Structuralia
Engineering eLearning

UNIVERSIDAD
NEBRIJA

Master´s Degree in Energy Technologies + 60 ECTS Credits





Choose to learn at school
leader in online training

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ABOUT STRUCTURALIA

Structuralia is an online educational institution offering highly specialized postgraduate programs in engineering, infrastructure, construction, energy, building, digital transformation, and new technologies. Since our founding in 2001, we have been committed to providing quality training for the professional development of **engineers, architects, and STEM professionals.**

We provide a platform where you can acquire new skills and enhance your knowledge without being limited by time or location. Our methodology ensures an engaging, interactive, and **supportive educational experience,** equipping our students to meet future challenges in their respective fields of work.

More than **20** years of experience

Over **200k** student have learnt with us

More than **90** nationalities among our students



Specialize to
advance your career

STRUCTURALIA ALLIANCE AND NEBRIJA UNIVERSITY

Structuralia and the University of Nebrija successfully consolidate a strategic partnership. Thus, the collaboration between Structuralia and the University of Nebrija promotes a collaborative, innovative and accessible approach towards learning that is adapted to the individual needs of students.

The two institutions prioritize practical and flexible learning, adapted to the demands of today's working world, and which promotes the personal and professional development of each student. The purpose is to acquire new knowledge in a dynamic and didactic way, which facilitates its retention and contributes to developing the necessary skills to be ready to take part in a society in constant and rapid transformation.

Structuralia and the University of Nebrija have set as their main objective the democratization of education to bring it to even the most remote areas and taking advantage of the latest technological innovations. In addition, they have a team of highly specialized teachers and learning platforms that incorporate cutting-edge educational technology to provide academic support throughout the entire educational process.



STRUCTURALIA RANKINGS

Structuralia has achieved the recognition of different national and international rankings, thanks to its commitment to **democratize education** and bet on educational innovation to **achieve excellence.**

For the elaboration of these rankings, **indicators** such as online and offline reputation, the quality of the institution, social responsibility, educational innovation or the profile of professionals are used.















QS, seal of academic excellence

Structuralia: 5 stars in online education

BY EDUCA EDTECH

Structuralia is a brand endorsed by **EDUCA EDTECH Group,** which is composed of a group of experienced and recognized **educational institutions of online training.** All the entities that make it up share the mission of **democratizing access to education** and are committed to knowledge transfer, technological development and research.

EDUCA EDTECH Group

ONLINE EDUCATION

EUROINNOVA INTERNATIONAL ONLINE EDUCATION

inesem business school

INEAF BUSINESS SCHOOL

red educa.net

inesalud

EDU SPORT

EDUCA business school

ESIBE ESCUELA IBEROAMERICANA DE POSTGRADO

Educa.Pro

ceupe European Business School

UDAVINCI

CAPMAN testing solutions

Structuralia Engineering eLearning

UNIMIAMI International University of Miami

Educa PHAROS

LXP METHODOLOGY

The **EDUCA LXP** methodology enhances the learning experience by incorporating AI into e-learning processes. It utilizes highly customized predictive models based on the analysis of student interactions with their virtual environments.

EDUCA LXP is the outcome of **Research Results Transfer** from multiple interdisciplinary R&D+i projects, involving international universities dedicated to knowledge transfer, technological development and research.



1. Flexibility

100% online and flexible learning, allowing students to study where, when and how they want.



2. Accessibility

We believe in making education accessible to all, working to ensure that everyone has the opportunity to continue their learning journey.



3. Personalization

We offer customized learning paths tailored to each student's unique needs and preferences.



4. Accompaniment / Academic mentoring

Guidance and support. Our team of expert teachers provides academic guidance, advocating for educational quality and adapting to the needs of the ever-changing labor market.



5. Innovation

We are at the forefront of technological development, constantly evolving with AI-driven Learning Experience Platforms.



6. Educational excellence

Our didactic approach focuses on competence based learning, promoting practical and meaningful learning experiences to ensure professional development.



Programs

Our own university and official programs

WHY CHOOSIG STRUCTURALIA

1. Our Experience

- ✓ More than **20 years of experience**.
- ✓ More than **200.000 students** have already learnt in our virtual classrooms.
- ✓ More than **90 nationalities** among our student body.

2. Our Team

Currently, Structuralia has a team of **more than 550 professionals working in the STEM (Science, Technology, Engineering and Mathematics)**. Our staff is solidly framed in a structure that facilitates the highest quality in the attention to students.

3. Our Methodology



100% ONLINE

Study at your convenience, wherever you are. Access our virtual campus from any device.



LEARNING

We strive for a deep integration of new knowledge into your cognitive framework.



TEAM TEACHERS

Structuralia has a team of professionals to elevate your study experience with topquality education.



NOT BE ALONE

Receive continuous guidance from our tutoring team throughout your student journey.

4. AENOR Quality

- ✓ We are Collaboration Agency Nº99000000169 authorized by the Ministry of Employment and Social Security.
- ✓ Annual external audits are carried out to ensure the highest quality by AENOR.
- ✓ Our teaching processes are certified by AENOR under ISO 9001.

Master´s Degree in Energy Technologies + 60 ECTS Credits

LENGHT
1500 horas

MODE
ONLINE

ASSISTANCE
PERSONALIZED

CREDIT
60 ECTS

Certificacion

Master´s Degree in Energy Technologies with 60 ECTS Credits awarded by the Antonio de Nebrija University. Teaching not leading to an officially accredited qualification



Description

The Master in Energy Technologies is your gateway to a thriving sector at the forefront of global transformation. As the world pivots towards sustainable energy solutions, expertise in energy technologies is in high demand. This master’s programme empowers you with in-depth knowledge of cutting-edge energy systems, ranging from hydrogen and biofuels to solar and wind power. You'll explore topics like hydrogen generation, photovoltaic technologies, and the evolution of the oil industry, equipping you with the skills to drive innovation in the energy transition. The flexible online format allows you to engage with expert-led modules and collaborate on projects from anywhere, fitting seamlessly into your lifestyle. By joining this programme, you position yourself at the heart of an ever-expanding field, ready to meet the energy challenges of tomorrow.

Goals

- Develop strategies for hydrogen storage and generation technologies.
- Evaluate hydrogen's role in power generation applications.
- Compare crude oil refining processes and their future prospects.
- Assess the impact of biofuels in reducing petroleum dependency.
- Analyse natural gas value chains and their role in energy transition.
- Design photovoltaic systems using PVsyst for optimal energy output.
- Apply wind data to optimise windfarm design and efficiency.

What does it prepare you for?

The Master in Energy Technologies is designed for industry professionals and graduates with a keen interest in advancing or updating their expertise in energy. It delves into advanced topics like hydrogen energy systems, oil and biofuel industries, natural gas, and cutting-edge renewables such as photovoltaic, wind, and hydroelectric power, making it ideal for those aiming to excel in energy transition and innovation.

Who is the target audience?

This Master's programme equips you with the skills to navigate the evolving landscape of energy technologies. You'll master hydrogen as an energy vector, exploring its generation, storage, and applications. Delve into the oil and biofuel industries, understanding their current and future roles. Gain expertise in natural gas and liquefied natural gas, pivotal for energy transition. Expand your knowledge in solar and wind energy, hydroelectric power, and alternative renewables. By the end, you'll confidently address complex energy challenges, shaping a sustainable future.

Job opportunities

- Hydrogen energy systems engineer - Biofuel production specialist - Natural and liquefied gas consultant - Photovoltaic solar project manager - Wind farm design engineer - Hydroelectric power analyst - Conventional thermal generation operator - Renewable energy consultant focusing on alternative sources - Energy transition strategist for 2050 scenarios

List of subjects

MODULE 1. HYDROGEN AS AN ENERGY VECTOR

UNIT 1. ENERGY AND HYDROGEN

1. The hystory of hydrogen
2. What is hydrogen?
3. Current electricity and energy matrix
4. Hydrogen as an energy carrier
5. Prospects for the hydrogen roadmap

UNIT 2. HYDROGEN GENERATION AND STORAGE

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

UNIT 3. POWER GENERATION AND OTHER APPLICATIONS

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

UNIT 4. HYDROGEN INSTALLATIONS

1. Refuelling stations
2. Sizing of main equipment
3. Safety considerations. Explosive atmospheres
4. Design of hydrogen and fuel cell installations
5. Examples of installation calculations

MODULE 2. THE OIL AND BIOFUEL INDUSTRIES, AND THE PROJECTED SCENARIO FOR 2050

UNIT 1. CRUDE OIL AND REFINING PROCESSES

1. Crude oils (I)
2. Crude oils (II)
3. Crude oils (III)
4. Refining processes (I)
5. Refining processes (II)

UNIT 2. REFINING PROCESSES AND PRODUCTS

1. Refining schemes (I)
2. Refining schemes (II)
3. Refining products (I)
4. Refining products (II)
5. Margin and profitability

UNIT 3. ALTERNATIVE FUELS TO PETROLEUM. BIOFUELS

1. Bioenergy
2. Biofuels
3. Bioethanol & biodiesel
4. SAF & Biogas
5. Bio-refineries

UNIT 4. PRESENT AND FUTURE OF THE OIL INDUSTRY

1. HSE & CO2 emissions
2. Oil industry. Short and medium term projections
3. Crude oil markets
4. Refining product markets
5. Biofuel markets

MODULE 3. THE NATURAL AND LIQUIFIED GAS INDUSTRY, AND ITS ROLE IN THE ENERGY TRANSITION PROCESS

UNIT 1. FUNDAMENTALS OF NATURAL GAS AND LIQUEFIED NATURAL GAS

1. Composition and properties
2. Exploration and production techniques
3. Types of reservoirs and characterization
4. Extraction techniques
5. Fracking

UNIT 2. NATURAL GAS VALUE CHAIN AND LIQUEFIED NATURAL GAS (I)

1. Natural gas value chain
2. Gas processing
3. Liquefaction
4. Transportation of liquid natural gas
5. Regasification

UNIT 3. NATURAL GAS VALUE CHAIN AND LIQUEFIED NATURAL GAS (II)

1. Liquefied natural gas storage
2. Offshore installations
3. Gas system and distribution
4. Marketing, regulation and markets
5. HSE and natural gas and natural gas liquids applications

UNIT 4. ENERGY TRANSITION AND THE 2050 SCENARIO

1. Energy transition and global position
2. European green deal & LATAM green
3. Net zero emissions by 2050
4. Natural gas central to the energy transition
5. Circular economy. Natural gas and hydrogenen

MODULE 4. PHOTOVOLTAIC SOLAR ENERGY

UNIT 1. THE SOLAR RESOURCE AND THE PHOTOVOLTAIC EFFECT

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

UNIT 2. SOLAR PHOTOVOLTAIC TECHNOLOGIES

1. Classification of pv solar technologies
2. Crystalline silicon technology
3. Thin-film panel technology (I)
4. Thin-film panel technology (II)
5. Concentrator photovoltaics

UNIT 3. ELECTRICAL ENERGY PRODUCED BY A PHOTOVOLTAIC POWER PLANT. THE PVSYST PROGRAM

1. Solar energy production. The pr concept
2. PVSYST. Site definition and meteorological basis
3. PVSYST. Component modeling (I)
4. PVSYST. Component modeling (II)
5. PVSYST. Energy simulation and results

UNIT 4. MAIN EQUIPMENT AND INFRASTRUCTURE

1. Photovoltaic self-consumption. PVSYST simulation program
2. Solar trackers and structures
3. Main electrical equipment
4. Medium-voltage cables and electrical substations
5. Civil works

MODULE 5. WIND ENERGY

UNIT 1. PHYSICAL AND METEOROLOGICAL CONCEPTS

1. History of wind energy
2. Wind meteorology
3. The physics of wind resources
4. Site selection
5. Wind resource measurement campaign

UNIT 2. WIND TURBINE TECHNOLOGY AND WIND DATA ANALYSIS

1. Wind resource
2. Practical exercise. Wind resource descriptive statistical analysis. Windographer program
3. Wind turbines (I)
4. Wind turbines (II)
5. Wind turbines (III)

UNIT 3. MICROSITING STUDY THROUGH AN ELECTRIC POWER PRODUCTION COMPUTATIONAL MODEL

1. WASP program. Data analysis model (WASP climate analyst)
2. WASP program. Terrain topographic modeling (WASP map editor)
3. Exercise. Power curve and thrust coefficient
4. WASP program. Power simulation (I)
5. WASP program. Power simulation (II)

UNIT 4. WINDFARM DESIGN

1. Windfarm construction project
2. Windfarm electrical power facilities and installations
3. High-voltage electrical power substation
4. Overhead high-voltage power line
5. Offshore wind power

MODULE 6. HYDROELECTRIC POWER

UNIT 1. INTRODUCTION TO HYDROPOWER. DAMS AND RESERVOIRS

1. Introduction and general information on hydroelectric generation
2. Typology of hydroelectric power plants
3. Hydraulic resource assessment
4. Dams and weirs (I). Introduction and typology
5. Dams and weirs (II). Actions, landfills and drainage

UNIT 2. HYDRAULIC CIRCUITS

1. Intake works
2. Channels and pressure galleries
3. Penstocks
4. Gates and valves
5. Hydraulic circuit equipment

UNIT 3. HYDROELECTRIC TURBINES AND ELECTRICAL EQUIPMENT

1. Powerhouse and introduction to turbines
2. Field of application of turbines and action turbines
3. Reaction turbines
4. Turbine selection criteria and performance
5. Generators, regulation and control

UNIT 4. PUMPED-STORAGE, PROJECT DEVELOPMENT AND ENVIRONMENTAL CONSIDERATIONS

1. Pumped-storage power plants
2. Feasibility studies
3. Sizing example
4. Hydroelectric projects
5. Environmental evaluation. Environmental impact mitigation

MODULE 7. CONVENTIONAL HEAT GENERATION

UNIT 1. INTRODUCTION TO THERMODYNAMICS. FUELS. THE STEAM POWER PLANT

1. Introduction to thermodynamics
2. Fuels and combustion
3. The steam power plant (I). The regenerative Rankine cycle
4. The steam power plant (II). General arrangement. Main equipment
5. Types of steam power plants

UNIT 2. GAS TURBINES POWER 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 power plants
5. General arrangement of a combined cycle power plant. Components

UNIT 3. DIESEL ENGINE POWER PLANTS. SITUATION AND OUTLOOK OF CONVENTIONAL THERMAL GENERATION

1. The internal combustión engine. The Otto cycle and the Diesel cycle
2. The diesel engine. Types. Technologists
3. The engine power plant. Types and configurations
4. General arrangement and components
5. Situation and outlook of conventional thermal generation

UNIT 4. NUCLEAR ENERGY

1. Nuclear energy basic concepts
2. Nuclear technology fundamentals
3. Conventional nuclear power plants
4. Nuclear power plants safety and radiation protection
5. The role of nuclear energy in the transition to decarbonization

MODULE 8. ALTERNATIVE RENEWABLE ENERGIES. BIOETHANOL, BIODIESEL, BIOGAS, BIOMASS COMBUSTION, AND SOLAR THERMOELECTRIC POWER

UNIT 1. BIOMASS

1. Introduction to biomass
2. Biomass as an energy source

3. Characterization of biomass as an energy resource
4. Problems of the use of biomass
5. Biomass technologies and treatments

UNIT 2. BIOGAS

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

UNIT 3. BIOFUELS

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

UNIT 4. BIOMASS COMBUSTION

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

MODULE 9. OFFSHORE ENERGY

UNIT 1. BASIC CONCEPTS OF OFFSHORE WIND

1. Introduction to offshore wind
2. Global market and main players
3. Fundamentals of offshore wind
4. Types of existing technologies
5. Environment, consenting and permitting

UNIT 2. OFFSHORE WIND PROJECT PHASES

1. Bidding phase and auction models
2. Development phase: DEVEX
3. Construction phase: CAPEX
4. Operation and decommissioning phase: OPEX & DISEX
5. Project financing

UNIT 3. MAIN COMPONENTS OF AN OFFSHORE WIND FARM

1. Foundations
2. Wind turbines

3. Transport and installation
4. Grid connection and electrical system
5. Other elements of an offshore wind farm

UNIT 4. ELECTRICITY MARKET

1. Actors in the energy market and their roles.
2. PPA
3. Subsidised remuneration system
4. Green certificates
5. Market challenges

MODULE 10. MASTER´S FINAL PROJECT

Did you find this information interesting?

If you still have questions, our academic advising team will be happy to answer them.

Ask us about our training method, our teachers, scholarships or even just get to know us.

Request information without commitment.

Find us here!

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