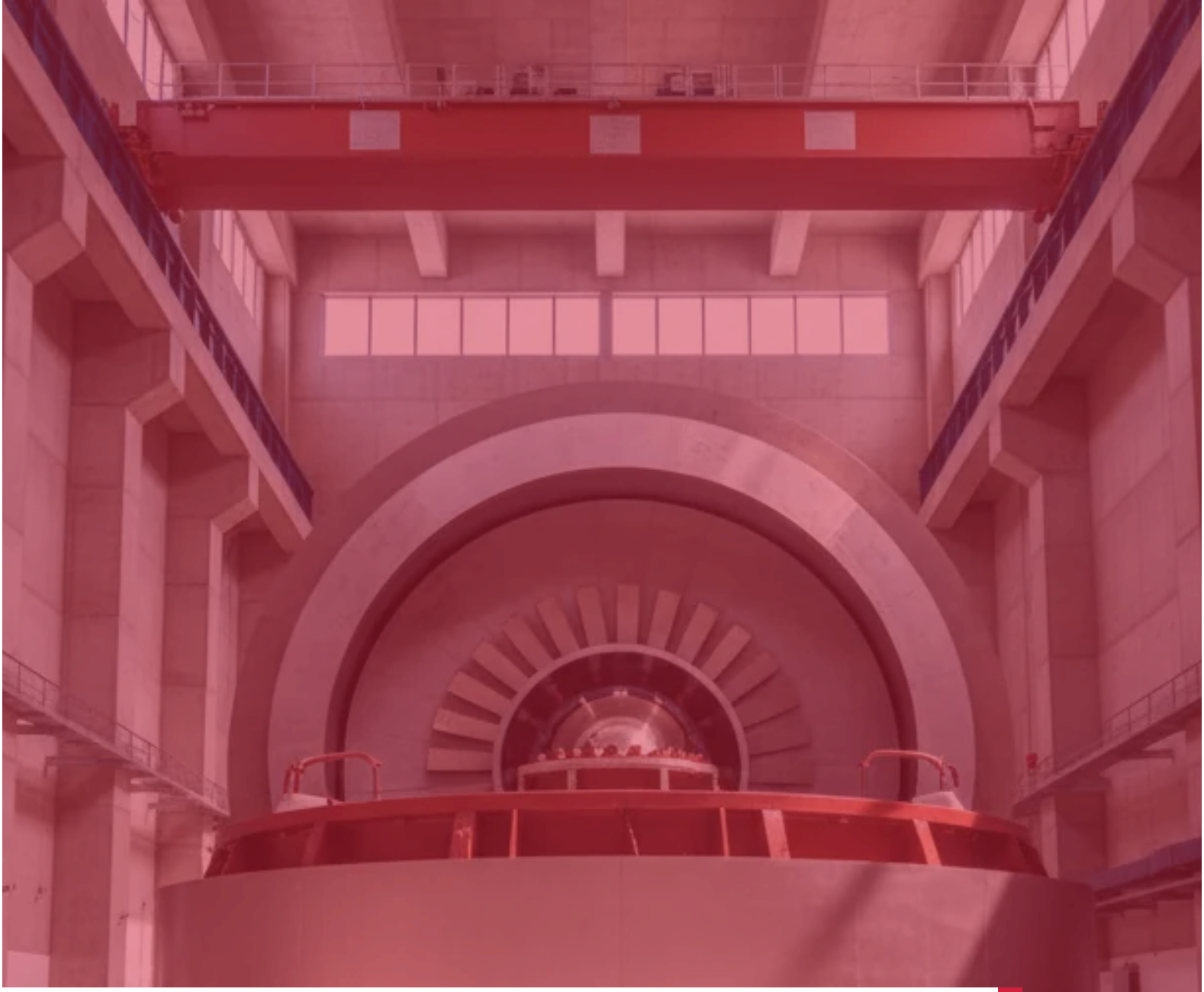


Máster online 100%

Master in Sustainable Electric Energy Generation + 60 ECTS Credits

Structuralia

Máster online 100%

Master in Sustainable Electric Energy Generation + 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 Sustainable Electric Energy Generation is a specialization program designed for professionals and operation managers in the electricity generation sector who seek to update and optimize their knowledge. This master's degree allows you to master the transformation of the energy sector, delving into cutting-edge technologies and the strategic management of electricity production. You will address the optimization of reliability, availability, maintainability and security (RAMS) in generation processes, a critical competence for any operation manager. You will develop a comprehensive vision to design and implement operation and maintenance strategies for energy infrastructures, ensuring their efficiency and operational resilience. You will consolidate your expertise in the management of sustainable generation projects, preparing you to lead initiatives that define the energy future. You will specialize in the analysis of renewable resources, the implementation of measurement campaigns and the integration of innovative solutions. This multidisciplinary approach equips you with the necessary tools to make strategic decisions in a

global energy environment that demands sustainability and operational efficiency, actively driving the energy transition.

Agenda

MODULE 1. GLOBAL ENERGY CONTEXT

1. DIDACTIC UNIT 1. ENERGY AND DEVELOPMENT

1. Global energy context
2. Climate change
3. Decarbonization of the economy and energy transition
4. Climate neutrality. The Green Deal Smart Cities

2. DIDACTIC UNIT 2. SUSTAINABLE DEVELOPMENT

1. Sustainable Development Goals
2. United Nations climate summits. Kyoto Protocol and Paris Agreement
3. Development Mechanisms
4. Clean (MDL) and Joint Application (AC)
5. CO2 Emission Rights Trading. Capture and use

3. DIDACTIC UNIT 3. THE ROLE OF RENEWABLE ENERGY AND OTHER STORAGE TECHNOLOGIES

1. Energy Security. Energy policy of the European Union
2. Penetration of renewable energies and electrification in 2050
3. The importance of Hydrogen
4. Batteries Distributed generation

4. DIDACTIC UNIT 4. OTHER VECTORS OF CHANGE

1. General Aspects of Energy Efficiency (I)
2. General Aspects of Energy Efficiency (II)
3. Energy efficiency in transportation
4. Energy efficiency in buildings
5. Circular Economy.

MODULE 2. CONVENTIONAL THERMAL GENERATION

1. DIDACTIC UNIT 1. INTRODUCTION TO THERMODYNAMICS. FUELS. STEAM PLANTS

1. Introduction to thermodynamics
2. Fuels and combustion
3. The steam plant. The regenerative Rankine cycle
4. The steam plant. General layout and main equipment
5. Types of steam plants

2. DIDACTIC UNIT 2. GAS TURBINE PLANTS

1. The gas turbine. The Brayton cycle
2. Types of gas turbines. Parts of the gas turbine. Technologists
3. Simple cycle power plants

4. Combined cycle plants
5. General layout of a combined cycle power plant. Components

3. DIDACTIC UNIT 3. DIESEL ENGINES POWER PLANTS. SITUATION AND PROSPECTS OF CONVENTIONAL THERMAL POWER PLANTS

1. The explosion engine. Otto cycle and Diesel cycle
2. The Diesel engine. Guys. Technologists
3. The engine plant. Types and configurations
4. The engine plant. General layout and components
5. Situation and perspectives of conventional thermal generation

4. DIDACTIC UNIT 4. NUCLEAR ENERGY

1. Basic concepts of Nuclear Energy
2. Fundamentals of Nuclear Technology
3. Conventional Nuclear Power Plants
4. Safety and radiological protection of nuclear power plants
5. The role of nuclear energy in the transition towards decarbonization.

MODULE 3. HYDROELECTRIC ENERGY

1. DIDACTIC UNIT 1. INTRODUCTION TO HYDROELECTRIC ENERGY. RESERVOIR INFRASTRUCTURES

1. Introduction and Generalities of hydraulic generation
2. Typology of Hydroelectric Power Plants
3. Hydraulic Resource Evaluation
4. Dams and weirs. Introduction and typology
5. Dams and weirs. Actions, landfills and drains

2. DIDACTIC UNIT 2. DRIVES

1. Taking works
2. Pressure channels and galleries
3. Penstocks
4. Gates and valves
5. Equipment and conduits

3. DIDACTIC UNIT 3. TURBINES AND ELECTRICAL EQUIPMENT

1. Powerhouse and turbine generalities
2. Field of application of turbines and action turbines
3. reaction turbines
4. Turbine selection and performance criteria
5. Alternators, regulation and control

4. DIDACTIC UNIT 4. REVERSIBLE PLANTS, PROJECTS AND ENVIRONMENTAL ASPECTS

1. Reversible Centrals
2. Feasibility studies
3. Sizing example

4. Hydroelectric projects
5. Environmental evaluation. Mitigation and environmental impact.

MODULE 4. PHOTOVOLTAIC SOLAR ENERGY

1. DIDACTIC UNIT 1. SOLAR RESOURCE AND PHOTOVOLTAIC EFFECT

1. The energy of the sun
2. Radiation measurement and databases
3. The photovoltaic effect
4. The solar cell
5. photovoltaic solar panel

2. DIDACTIC UNIT 2. SOLAR PHOTOVOLTAIC TECHNOLOGIES

1. Crystalline silicon panel technology
2. Crystalline silicon technology
3. Thin film panel technology
4. Thin film panel technology
5. Concentrated solar photovoltaic

3. DIDACTIC UNIT 3. ELECTRICAL ENERGY PRODUCED BY A PHOTOVOLTAIC SOLAR PLANT. PVSYST PROGRAM

1. Solar energy produced. PR concept
2. PVsyst. Definition of the site and meteorological base
3. PVsyst. Component modeling (I)
4. PVsyst. Component modeling (II)
5. PVsyst. Energy simulation and results

4. DIDACTIC UNIT 4. MAIN EQUIPMENT AND INFRASTRUCTURES

1. Photovoltaic self-consumption. Simulation with PVsyst program
2. Structures and solar trackers
3. Main electrical equipment
4. Medium voltage cables and electrical substation
5. civil works

MODULE 5. HYDROGEN AS AN ENERGY VECTOR

1. DIDACTIC UNIT 1. ENERGY AND HYDROGEN

1. History of hydrogen
2. What is hydrogen?
3. Current electrical and energy matrix
4. Hydrogen as an energy vector
5. Outlook for the Hydrogen Roadmap

2. DIDACTIC UNIT 2. HYDROGEN GENERATION AND STORAGE

1. PEM Electrolysis
2. Alkaline Electrolysis
3. SOEC and AEM electrolysis
4. Hydrogen storage

5. Hydrogen distribution

3. DIDACTIC UNIT 3. ELECTRICAL POWER GENERATION AND OTHER APPLICATIONS

1. fuel cells
2. PEM fuel cells
3. AT fuel cells
4. Hydrogen turbines and engines
5. Fuel cell vehicles

4. DIDACTIC UNIT 4. HYDROGEN INSTALLATIONS

1. refueling stations
2. Sizing of main equipment
3. Security considerations. Explosive atmospheres
4. Design of facilities related to hydrogen fuel cells
5. Installation calculation example.

MODULE 6. ALTERNATIVE RENEWABLE ENERGY. BIOETANOL, BIODIESEL, BIOGAS, BIOMASS COMBUSTION AND SOLAR THERMOELECTRIC

1. DIDACTIC UNIT 1. BIOMASS

1. Introduction to biomass
2. Biomass as an energy source
3. Characterization of biomass as an energy resource
4. The problem of the use of biomass
5. Biomass technologies and treatments

2. DIDACTIC UNIT 2. BIOGAS

1. Introduction to biogas
2. Biogas production
3. Biogas production technologies
4. Operations before and after biomethanization
5. Uses of biogas

3. DIDACTIC UNIT 3. BIOFUELS

1. HVO Biodiesel
2. Biodiesel FAME
3. Bioethanol
4. Bioethanol production

4. DIDACTIC UNIT 4. BIOMASS COMBUSTION

1. The combustion reaction. Reagents
2. The combustion reaction. Products
3. Design of combustion facilities
4. Electricity generation with biomass
5. Solar thermoelectric I
6. Solar thermoelectric II

MODULE 7. ENERGY IN A SMART CITY. ELECTRIC VEHICLE, SELF-CONSUMPTION, DISTRIBUTED GENERATION AND SMART GRIDS

1. DIDACTIC UNIT 1. INTRODUCTION. SMART CITY CONCEPT.

1. Introduction and Objectives.
2. Smart cities.
3. Some Smart Cities experiences.
4. Energy in cities.
5. The consumer at the center. Smart meters.

2. DIDACTIC UNIT 2. SUSTAINABLE MOBILITY.

1. Need for decarbonization of transportation.
2. Possible actions to decarbonize transportation.
3. The electric vehicle.
4. The electric bus.
5. New activity or business models.

3. DIDACTIC UNIT 3. RENEWABLE DISTRIBUTED GENERATION.

1. Overview of renewable distributed generation.
2. Promotion of distributed generation and self-consumption.
3. Incorporation of self-consumption in the electrical system.
4. Energy communities.
5. Some experiences.

4. DIDACTIC UNIT 4. SMART NETWORKS

1. The distribution of electrical energy (I).
2. The distribution of electrical energy (II).
3. Networks in the face of the energy transition.
4. New tools. Acquisition of flexibility.
5. Smart Grids.

MODULE 8. MANAGEMENT AND DEVELOPMENT OF ENERGY PROJECTS

1. DIDACTIC UNIT 1. THE PROJECT AND ITS ORGANIZATION

1. Renewable energy projects. Definition and type of projects
2. Project objectives
3. Different organizations and roles in the project
4. The project team. The project manager

2. DIDACTIC UNIT 2. THE DEVELOPMENT OF THE PROJECT

1. Site search and land management
2. Acquisition of projects in the development phase
3. Project analysis. Detailed business plan
4. Project processing

3. DIDACTIC UNIT 3. DEFINITION OF DETAILS AND PROPOSAL FOR APPROVAL

1. Project execution strategy (I)
2. Project execution strategy (II)
3. Bidding processes
4. Contracts
5. Risk management (I). Risk matrix
6. Risk management (II). Contingency estimation

4. DIDACTIC UNIT 4. CONSTRUCTION AND COMPLETION OF THE PROJECT

1. Project planning
2. The budget and economic control of the project
3. Safety and environmental management
4. Supply management and equipment manufacturing control
5. Construction and commissioning supervision
6. Completion of plant construction, closing of contracts and transfer to the operations organization.

MODULE 9. WIND ENERGY

1. DIDACTIC UNIT 1. PHYSICAL AND METEOROLOGICAL CONCEPTS OF WIND ENERGY.

1. Wind energy history.
2. Wind meteorology.
3. Physics of the wind resource.
4. Site selection.
5. Wind measurement campaign.

2. DIDACTIC UNIT 2. WIND TURBINE TECHNOLOGY AND WIND DATA ANALYSIS. WINDOGRAPHER PROGRAM.

1. Wind resource.
2. Exercise. Descriptive statistical analysis of the wind resource.
3. Wind turbines 1.
4. Wind turbines 2.
5. Wind turbines 3.

3. DIDACTIC UNIT 3. MICROSITING STUDY USING A COMPUTATIONAL MODEL OF ELECTRICAL ENERGY PRODUCTION.

1. WASP Program. Data analysis model (WAP CLIMATE ANALYST).
2. WASP Program. Topographic terrain model (WAP BAD EDITOR).
3. WASP Program. Wind Turbine Generator Model.
4. WASP Program. Energy simulation I.
5. WASP Program. Energy simulation II.

4. DIDACTIC UNIT 4. DESIGN OF WIND FARMS.

1. Civil works of a wind farm.
2. Electrical generation installations of a wind farm.
3. High voltage electrical substation.
4. High voltage overhead power line.
5. Offshore wind energy.

MODULE 10. TFM. MASTER IN SUSTAINABLE GENERATION OF ELECTRICAL ENERGY"

Qualification

University Degree in Master's Degree in Lifelong Learning in Sustainable Generation of Electric Energy issued by the Antonio de Nebrija University with 60 ECTS University Credits. Courses not leading to an official qualification

Objectives

- • Integrate a strategic vision of the global energy context, understanding the evolution towards decarbonization and the role of renewable sources and storage. • Analyze energy production technologies, including conventional thermal energy and its integration into sustainable models. • Design and implement strategies for electricity production projects based on renewable resources (wind, solar, hydraulic, biomass). • Optimize reliability, availability, maintainability and security (RAMS) in production plants, applying advanced methodologies. • Manage the evaluation and measurement of renewable resources, developing feasibility analyzes for new locations. • Evaluate the impact of energy policies and regulatory frameworks on the development of clean production technologies. • Lead the integration of energy storage systems and smart grids to optimize demand and supply management. • Make strategic decisions in the planning and execution of investments in sustainable generation infrastructures, considering technical, economic and environmental factors.

What does it prepare you for?

This program prepares you to lead the transformation of the energy sector, providing you with the necessary skills for the development and management of sustainable energy projects. You will train in RAMS optimization for the efficient management of energy infrastructures, both conventional and renewable. You will design and size renewable energy infrastructure, such as wind farms, photovoltaic solar plants, hydraulic power plants and biomass projects. You will integrate a global vision that covers technical, economic and environmental aspects, allowing you to make strategic decisions in the management of plant operation and maintenance. You will evaluate the impact of energy policies and storage technologies, implementing solutions that optimize the reliability, availability, maintainability and security of the systems. You will manage multidisciplinary teams and direct the implementation of advanced technologies for efficient and responsible energy production, consolidating your role in the energy transition.

Who is it addressed to?

If you are a professional or operation manager in the electricity generation sector and are looking to update and specialize your knowledge in sustainable generation technologies and renewable energies, this master's degree is for you. If you work in plant operation or maintenance roles, or in the management of energy projects, and feel the need to delve deeper into the optimization of processes and the implementation of strategies to improve the reliability, availability, maintainability and security (RAMS) of energy infrastructures, this program offers you the specialization you need. It is also designed for you if, with a solid technical or scientific base, you want a strategic and multidisciplinary vision to face the challenges of the energy transition, seeking a significant impact on the energy future.

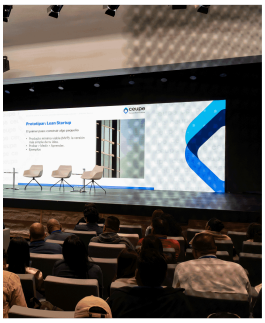
Official Character

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

- Your specialization in energy management with a sustainable approach will position you to assume highly responsible roles in the energy sector. You will be able to lead as Director of Operations of Renewable Energy Plants, managing the implementation and optimization of resource measurement campaigns and the technical-economic analysis of their viability. You will also be able to serve as an Energy Asset Manager, ensuring the reliability, availability, maintainability and security (RAMS) of the facilities. Another route is that of a Specialized Consultant in Sustainable Energy Projects, advising on the development and evaluation of initiatives that integrate conventional and advanced technologies. Your profile will be key to making strategic decisions in the energy transition, leading multidisciplinary teams and optimizing the performance of generation infrastructures. You will be a reference for the implementation of innovative solutions in energy production.







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.

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

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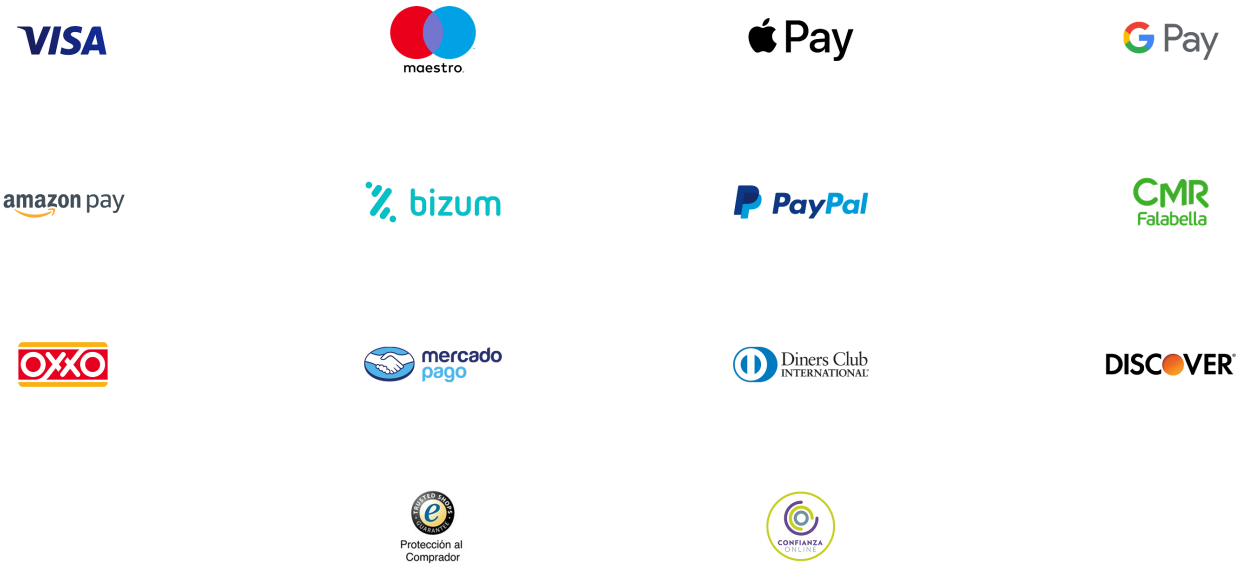
EDUCA EDTECH Group leads the digital revolution in education, promoting the continuous learning and technological transformation. The group is made up of recognized training institutions and its mission is to democratize access to education, promote the transfer of knowledge, technological development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

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