

Máster online 100%

Master in Energy Technologies + 60 ECTS Credits

Structuralia

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Modality
Online

Languages
Español

Duration
1500 hours (60 ECTS)

No Limit
AI Assistant

Does it include practices?
NO

Educational Institutions

Structuralia
Engineering eLearning

Summary

You will delve into the strategic role of green hydrogen as an energy vector, from its generation and storage to its various applications in electricity production and other industries, addressing specific installations. You will analyze oil refining processes, schemes and derivative products, and explore the future of advanced biofuels and the evolution of the oil industry in the context of the energy transition. This program will allow you to understand the liquefied natural gas value chain and its impact on global supply, from extraction to distribution. You will develop advanced skills in the design and optimization of photovoltaic systems, using specialized tools such as PVsyst, and you will apply micrositing techniques for the efficient planning of wind farms. You will integrate hydroelectric solutions with a rigorous environmental approach, and explore conventional thermal generation as well as other alternative renewable energies. You will prepare to lead the implementation of innovative and sustainable solutions, anticipating the challenges of the demand for new technologies in the field of the global energy transition.

Agenda

MODULE 1. 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 2. OIL INDUSTRY, BIOFUELS AND 2050 SCENARIO

1. DIDACTIC UNIT 1. CRUDE OIL AND REFINING PROCESSES

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

2. DIDACTIC UNIT 2. REFINING SCHEMES AND PRODUCTS

1. Refining schemes (I)
2. Refining schemes (II)

3. Refined products (I)
4. Refining products (II)
5. Margin and profitability

3. DIDACTIC UNIT 3. ALTERNATIVE FUELS TO PETROLEUM. BIOFUELS

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

4. DIDACTIC UNIT 4. CURRENT AND FUTURE OF THE OIL INDUSTRY

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

MODULE 3. NATURAL GAS AND LIQUEFIED NATURAL GAS INDUSTRY. KEY ROLE IN THE ENERGY TRANSITION

1. DIDACTIC UNIT 1. BASICS NATURAL GAS AND LIQUEFIED NATURAL GAS

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

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

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

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

1. Storage of liquefied natural gas
2. Offshore installations
3. Gas system and distribution
4. Marketing, regulation and markets
5. HSE and natural gas and liquefied natural gas applications

4. DIDACTIC UNIT 4. ENERGY TRANSITION AND 2050 SCENARIO

1. Energy transition and global position
2. European Green Deal & LATAM Green
3. Net zero emissions by 2050

4. Natural gas essential in the energy transition
5. Circular economy. Natural gas and hydrogen

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. 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 6. 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 7. 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 8. 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 9. OFFSHORE OFFSHORE WIND

1. DIDACTIC UNIT 1. BASIC CONCEPTS OF OFFSHORE WIND

1. Introduction
2. Global market and main agents
3. Fundamentals of offshore wind
4. EYA and consenting
5. Types of existing technology

2. DIDACTIC UNIT 2. PROJECT PHASES IN OFFSHORE WIND

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

3. DIDACTIC UNIT 3. MAIN COMPONENTS OF AN OFFSHORE WIND FARM

1. Foundations
2. Wind turbines
3. Transportation and installation
4. Network connection and electrical system
5. Other elements of an offshore wind farm

4. DIDACTIC UNIT 4. ELECTRICAL MARKET

1. Market actors and their roles
2. Power Purchase Agreement (PPA)
3. Remuneration system with subsidy and green certificates
4. Levelized Cost of Energy (LCOE)
5. Market challenges

MODULE 10. FINAL PROJECT

Qualification

University Degree in Master's in Continuing Education in Energy Technologies issued by the Antonio de Nebrija University with 60 ECTS University Credits. Education not leading to the obtaining of an official degree

Objectives

- • Lead the integration of hydrogen as an energy vector in industrial decarbonization strategies. • Design strategies for the optimization of crude oil refining processes and the incorporation of fuels of biological origin. • Manage the liquefied natural gas value chain, evaluating its role in the global energy mix and energy efficiency. • Implement the design and optimization of advanced photovoltaic systems with PVsyst. • Direct wind farm projects, applying micrositing techniques to maximize their performance and energy management. • Assess the impact of emerging energy technologies and their potential in shaping the energy future. • Develop a strategic vision for decision-making in the transition towards sustainable energy models.

What does it prepare you for?

This program prepares you to face the challenges of the transformation of energy technologies, providing you with a strategic vision of the future of the sector. You will specialize in the management of hydrogen projects, from its generation and storage to its various applications in the production of electrical energy and other industries, promoting industrial decarbonization. You will design and optimize crude oil refining processes, understanding production schemes and the integration of alternative fuels such as biofuels. You will evaluate the impact of new technologies in the oil industry, anticipating its evolution towards 2050. You will make informed decisions on the direction of the energy transition, leading the adoption of innovative and sustainable solutions in your organization and actively contributing to the transformation of the global energy landscape.

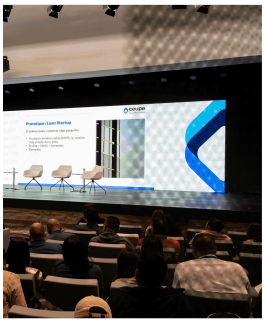
Who is it addressed to?

Professionals in the energy sector who seek to deepen their knowledge of the role of hydrogen as a key energy vector, from its generation to its industrial applications. This program is for those who work in the crude oil industry and want to understand refining processes, production schemes and the future of alternative fuels. It is also aimed at those with an interest in fuels of biological origin and their integration into the energy scenario, as well as in the management of hydrogen facilities. You will acquire a strategic vision of the evolution of the industry and the implementation of advanced energy solutions.

Professional Outings

- Specialization in energy technologies will position you to assume highly responsible roles in a sector in transformation. You will lead the implementation of hydrogen projects as an energy vector, from generation to storage and applications in electricity production. You will design strategies for the optimization of crude oil refining processes, managing the production of fuels and derivatives in the oil industry. You will advise organizations on the integration of biofuels and other alternatives, anticipating the energy scenario of 2050. You will be able to develop your career as a Senior Consultant in Energy Innovation, Business Development Manager in Green Hydrogen, or Director of Operations in Alternative Fuel Plants. Your strategic vision will allow you to drive the evolution of the industry towards more sustainable models, managing the transition and adoption of new technologies.







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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5 stars

QS ranking in online education

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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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