Structuralia
Engineering eLearning

UNIVERSIDAD
NEBRIJA

Master´s Degree in Road Construction, Maintenance and Operation + 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 Road Construction, Maintenance and Operation + 60 ECTS Credits



LENGHT
1500 horas



MODE
ONLINE



ASSISTANCE
PERSONALIZED



CREDIT
60 ECTS

Certificacion

Master´s Degree in Road Construction, Maintenance and Operation with 60 ECTS Credits awarded by the Antonio de Nebrija University. Teaching not leading to an officially accredited qualification



Description

Nowadays, roads are the main means of land transport, both for goods and people. As a matter of fact, the construction of new roads, and the maintenance of existing ones, have become a global demand, which has led to the increasing need for professionals with training and knowledge for the construction, maintenance, and operation of roads, considering that the service levels for mobility infrastructure is increasingly demanding.

Goals

This program has been designed to achieve the following goals: - Gain a general understanding of road construction. - Learn about the practical means and methodologies applied to earthworks during road construction. - Learn the most important elements involved in structure construction from an operation- oriented point of view. - Learn about bituminous mixes: Manufacturing and implementation. - Quality control in road construction. - Road maintenance methodologies. - Gain a comprehensive understanding of road maintenance. - Learn the use of organization tools for the maintenance of road elements.

What does it prepare you for?

This master’s degree is intended for civil engineers, architects and technicians who are currently qualified in the field of construction, or who are interested in starting a career in the sector. The program is also aimed at anyone who seeks to acquire, or update, their knowledge about road

construction, maintenance and operations from a practical point of view.

Who is the target audience?

The career opportunities this master include roles such as road construction engineer, road maintenance manager, road operation specialist, infrastructure consultant for roads, road construction project supervisor, and road safety management expert.

Job opportunities

- Construction Production Manager - Construction Manager at construction firms - Road Operation and Maintenance Manager - Technical Office Manager

List of subjects

MODULE 1. EXCAVATION, BLASTING AND EARTHWORKS

UNIT 1. EARTHWORKS

1. Earthworks classification
2. Geotechnical materials and earthworks
3. Excavability
4. Surveying
5. Environmental impact and safety and health

UNIT 2. OPERATIONS AND HEAVY MACHINERY

1. Digging
2. Loading and hauling
3. Spreading, grading and compaction
4. Earthworks machinery productivity
5. Excavations below the water table

UNIT 3. BLASTING EXCAVATION

1. Basic concepts on blasting
2. Blast-holes drilling
3. Explosives
4. Blasting mechanics
5. Blasting vibrations and their control

UNIT 4. BLASTING DESIGN

1. Bench blasting: main variables
2. Bench blasting design
3. Tunelling blasting: general aspects
4. Tunelling blasting design
5. Practical aspects and common deficiencies in blasting

MODULE 2. DRAINAGE IN LINEAR WORKS

UNIT 1. HYDROLOGY IN LINEAR CONSTRUCTION

1. General concepts. Definitions
2. Maximum daily precipitation
3. Physical characteristics and intensity of rainfall
4. Runoff and methods for calculating flood flows
5. Application of SIG to hydrology

UNIT 2. TRANSVERSE DRAINAGE

1. General concepts. Definitions
2. Transverse drainage works
3. Design criteria and calculation methodology
4. Energy dissipators
5. Erosion and sedimentation in the cross drainage system

UNIT 3. DRAINAGE OF ROADBED AND MARGINS

1. General concepts. Definitions
2. Drainage in clearings
3. Slope drainage
4. Pavement drainage, structures, tunnels and sustainable drainage
5. Design and dimensioning criteria

UNIDAD 4. HYDRAULICS IN BRIDGES AND VIADUCTS

1. General concepts. Definition
2. 1D hydraulic modeling
3. 2D hydraulic modeling
4. Erosion and foundation protection
5. Channelization and protection

MODULE 3. CIVIL ENGINEERING STRUCTURAL CALCULATION

UNIT 1. PRESTRESSED CONCRETE

1. Introduction
2. Materials
3. Prestressing force. Instantaneous losses
4. Prestressing deferred losses
5. Calculating prestressing force in hyperstatic structures

UNIT 2. UNDERPASS STRUCTURES OR BURIED WORKS

1. Underpass works (I). Types
2. Underpass works (II). Acting loads
3. Cylindrical shells. Concepts and behavior
4. Predimensioning of cylindrical shells (I). Concept and calculation
5. Predimensioning of cylindrical shells (II). Spandrels and edge beams

UNIT 3. CONCRETE TANKS

1. Concrete tank calculation elements
2. Concrete tank design elements. Principles applied to calculating rectangular reinforced concrete tanks
3. Calculating a rectangular reinforced concrete tank wall. Example
4. Principles applied to calculating cylindrical reinforced concrete tanks
5. Principles applied to analyzing a reinforced concrete tank floor slab. Example of how a rectangular reinforced concrete tank floor slab is calculated

UNIT 4. METAL TANKS

1. Introduction. Design codes
2. Types of storage tanks. Materials, joints and welds
3. Design and calculation. Bottom and shell
4. Calculation of fixed roofs
5. Calculation by manometric pressure

MODULE 4. ROAD SURFACES, PAVEMENTS, AND BITUMINOUS MIXES. BASIC CONCEPTS

UNIT 1. INTRODUCTION TO THE SUBJECT OF PAVEMENTS AND ROAD SURFACES

1. Definition of road surface and pavement, and types of road surfaces
2. Main layers and materials composing road surfaces
3. Basic design of a road surface following Standard 6.1-IC
4. Influence of the road surface on the environment
5. Management systems

UNIT 2. MATERIALS THAT MAKE UP ROAD SURFACES

1. Hydrocarbon binders: bitumens and emulsions
2. ARID
3. Granular layers
4. Lime and cement-treated coatings
5. Concrete

UNIT 3. BITUMINOUS MIXES AND SURFACE TREATMENTS

1. Bituminous mixes: classification and characterisation
2. Design, testing and characterisation of bituminous mixes
3. Manufacture and laying of hot mix bituminous mixes
4. Cold asphalt mixes and surface treatments
5. Functional and structural properties. Auscultations

UNIT 4. NEW PAVING TECHNOLOGIES

1. Mixture with rubber
2. Semi-hot and warm mixes
3. Ultra-thin mixtures
4. SMA mixes
5. Photocatalytic road surfaces

MODULE 5. QUALITY CONTROL IN PROJECT DESIGN AND IMPLEMENTATION

UNIT 1. RISKS, THE PLANNING PROCESS, AND INTRODUCTION TO QUALITY PLANNING IN CONSTRUCTION PROJECTS

1. Introduction
2. Risk and opportunities in construction projects
3. Project design and development quality control

4. Construction project quality planning

UNIT 2. DETAILED QUALITY PLANNING AND ITS APPLICATION DURING PROJECT IMPLEMENTATION

1. Implementation resource organization
2. Specification, methods, and template development
3. Procurement control
4. Supplier and outsourcing control
5. Construction project monitoring and evaluation

UNIT 3. BUILDING AND URBAN DEVELOPMENT QUALITY AND WATER TREATMENT

1. Quality in urban development and urban construction projects
2. Quality control in residential construction projects
3. Quality control for non-residential social buildings
4. Quality control for non-residential industrial buildings
5. Quality control in the construction of water treatment facilities

UNIT 4. QUALITY CONTROL IN CONSTRUCTION WORKS

1. Dam quality control
2. Roads and airport quality control
3. Railway quality control
4. Quality control in port and offshore construction works
5. Quality control in crossing construction works: Bridges, crossings, etc.
6. Quality control in crossing construction works: Tunnels

MODULE 6. GENERAL CONSERVATION SCHEME

UNIT 1. INTRODUCTION AND OBJECTIVES

1. General concepts
2. Road assistance
3. Routine maintenance or unkeep activities
4. Activites to improve functional and safety condition
5. Road use and defence activities

UNIT 2. MAIN CONSERVATION ACTIONS

1. Mowing, pruning and weeding
2. Maintenance of plantations
3. Roadway and shoulder cleaning
4. Road safety
5. Cleaning and repair of drainage

UNIT 3. OPERATIONAL GROUPS

1. The management of conservation activities
2. Road and operational procedures
3. Routine maintenance operations (I)

4. Routine maintenance operations (II)
5. Machinery

UNIT 4. OPERATIONAL, ENERGY, AND ENVIRONMENTAL

1. Efficiency of heavy maintenance vehicles
2. Tunnel lighting
3. Control and management system for tunnel installations
4. Environmental management in integrated conservation
5. Indicators and exploitation

MODULE 7. ROAD SAFETY. ROAD OPERATIONS

UNIT 1. ACCIDENTS ON ROAD NETWORKS

1. Competing factors. Accident rates
2. Road safety programmes. Audits and inspections
3. Analysis of accidents 'in situ'. Mobility restriction
4. Traffic engineering (I)
5. Traffic engineering (II)

UNIT 2. ROAD OPERATION

1. Legislation. Public domain
2. Advertising. Authorisations and other elements
3. Access
4. Infractions and penalties
5. Arterial networks, crossings and urban sections

UNIT 3. FIXED WORKS SIGNS

1. Role and purpose
2. Elements
3. Traffic management. Manual of examples
4. Installation and removal of construction site signs
5. Special cases, conservation, errors and developments

UNIT 4. MOBILE CONSTRUCTION SITE SIGNALLING

1. Function and purpose
2. Procedure
3. Equipment and marking of vehicles
4. Maintenance work with mobile signalling
5. Manual of examples. Evolution of the technique

MODULE 8. MAINTENANCE OF ROAD ELEMENTS (I)

UNIT 1. PAVEMENTS (I)

1. Classification of Pavements

2. Pavement Monitoring
3. Surface Repair of Pavements
4. Deep Pavement Repair (I)
5. Deep Pavement Repair (II)

UNIT 2. PAVEMENTS (II)

1. Pavement Management
2. Maintenance Activities
3. Studies of the Evolution of a Pavement
4. Operational Efficiency in Pavement Maintenance
5. Software for Road Management and Maintenance

UNIT 3. LAND AND STRUCTURES (I)

1. Inspection of Structures
2. Monitoring of Structures
3. Maintenance Plan
4. Typology of Damage to a Structure
5. Repair Catalog

UNIT 4. LAND AND STRUCTURES (II)

1. Slope Inspection
2. Anchors and Guided Meshes on Slopes
3. Landslide Barriers
4. Protection Ditches
5. Slope Control and Monitoring

MODULE 9. MAINTENANCE OF ROAD ELEMENTS (II)

UNIT 1. SIGNALLING

1. Definition, design and characteristics of vertical signage
2. Retroreflection and criteria for vertical signage implementation
3. Vertical marking operations
4. Definition, purpose and characteristics of horizontal signage
5. Materials, selection criteria and application of horizontal signage

UNIT 2. BEACONING AND DEFENCES

1. Definition, classification and beaconing elements
2. Installation and operations of beacons
3. Enclosure fencing
4. Vehicle restraint systems. Safety barriers and parapets
5. Arrangement of barriers and parapets. Other vehicle restraint systems

UNIT 3. TUNNEL INSTALLATIONS

1. Diagnosis of the installations

2. Tunnel diagnosis and intervention
3. Tunnels - facilities
4. Tunnels - structural elements
5. Tunnels - state of the linings

UNIT 4. WINTER MAINTENANCE

1. General aspects
2. Organisation of winter maintenance
3. Fluxes and machinery
4. Performance techniques
5. Meteorology and management systems

MODULE 10. MFP. MASTER´S DEGREE IN ROAD CONSTRUCTION, MAINTENANCE AND OPERATION

1. TRABAJO FINAL DE MÁSTER.

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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www.structuralia.com

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