepts and types of substations
2. Design of a substation
3. Elements of a traction substation
4. Protective equipment and ground network
5. Energy remote control

4. DIDACTIC UNIT 4. HIGH SPEED ENERGY SUBSYSTEM, METRO AND TRAM

1. Design parameters of high-speed lines
2. Design parameters of metro lines
3. Design parameters of tram lines

4. Railway energy efficiency
5. Tram-train and train-tram

MODULE 4. DESIGN AND CONSTRUCTION OF SIGNALING AND TELECOMMUNICATIONS SUBSYSTEMS ON RAILWAYS

1. DIDACTIC UNIT 1. SIGNALING SYSTEMS AND COMPONENTS

1. Generalities
2. Assembly Block Diagram
3. Train position detection systems
4. Signaling systems associated with detours and light signaling systems
5. Protection of level crossings

2. DIDACTIC UNIT 2. MAIN ATP SYSTEMS

1. Generalities
2. ASFA
3. The LZB system
4. ERTMS
5. The CBTC signaling system on metropolitan railways

3. DIDACTIC UNIT 3. TELECOMMUNICATIONS SUBSYSTEM. TRANSMISSION MEDIA AND TELECOMMUNICATIONS NETWORKS

1. Metal cable transmission media
2. Fiber optic and radio link transmission media
3. transportation network
4. PDH access network
5. Voice switching network and data network

4. DIDACTIC UNIT 4. TELECOMMUNICATIONS SUBSYSTEM. NETWORK MANAGEMENT AND SUPERVISION SYSTEMS, TELECOMMUNICATIONS SERVICES AND TECHNICAL ROOMS

1. Network management and supervision systems
2. Voice and data services
3. Mobile services - train-ground system
4. Mobile services - GSM-R system
5. Telecommunications rooms in buildings

MODULE 5. MAINTENANCE OF RAILWAY INFRASTRUCTURE

1. DIDACTIC UNIT 1. MAINTENANCE, OPERATION AND EXPLOITATION MODELS AND PLANS

1. Fundamental principles of maintenance
2. Types of maintenance
3. Coordination of maintenance and operation and incident management
4. Works on track. Personnel involved, work regime and risks
5. Traffic safety management systems

2. DIDACTIC UNIT 2. EARTH WORKS MAINTENANCE

1. Slope stability and auscultation elements
2. Slope protection elements: Metal nets, geotextiles, gabions and gunite
3. Retaining walls and earth pushes. Rankine theory
4. Ground thrusts. Coulomb theory and stability of retaining walls
5. Stability of embankments. Treatments

3. DIDACTIC UNIT 3. TUNNELS

1. Infrastructure and superstructure
2. Drain maintenance
3. Tunnels
4. Unique buildings and drones
5. Diagnosis and rehabilitation systems

4. DIDACTIC UNIT 4. BRIDGES AND VIADUCTS

1. Repair and inspection procedures
2. metal bridges
3. Reinforcements in piers and abutments. Treatments against oxidation
4. concrete structures
5. Damage categorization. Main bridge inspections

MODULE 6. MAINTENANCE OF THE RAILWAY SUPERSTRUCTURE

1. DIDACTIC UNIT 1. MAINTENANCE MODELS AND PLANS. OPERATIONS AND EXPLOITATION

1. Historical evolution of maintenance
2. Track maintenance programming
3. Operations constituting the conservation of the road
4. Typology of partially mechanized track maintenance work
5. Typology of fully mechanized track maintenance work

2. DIDACTIC UNIT 2. ROAD APPARATUS

1. Introduction to the maintenance of track materials
2. Ballast, sleepers, fastening systems and rail
3. Maintenance of track devices
4. Plate track
5. Latest trends in superstructure maintenance

3. DIDACTIC UNIT 3. CONTROL AND SUPERVISION OF WELDING

1. Electrical spark butt rail welding
2. Thermal aluminum rail welding
3. Inspections of aluminothermic welds
4. Ultrasonic detection of rail and weld effects
5. Typology of fully mechanized track maintenance work

4. DIDACTIC UNIT 4. ROAD QUALITY EVALUATION

1. Concept of road quality and quality quantification
2. Geometric and dynamic track monitoring

3. Analysis of geometric auscultation results: safety and comfort
4. Analysis of geometric auscultation results: tread condition - wave wear
5. Analysis of the geometric auscultation results: tread condition - vertical, lateral and total wear; "mean gauge definition"

MODULE 7. MAINTENANCE OF RAILWAY ELECTRIFICATION

1. DIDACTIC UNIT 1. MAINTENANCE OF THE AIR CONTACT LINE

1. Maintenance of the overhead contact line
2. Types of overhead contact line maintenance
3. Contact overhead line maintenance planning
4. Objectives, maintenance indicators and advanced maintenance of the overhead contact line
5. Geometric auscultation of the catenary

2. DIDACTIC UNIT 2. CONTROL OF THE SUPPORT ELEMENTS OF THE AIR CONTACT LINE

1. Massifs and support posts
2. Support Bracket Assembly
3. Compensation system
4. aerial needles
5. Sectioning

3. DIDACTIC UNIT 3. THE MAINTENANCE OF TRACTION SUBSTATIONS

1. Introduction to traction substation maintenance
2. Reviews
3. Measurement systems and equipment
4. Tensions
5. AC substations

4. DIDACTIC UNIT 4. TROUBLESHOOTING

1. Catenary protection systems
2. Grounding
3. Grounding installations
4. Most frequent breakdowns
5. Assembly and routing of cables

MODULE 8. MAINTENANCE OF RAILWAY SIGNALING AND TELECOMMUNICATIONS SYSTEMS

1. DIDACTIC UNIT 1. MAINTENANCE OF INTERLOCKS, LOCKS AND CTC

1. Introduction to railway signaling. CMS TSI
2. Interlocks. Origins of electrical interlocks
3. Electronic interlocks
4. Installations to be governed by interlocks
5. Locking systems

2. DIDACTIC UNIT 2. MAINTENANCE OF ROAD CIRCUITS AND LEVEL CROSSINGS

1. Introduction to train detection systems. SIL

2. Track circuits separated by rail insulating joints
3. Train detection using axle counters
4. Protection systems using semi-barriers
5. Maintenance and troubleshooting at level crossings

3. DIDACTIC UNIT 3. SYSTEMS MAINTENANCE (ATP - ERTMS)

1. Introduction to ATP systems. EBICAB900 system
2. The LZB system. Maintenance
3. ERTMS system. Maintenance
4. Security remote control overview
5. Remote control subsystems

4. DIDACTIC UNIT 4. MAINTENANCE OF TELECOMMUNICATIONS SYSTEMS

1. Maintenance of communications and fiber optic cables
2. Transportation networks. Maintenance of transmission networks and DWDM networks
3. Maintenance of radio communications networks. Train-ground and GSM-R
4. Maintenance of networks and data and voice services
5. Information and control systems

MODULE 9. METROPOLITAN RAILWAYS SPECIALTY

1. DIDACTIC UNIT 1. KEY ASPECTS IN THE DESIGN OF A METROPOLITAN RAILWAY

1. Metropolitan railways
2. Infrastructure for metropolitan railways
3. Fixed installations. Energy subsystem
4. Fixed installations. Signaling, telecommunications and other subsystem
5. Rolling stock on metropolitan railways

2. DIDACTIC UNIT 2. DESIGN AND CONSTRUCTION OF THE TRACK SUPERSTRUCTURE AND FIXED INSTALLATIONS

1. Unique track geometry studies
2. Singular studies of transversal and vertical track mechanics
3. Ballasted track superstructure
4. Plate track superstructure
5. Superstructure in track equipment area

3. DIDACTIC UNIT 3. KEY ASPECTS IN THE MAINTENANCE OF A METROPOLITAN RAILWAY

1. Fundamental aspects in the maintenance of the metropolitan railway
2. Metropolitan track railway maintenance
3. Maintenance of fixed installations. Energy and signaling
4. Maintenance of other facilities. Stations and full line
5. Machinery for maintenance

4. DIDACTIC UNIT 4. MAINTENANCE OF THE TRACK SUPERSTRUCTURE AND FIXED INSTALLATIONS

1. Maintenance works. Actions with service interruption

2. Maintenance works. Actions without service interruption
3. Maintenance works. Renovations of track devices with service line
4. Causes of noise cases and possible solutions for its attenuation
5. Railway regulations

MODULE 10. TFM. MASTER IN DESIGN, CONSTRUCTION AND MAINTENANCE OF INFRASTRUCTURES AND FACILITIES ON RAILWAY LINES. METROPOLITAN RAILWAYS SPECIALTY

Qualification

University Degree in Master of Lifelong Training in Project, Construction and Maintenance of Infrastructures and Installations on Railway Lines. Metropolitan Railways Specialty issued by the Antonio de Nebrija University with 60 ECTS University Credits. Teachings not leading to obtaining an official qualification

Objectives

- • Direct the comprehensive management of initiatives in the field of railway transportation, from planning to execution, considering legal, financial and environmental conditions. • Design strategies for the modernization and construction of new lines, covering infrastructure, superstructures and energy subsystems. • Implement advanced technical solutions in the design of platforms, tunnels, bridges and viaducts for complex railway transport infrastructures. • Manage the selection of materials and track assembly, optimizing the layout and facilities for the efficient operation of the railway. • Evaluate the impact of technological and regulatory innovations on the life cycle of rail transport systems, ensuring their sustainability and safety. • Make strategic decisions in financing and relationships with suppliers for large-scale initiatives in the railway field. • Integrate a global vision of intermodal transport in the development of infrastructure and railway terminals. • Lead multidisciplinary teams in the drafting and execution of railway infrastructure initiatives, including conventional, high-speed and metropolitan lines.

What does it prepare you for?

This program prepares you to lead the transformation in the design, construction and maintenance of transportation infrastructure and facilities on railway lines. You will acquire a strategic vision of the complete life cycle of the railway system, from the conception of the project to its operation and maintenance. You will develop the ability to integrate comprehensive project management, addressing key aspects such as intermodality, platform, earthworks, tunnels, bridges and viaducts. You will master the design and assembly of the superstructure, including the track layout and selection of materials, as well as the essential facilities for exploitation. You will specialize in the energy subsystem, understanding its impact on efficiency and sustainability. This Master trains engineers and technicians in comprehensive project management to optimize the efficiency and security of metropolitan networks. You will make informed decisions, applying current regulations and the latest technical innovations to optimize each phase of metropolitan railway projects.

Who is it addressed to?

Aimed at professionals in the transport infrastructure engineering and construction sector who are seeking high-level specialization. If your interest is focused on updating and deepening your knowledge about the complete life cycle of the railway system, from the conception of the project to its maintenance, this master's degree will provide you with the necessary tools. You will develop strategic skills to address the challenges of efficiency, safety and sustainability, integrating the technical complexities and management of railway projects, including current regulations and technological evolution, to assume roles of greater responsibility in the field.

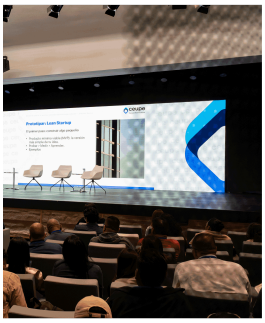
Official Character

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

- In the transportation infrastructure engineering and construction sector, this specialization positions you for senior management and consulting roles. You will be able to manage railway projects, leading the planning and execution of complex works, from the platform to tunnels and bridges. You will develop as a Track Engineering Manager, managing the design and assembly of the superstructure, or as a Railway Facilities Specialist, optimizing the energy and operation subsystems. In specialized consulting firms, you will act as a Senior Transport Infrastructure Consultant, advising on comprehensive project management and the application of regulations. You will also be able to play the role of Railway Maintenance Manager, guaranteeing the operability and safety of the lines, especially in metropolitan railway environments.







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

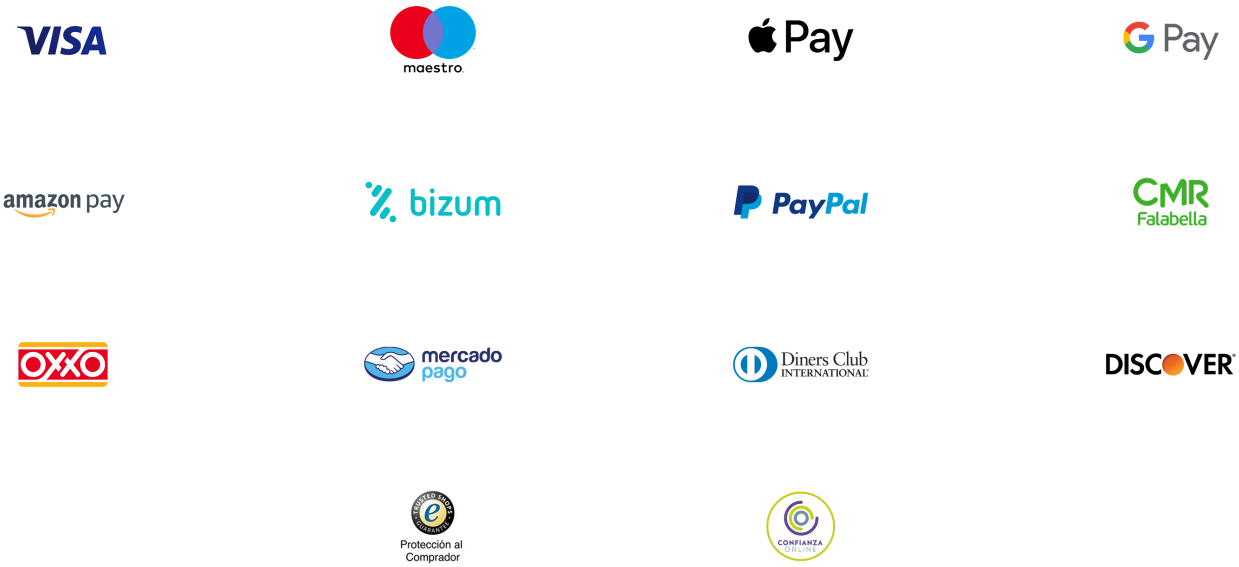
EDUCA EDTECH Group leads the digital revolution in education, promoting the continuous learning and technological transformation. The group is made up of recognized training institutions and its mission is to democratize access to education, promote the transfer of knowledge, technological development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



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