Advanced Master's Degree

Water and Urban Waste Services Engineering

tech global university

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Advanced Master's Degree
Water and Urban Waste Services Engineering

- Modality: **online**
- Duration: **2 years**
- Certificate: **TECH Global University**
- Credits: **120 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Website: **www.techtitute.com/us/engineering/advanced-master-degree/advanced-master-degree-water-urban-waste-services-engineering**

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01

Introduction

Water has always been a very important commodity in the market economy, largely because of the enormous monetary investment which is made to ensure it's treated and distributed satisfactorily. In recent years, this service has been professionalized, creating vital roles for a group of specialists who are in charge of providing this service and who, also, propose environmentally friendly solutions. As a result the following program, which will allow students to learn how public water management is carried out, has been created. In addition, we will also investigate the private sector's interest in developing new technology so as to be capable of distributing water to all the corners of the earth.

Water is a natural resource which is essential to the survival of our planet. Learn how to manage its distribution in urban areas and develop new proposals to introduce in the sector"

Everyone agrees that water is an essential resource and for this reason, since long ago, efforts have been made to guarantee a safe, relaible and, above all, high-quality supply is available. Economic investment in this sector has increased in recent years, a factor which has led to the need for support from trained professionals who know and understand how this vital liquid is processed, distributed and reused.

This Advanced Master's Degree is a unique opportunity to give students the chance to deepen their understanding of water management and urban waste services. A review will be carried out of everything related to the water cycle in urban areas and the measures which have been adopted by the sector to ensure responsible consumption. All of this is marked by the 2030 Agenda, a proposal which was signed by the member states of the United Nations that aims to move the world towards a sustainable and environmentally friendly society.

This is essential nowadays, due to the increasing scarcity and the decrease in the quality of the water available to us. As a result, urban areas are constantly in need of a better water supply and, in order to achieve this, the engineers in charge must be trained and specialized with a clear understanding of the new hydraulic pump proposals, which must be built appropriately monitored in unique stations.

This program will also be of great interest due to its extensive coverage of urban waste management, a necessity brought about as a result of the waste which is produced in cities, such as debris, plastics, organic matter etc. Students will learn all about how the classification system works according to the regulations, its effects on public health, the importance of reducing how much waste is produced and the innovative digitization of refuse by organizations (based on Deep Learning).

Students who enrol on this Advanced Master's Degree in Water and Urban Waste Services Engineering will acquire the necessary skills to improve their professional profile, becoming engineers who are fully capable of working anywhere in the world. This qualification will allow them to professionaly promote technological, social or cultural progress within a knowledge-based society, following sustainable precepts.

This **Advanced Master's Degree in Water and Urban Waste Services Engineering** contains the most complete and up-to-date educational program on the market. The most important features include:

- Practical case studies presented by expert engineers in the Water and Urban Waste Services
- The graphic, schematic, and eminently practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- Practical exercises where self-assessment can be used to improve learning
- Special emphasis on innovative methodologies in engineering
- Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- Content that is accessible from any fixed or portable device with an Internet connection

"The 2030 Agenda has been adhered to in recent years in order to ensure the responsible use of water in modern society"

Use a water balance in order to determine which regulatory measures should be implemented in resource management"

This Advanced Master's Degree will increase your chances of participating in international projects which distribute water all over the world.

Water is a precious commodity that must be cared for. Collaborate with the best companies in the industry to create more sustainable measures.

The teaching staff includes professionals from the engineering sector, who bring their experience to this training program, as well as renowned specialists from leading societies and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide an immersive training experience designed to train for real-life situations.

This program is designed around Problem Based Learning, whereby the student must try to solve the different professional practice situations that arise during the course. For this purpose, the professional will be assisted by an innovative interactive video system created by renowned and experienced experts.

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Objectives

The main objective of this Advanced Master's Degree is to provide students with the fundamental skills to learn how water distribution, maintenance and reuse services are carried out in urban areas, as well as the correct management and classification of waste a factor that can compromise the quality of this vital liquid. In this way, they will be capable of taking on national and international projects that seek to bring water to areas that are difficult to access.

Learn how to use tools such as hydrodynamic simulation to facilitate the design of a pumping system"

General objectives

- Deepen understanding of key aspects of urban water services engineering integral water cycle departments
- Manage distribution and sanitation departments
- Know how to manage water treatment, desalination and purification plants
- Be able to manage the technical and research office of companies in the sector
- Master a strategic vision of the subject matter
- Have a solid understanding in order to coordinate concessions and administrative relations
- Acquire skills relative to the implementation of urban water systems
- Be able to apply the latest technological innovations in order to establish optimal management of the service
- Know the latest applicable legislation that supports waste management and water engineering, allowing the student to know the legal instruments used in environmental management
- Apply the circular economy in water and waste management systems to quantify the economic and environmental impact of water and waste reuse and revaluation improvements in the organization through appropriate tools and methodologies
- Address the relationship between water and the environment and describe the physicochemical processes involved in a wastewater treatment plant, enabling the student to design equipment for a wastewater treatment plant
- Deepen understanding of the different energy carriers such as biogas or hydrogen in its molecular form (H2) for its subsequent energy use, allowing the student to make designs based on hydrogen or biogas
- Acquire the knowledge of chemistry related to its function, composition, structure and reactivity, in order to understand its importance in the life cycle and in the other fields that concern it
- Understand the processes involved in the potabilization of water for human and industrial consumption, as well as the analytical methods and management that control it considering the costs in the service of drinking water
- Provide the student with the knowledge to identify waste, classify it and understand its flow
- Know the characteristics of waste and the problems involved in its management and final treatment
- Identify the origin of urban or municipal waste and the evolution in its production
- Gain key knowledge of the potential health and environmental effects of municipal waste and landfill issues
- Know the main digital technologies available in municipal solid waste management
- Further the optimal management of industrial waste, mainly through minimization at source and by recycling by-products
- Know the most relevant aspects of industrial waste and the environmental legislation applicable to the management of industrial waste together with the procedure for the correct management of industrial waste and its obligations as a producer
- Master the latest industrial waste treatment and disposal techniques
- Optimize industrial waste management through the use of waste minimization techniques
- Know the types of hazardous waste generated depending on the sector and the existing recovery options, providing the student with the ability to develop waste management plans and carry out environmental awareness activities in different sectors

Specific objectives

- Deepen understanding of the concept of water footprint in order to be able to implement reduction policies in an urban water service
- Understand the problem of water stress in cities
- Influence stakeholders related to the integral water cycle to improve the position of the student's organization
- Guide the student's professional activity towards the achievement of the Water objective in the 2030 Agenda
- Characterize water catchments in order to manage them in a sustainable manner
- Use a water balance to influence the adoption of regulatory measures in resource management
- Establish monitoring systems to prevent contingency situations
- Learn in detail about the possibilities that full connectivity between devices offers for water resource management
- Complete sizing of a water pumping station
- Select the most suitable electromechanical equipment for the needs of a water lifting system
- Analyze novel hydrodynamic simulation tools that facilitate the successful design of a pumping system prior to commissioning
- Be able to apply the latest technological innovations to establish state-of-the-art management of pumping stations
- Understand in detail the seawater osmotization process to diagnose the causes of deviations from process standards
- Make an exhaustive analysis of the most important equipment of a desalination plant to know how to allocate the appropriate resources in the event of an incident in any of them

- Integrally manage the operation of a seawater desalination plant
- Identify the possibilities for energy savings in a desalination plant in order to improve the economic performance of a concession
- Quickly identify the problems associated with a supply network based on the design typology of the network itself
- Diagnose the deficiencies of an existing network based on the most important operating parameters With the possibility of capturing it in the most widely used simulation software in the sector, such as EPANET
- Be able to elaborate and supervise a preventive and corrective maintenance plan for the drinking water distribution network
- Control the revenues and costs of a supply system to maximize the economic performance of an administrative concession
- Obtain a strategic vision of the importance of sanitation networks within the integral water cycle
- Gain in-depth knowledge of the elements of the sewage network to act with discretion when making decisions in the event of failures
- Identify the main problems of wastewater pumping stations to optimize their operation
- Analyze the main IT tools related to a sanitation system such as GIS and SWWM
- Provide an overview of the importance of drinking water treatment in a water treatment plant
- Deepen understanding of the treatments that intervene in the potabilization processes in order to effectively detect the origin of the problem in the event of non-compliant water analysis at the plant outlet
- Minimize the cost of water production by optimizing the resources available in a water treatment plant
- Acquire the competences related to a site manager in the implementation of wastewater treatment plants, the most relevant ones being: Order management, subcontracting coordination and budget control
- Deepen understanding of the design criteria, as well as the most relevant aspects to take into account during the execution of the work in the main stages of a wastewater treatment plant
- Know in detail the commercial software for the elaboration of budgets and work certifications for the client
- Gain detailed knowledge of the current regulatory framework on water reclamation and its possible uses, as well as why it is necessary to implement water reuse policies
- Deepen undertsanding of the available treatments to enable water reuse
- Analyze examples of projects already carried out in order to extrapolate them for the student's needs
- Understand the need for the implementation of different process sensors in an urban water system
- Select the most suitable flow measurement technologies for each application
- Make a general projection of the appropriate metering devices for a general urban water service
- Acquire knowledge of environmental law at the community, state and regional levels
- Have an up-to-date repository of legislation to ensure proper compliance with applicable regulations

- Know the necessary procedures for the figures of waste producer and manager
- Understand the requirements of the different environmental management systems, ISO 14001 and EMAS
- Gain in-depth knowledge of the circular economy for its strategic implementation through proposals for efficient and sustainable use of water and the revaluation of waste and by-products
- Measure through life cycle analysis, eco-design and zero discharge tools the environmental impact of products and/or processes in order to develop improvement plans capable of becoming benchmark success stories
- Know the criteria of green public procurement and the innovative public procurement tool to address and meet proposals from public administrations
- Establish environmental accounting to quantify and classify proposed improvements and environmental costs and integrate them into the organization's accounting
- Know the process steps of a wastewater treatment plant
- Design equipment such as tanks, piping, pumps, compressors and heat exchangers, as well as specific WWTP equipment dedicated to sedimentation or flotation
- Study biological processes and associated technologies such as biofilters, aerobic digesters or activated sludge digesters
- Understand technologies for nitrogen and phosphorus removal
- Study low-cost purification technologies such as lagooning and green filtering
- Learn more about the production, conditioning, storage and utilization of biogas
- Analyze the global energy landscape, as well as other energy solutions based on renewable energies
- Understand the hydrogen economy
- Study fuel cells for the production of electrical energy from hydrogen
- Discuss in detail the water molecule, structure, states of aggregation, chemical bonds, and physical and chemical properties
- Study the reactivity of the water molecule in organic and inorganic reactions
- Address the great importance of this molecule as a universal solvent in the cycle of life, also dealing with the main thermodynamic laws
- Deepen understanding of the different water purification processes and know the components that determine its quality as drinking water
- Delve into the types and effects of contamination in drinking water, in order to subsequently study the processes of drinking water treatment
- Compare the different equipment used in water purification
- Study the methods of water analysis to confirm its drinkability
- Understand the role of water in different industrial processes in order to learn how to manage it as a resource
- Gain in-depth understanding of the economic considerations and costs of drinking water services in order to establish relevant actions in the face of freshwater scarcity and aligned with the strategies set out in the 2030 Agenda of the Sustainable Development Goals (SDGs)
- Know how to identify waste
- Identify and differentiate between the different types of waste that exist
- Understand from a practical point of view the different management options available for different waste streams

- Be able to propose different treatment schemes according to waste characteristics
- Deepen knowledge of the existing problems related to waste production
- Analyze the evolution of waste production by origin and type of waste
- Know how to analyze and assess the health and environmental impact of waste management
- Propose measures to reduce, recycle and reuse the waste generated
- Propose landfill management and restoration models
- Gain in-dpeth knowledge of the latest digital technologies available in municipal solid waste management
- Know how to propose internal waste management models
- Gain knowledge of the development and evaluation of waste management plans
- Have the ability to reduce industrial waste through the use of by-product bags
- Identify and understand the market for waste as a secondary raw material
- Perform an in-depth breakdown of the obligations of waste producers according to their sector
- Analyze the type of waste generated by different activities
- Acquire transversal skills necessary for work performance in the new cultural frameworks of the current productive system
- Know how to manage waste, mainly hazardous waste, applying the regulations that regulate it
- Deepen knowledge of the valorization methods
- Develop environmental awareness activities

Urban waste is a source of pollution that must be contained. Develop a viable strategy using the methods outined in the 2030 Agenda"

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Skills

Upon completion of this TECH degree, students will have acquired the necessary skills to enable themselves to identify and solve the problems that arise in a treatment plant or in any organization in charge of managing the water service. As a result, they will be able to fulfill a variety of roles such as irrigation consultant, water works supervisor or a manager in charge of planning and managing a city's water resources

Participate in important water infrastructure projects to ensure the supply and sanitation of cities”

General skills

- Master the necessary tools for urban water service,from an international perspective through the development of projects, operation and maintenance plans for water sectors
- Apply acquired knowledge and problem-solving skills in current and global environments within broader contexts related to urban water services
- Integrate knowledge and get a deep insight into the different uses of Urban Water Service management, as well as the importance of its use in today's world
- Know how to communicate concepts of design, development and management of the different hydraulic engineering systems
- Understand and internalize the scope of digital and industrial transformation applied to the sector's systems for efficiency and competitiveness in today's market
- Perform critical analysis, evaluation and synthesis of new and complex ideas related to the field of water engineering
- Promote, in professional contexts, technological, social or cultural progress within a knowledge-based society, following sustainable precepts
- Enforce water and waste regulations
- Develop transformation processes in the circular economy in administrations or companies in the water and waste management sector
- Analyze and design Drinking Water Treatment Plants (DWTP), as well as Wastewater Treatment Plants (WWTP)
- Correctly and adequately classify the different types of solid urban, industrial and hazardous waste for subsequent management or revaluation

Specific skills

- Establish, implement and enforce the necessary water sustainability policies to minimize the water footprint of the service
- Deepen understanding of the current models of sustainable management in the cities of the future and be able to manage the available water resources
- Establish the necessary strategies to maintain an adequate balance between demand and sustainability of water catchment. In addition, students will understand the importance of the current means of connectivity to optimize the management of water resources
- Develop efficient and innovative water lifting solutions. In addition, this program will provide the keys to optimal maintenance and control in order to guarantee the continuous operation of this key stage in a supply and sanitation network
- Obtain a deeper understanding of the usual problems associated with pumping station installations, their maintenance and control
- Acquire a complete vision of all aspects related to the pumping network, an essential stage in any drinking water distribution network and sanitation system
- Measure the processes involved in a desalination plant and optimize their performance to the maximum through cost control, taking full responsibility for the technical control and management of a desalination plant
- Master the design of the main stages of a desalination plant and solve the problems encountered during plant operation
- Establish an effective network control plan, as well as carry out its monitoring
- Manage drinking water distribution and possess knowledge of existing network typologies. Use EPANET software as a support tool for network modeling
- Develop skills in the tasks of responsible engineering applied to the sewage network

- Measure and select the most appropriate equipment for the design and reformation of a new sewage system
- Design the treatment stages of a water treatment plant
- Implement a quality control plan to quickly identify deviations from service standards
- Create an operations registry to enable continuous improvement and optimization of water service
- Gain in-depth knowledge of the headworks, pretreatment and primary, secondary and tertiary treatment stages in a wastewater treatment plant
- Coordinate a complete WWTP project and take responsibility for the site management of this type of treatment plant
- Make it easier to monitor budget control and certification of the project, as well as to coordinate effectively with the client on these aspects, including a topic on project control software
- Acquire a strategic vision for decision making in relation to the possible introduction of water reuse and reclamation policies in this field of work
- Analyze, implement and supervise a complete telemetering system for all parameters involved in an integrated urban water system
- Apply current legislation in the field of water engineering and urban waste management
- Implement proposals for efficient and sustainable water use
- Implement all the necessary processes and machinery in wastewater treatment plants
- Design and introduce renewable energies in different aspects of life

- Have sound knowledge of all aspects of water issues
- Carry out water purification treatments
- Differentiate between the different types of waste and know how to manage them in an appropriate way
- Reduce the environmental impact of solid urban waste
- Reduce industrial waste through the implementation of improved waste management practices
- Identify hazardous waste and apply the regulations in force for its management

Help ensure the quality of drinking water by means of the EPANET software which serves as a support tool for network modeling"

04

Course Management

During the program, students will have the support of a select group of experts, who will share their many years of academic and professional experience for the benefit of the next generation. In addition to being familiar with the priorities in water service and waste management, they have participated in the development of an agenda that meets today's requirements. Thus, they ensure that the student is able to work in any national or international environment.

Improve your career opportunities with the experience of a teaching staff specialized in the management and development of water projects"

Management

Mr. Ortiz Gómez, Manuel

- Assistant for the head of the water treatment department at FACSA
- Head of Maintenance at TAGUS, water and sewage service operator in Toledo
- Industrial Engineer Jaume I University
- Postgraduate in Innovation in Business Management from the Valencian Institute of Technology
- Executive MBA from EDEM
- Author of several papers and presentations at congresses of the Spanish Association of Desalination and Reuse and the Spanish Association of Water Supply and Sanitation

Mr. Nieto-Sandoval González-Nicolás, David

- Engineering consultant, project manager for energy saving and circularity in organizations
- Professor certified by the EOI in the areas of industry, entrepreneurship, human resources, energy, new technologies and technological innovation
- Trainer on the European INDUCE project
- Trainer for institutions such as COGITI and COIIM
- Industrial Technical Engineer from the E.U.P. of Malaga
- Industrial Engineer for ETSII
- Master's Degree in Integrated Quality, Environmental and Occupational Health and Safety Management from the University of the Balearic Islands

Professors

Mr. Llopis Yuste, Edgar

- Expert in the construction of hydraulic infrastructures, industrial process water treatment equipment and drinking water treatment
- Municipal drinking water supply manager
- Technical Engineer in Public Works from the Polytechnic University of Valencia
- Degree in Environmental Sciences from Polytechnic University of Valencia
- MBA from Polytechnic University of Valencia
- Master's Degree in Industrial Wastewater Treatment and Recycling Engineering, Catholic University of Valencia

Mr. Sánchez Cabanillas, Marciano

- Director-Coordinator of the Advanced Course for Laboratory Technicians of Wastewater Treatment Plants. Regional Government of Castilla La Mancha
- CEO of PECICAMAN (Castilla La Mancha Circular Economy Projects)
- Industrial Chemical Engineer Technician UCLM
- Master's Degree in Engineering and Environmental Management EOI, Madrid
- Master's Degree in Business Administration and Management. CEREM, Madrid
- Expert professor in the Master's Degree in Environmental Engineering and Management at ITQUIMA-UCLM
- Research work on reuse of sludge from chemical washing of nitric acid boilers and nanoscale products for water treatment using new technologies
- Speaker at national and international congresses on Water, Agriculture and Sustainabilit

Ms. Arias Rodríguez, Ana

- Project technician at Canal de Isabel II: management, maintenance and operation of sewage and water supply networks in the Community of Madrid
- Technical Engineer in Public Works from the Polytechnic University of Madrid
- Degree in Civil Engineering from the Polytechnic University of Avila, University of Salamanca
- Master's Degree in Professional Development from the University of Alcalá

Mr. Salaix, Rochera, Carlos

- Professional in sectors related to urbanization, construction of sewage and water treatment plants and maintenance of water supply and sanitation infrastructure networks
- Technical Engineer in Public Works, specializing in Transport and Urban Services, Polytechnic University of Valencia
- Master's Degree in Integrated Management PRL, Quality, Environment, Continuous Improvement (EFQM), University Jaume I of Castellón
- Official Master's Degree in Occupational Risk Prevention (Hygiene, Safety, Ergonomics), University of Jaume I of Castellón

Ms. Mullor Real, Cristina

- Environmental Consultant in Diverse Industrial Sectors
- Safety advisor for the transport of dangerous goods by road
- Degree in Environmental Sciences from the University of Miguel Hernández de Elche
- Master's Degree in Environmental Engineering, specializing in industrial environmental management and management of water treatment plants from the University of Valencia

Mr. Simarro Ruiz, Mario

- Key Account Manager for Spain & Portugal and Technical Sales Representative in EMEA & LATAM in DuPont Water Solutions
- 15 years' experience in the municipal water segment, mainly water treatment and reuse, promoting technologies and developing markets
- Industrial Engineer, Polytechnical University of Madrid
- Executive MBA, EAE Business School
- Speaker in congresses of the Spanish Association of Desalination and Reuse and with other entities

Mr. Titos Lombardo, Ignacio

- Administrator of Imsica Formación, S.L., an entity specialized in in-company training for its clients
- Teacher of the Recicla2 Project for the promotion of waste management and recycling and the creation of green companies
- Advisor and auditor for companies in sectors as varied as waste, water, food, industrial, transportation, renewable energy, etc.
- Teacher on various professional certificate courses
- Graduate in Environmental Sciences from the University of Castilla La Mancha
- Master's Degree in Integrated Quality and Environment Management
- Senior Technician in Occupational Risk Prevention
- Partner-Consultant of Implantación Integral de Sistemas de Calidad, S.L., a consulting firm created in 1998 and specialized in the development of quality, environmental and prevention consulting and auditing projects and in advising local corporations on environmental matters

Ms. Álvarez Cabello, Begoña

- Technician in Occupational Risk Prevention from the Construction Foundation
- Specialist in Geographic Information Systems (GIS)
- Extensive experience as an environmental and occupational risk prevention technician, with more than 15 years of experience in different sectors: waste, renewable energies, industry, environmental impact assessment, local and regional administration, and conservation biology
- Teacher of Certificate of Professionalism and approved by the EOI in environmental, waste and water issues
- Member of the Harmush Study and Fauna Conservation Association, which develops international projects on endangered species and has various publications
- Degree in Biology from the University of Cordoba
- Master's Degree in Quality and Environmental Sustainability in Local and National Development from the University of Castilla La Mancha

Ms. Castillejo de Tena, Nerea

- Graduate in Chemical Engineering from the University of Castilla La Mancha
- Master's Degree in Environmental Engineering and Management in the Institute of Chemical and Environmental Technology from the University of Castilla La Mancha
- Author of projects such as "Hysys simulation, optimization and energy analysis in the wastewater treatment unit of the urea plant (PAR)" at Fertiberia Puertollano
- Co-author of "Methodology for calculating energy efficiency in waste to energy recovery facilities"
- Member of ACMIQ

05

Structure and Content

This Advanced Master's Degree in Water and Urban Waste Services Engineering is based on a syllabus which includes essential contents for the professional development of students interested in the sector. In this way, the concept of a water footprint will be studied in depth to help implement new and sustainable policies for water distribution and treatment. In addition, students will get to grips with how a treatment plant works and what measures have been taken globally to conserve the vital liquid.

Large companies are looking for new technological projects to guarantee the distribution of safe water. Get involved with these thanks to this program"

Module 1. Water and Sustainability in the Urban Cycle of Water

1.1. Social Commitment for the Reduction of Water Consumption in the Urban Cycle
- 1.1.1. Water Footprint
- 1.1.2. Importance of Our Water Footprint
- 1.1.3. Generation of Assets
- 1.1.4. Generation of Services
- 1.1.5. Social Commitment to Reducing Consumption
- 1.1.6. Citizen Involvement
- 1.1.7. Public Administration Involvement
- 1.1.8. Businesses Involvement R.S.C

1.2. Water Problems in Cities Analysis of Sustainable Use
- 1.2.1. Water Stress in Modern Cities
- 1.2.2. Water Stress
- 1.2.3. Causes and Consequences of Water Stress
- 1.2.4. Sustainable Environment
- 1.2.5. The Urban Water Cycle as a Vector of Sustainability
- 1.2.6. Coping With Water Shortages Possible Answers

1.3. Sustainability Policies in the Management of the Urban Cycle of Water
- 1.3.1. Control of Water Resources
- 1.3.2. The Triangle of Sustainable Management: Society, Environment and Efficiency
- 1.3.3. Integral Water Management as a Support for Sustainability
- 1.3.4. Expectations and Commitments in Sustainable Management

1.4. Sustainability Indicators Eco-Social Water
- 1.4.1. Triangle of Water Sustainability
- 1.4.2. Society - Economy - Ecology
- 1.4.3. Eco-social Water Scarce Commodity
- 1.4.4. Heterogeneity and Innovation as a Challenge in the Fight Against Water Misallocation

1.5. Agents Implicated in Water Management Role of the Managers
- 1.5.1. Those Involved in the Action or Situation of the Water Environment
- 1.5.2. Those Involved in Duties and Rights
- 1.5.3. Individuals That May Be Affected and/or Benefit From the Action or Situation of the Water Environment
- 1.5.4. Role of Managers in the Urban Cycle of Water

1.6. Uses of Water Training and Good Practices
- 1.6.1. Water as a Supply Source
- 1.6.2. Water as a Mode of Transport
- 1.6.3. Water as a Receiving Medium for Other Water Flows
- 1.6.4. Water as a Source and Receiver of Energy
- 1.6.5. Good Practices in the Use of Water Training and Information

1.7. Analysis of the Integral Urban Water Cycle
- 1.7.1. High Supply Collection
- 1.7.2. Low Supply Distribution
- 1.7.3. Sanitation Rainwater Collection
- 1.7.4. Waste Water Treatment
- 1.7.5. Regeneration of Waste Water Reuse

1.8. Looking to the Future in Uses of Water
- 1.8.1. Water in the 2030 Agenda
- 1.8.2. Gurantee of Availability, Management and Sanitation of Water for Everyone
- 1.8.3. Resources Uses/ Total Resources Available Short-Term, Medium-Term and Long-Term
- 1.8.4. General Participation of Local Communities in Improving Management

1.9. New Cities The Most Sustainable Management
- 1.9.1. Technological and Digitalization Resources
- 1.9.2. Urban Resilience Collaboration Between Those Involved
- 1.9.3. Factors for Being a Resilient Population
- 1.9.4. Urban, Peri-Urban and Rural Area Links

Module 2. Water Resources in a Supply

2.1. Subsurface Water Subsurface Hydrology
- 2.1.1. Subsurface Water
- 2.1.2. Characteristics of Subsurface Water
- 2.1.3. Types of Subsurface Water and Location
- 2.1.4. Water Flow Through a Porous Medium Darcy's Law

2.2. Surface Water
- 2.2.1. Characteristics of Surface Water
- 2.2.2. Division of Surface Water
- 2.2.3. Difference Between Subsurface Water and Surface Water

2.3. Alternative Water Resources
- 2.3.1. Use of Groundwater, Runoff and Rain Water
- 2.3.2. Renewable Resources vs. Contaminated Resources
- 2.3.3. Reusable Water From WWTPs Reused from Buildings
- 2.3.4. Initiative, Media and Control Organizations

2.4. Water Balances
- 2.4.1. Methodology and Theoretical Considerations for Water Balance
- 2.4.2. Quantitative Water Balance
- 2.4.3. Qualitative Water Balance
- 2.4.4. Sustainable Environment
- 2.4.5. Resource and Risks in Non-Sustainable Environments Climate Change

2.5. Collection and Storage Environmental Protection
- 2.5.1. Components of Collection and Storage
- 2.5.2. Surface or Subsurface Collection
- 2.5.3. Potabilization (DWTP)
- 2.5.4. Storage
- 2.5.5. Distribution and Sustainable Consumption
- 2.5.6. Sewage Network
- 2.5.7. Purification (WWTP)
- 2.5.8. Disposal and Reuse
- 2.5.9. Ecological Flow
- 2.5.10. Eco-Social Urban Water Cycle

2.6. Optimal Model for Water Management Principles of Supply
- 2.6.1. Set of Sustainable Actions and Processes
- 2.6.2. Provision of Supply and Sewerage Services
- 2.6.3. Assuring Quality Generating Knowledge
- 2.6.4. Actions to Take in Assuring Quality of Water and its Installations
- 2.6.5. Generating Knowledge to Prevent Errors

2.7. Optimal Model for Water Management Socio-Economic Principles
- 2.7.1. Current Financing Model
- 2.7.2. Taxes in the Management Model
- 2.7.3. Financing Alternatives Proposals for the Creation of Financing Platforms
- 2.7.4. Security of Water Supply (Distribution and Supply) for All
- 2.7.5. Involvement of Local, National and International Communities in Financing

2.8. Monitoring Systems Prediction, Prevention and Contigency Situations
- 2.8.1. Identification of Water Bodies and Their Status
- 2.8.2. Proposals for Water Distribution According to Needs
- 2.8.3. Knowledge and Control of Water
- 2.8.4. Maintenance of Facilities

2.9. Good Practices in Water Supply and Sustainability
- 2.9.1. Posadas Peri-Urban Park Córdoba
- 2.9.2. Palma del Rio Periurban Park Córdoba
- 2.9.3. State of the Art Others

2.10. 5G in the Management of Water Resources
- 2.10.1. 5G Features
- 2.10.2. Importance of 5G
- 2.10.3. Relationship Between 5G and Water Supply

Module 3. Pumping Stations

3.1. Applications
- 3.1.1. Supply
- 3.1.2. Purification and WWTP's
- 3.1.3. Singular Applications

3.2. Hydraulic Pumps
- 3.2.1. Evolution of Hydraulic Pumps
- 3.2.2. Types of Impellers
- 3.2.3. Advantages and Disadvantages of the Different Types of Pumps

3.3. Engineering and Design of Pumping Stations
- 3.3.1. Submersible Pumping Stations
- 3.3.2. Dry Chamber Pumping Stations
- 3.3.3. Economic Analysis

3.4. Installation and Functioning
- 3.4.1. Economic Analysis
- 3.4.2. Designs of Real Cases
- 3.4.3. Pump Tests

3.5. Monitoring and Control of Pumping Stations
- 3.5.1. Pump Starting Systems
- 3.5.2. Protection Systems in Pumps
- 3.5.3. Optimization of Pump Control Systems

3.6. Enemies of Hydraulic Systems
- 3.6.1. Water Hammer
- 3.6.2. Cavitation
- 3.6.3. Sounds and Vibrations

3.7. Total Lifetime Cost of a Pumping Operation
- 3.7.1. Costs
- 3.7.2. Cost of Distribution Models
- 3.7.3. Identification of Areas of Opportunity

3.8. Hydro-Dynamic Solutions CFD Model
- 3.8.1. Importance of CFD
- 3.8.2. Process of CFD Analysis in Pumping Stations
- 3.8.3. Interpretation of Results

3.9. Latest Innovations Applied in Pumping Stations
- 3.9.1. Innovation in Materials
- 3.9.2. Intelligent Systems
- 3.9.3. Digitization of the Industry

3.10. Singular Designs
- 3.10.1. Singular Design in Supply
- 3.10.2. Singular Design in Sanitation
- 3.10.3. Pumping Station in Sitges

Module 4. Desalination. Design and Operation

4.1. Desalination
- 4.1.1. Processes of Separation and Desalination
- 4.1.2. Water Salinity
- 4.1.3. Characterization of Water

4.2. Reverse Osmosis
- 4.2.1. Process of Reverse Osmosis
- 4.2.2. Key Parameters in Osmosis
- 4.2.3. Disposition

4.3. Membranes of Reverse Osmosis
- 4.3.1. Materials
- 4.3.2. Technical Parameters
- 4.3.3. Evolution of Parameters

4.4. Description of Installation Water Intake
- 4.4.1. Pre-Treatment
- 4.4.2. High Pressure Pump
- 4.4.3. Racks
- 4.4.4. Instruments

4.5. Physical Treatment
- 4.5.1. Filtration
- 4.5.2. Coagulation and Flocculation
- 4.5.3. Membrane Filters

4.6. Chemical Treatments
- 4.6.1. Regulation
- 4.6.2. Reduction
- 4.6.3. Stabilization
- 4.6.4. Remineralization

4.7. Design
- 4.7.1. Water to be Desalinated
- 4.7.2. Required Capacity
- 4.7.3. Membrane Surface
- 4.7.4. Recuperation
- 4.7.5. Number of Membranes
- 4.7.6. Stages
- 4.7.7. Other Aspects
- 4.7.8. High-Pressure Pump

4.8. Operation
- 4.8.1. Dependence of the Main Operating Parameters
- 4.8.2. Pollution
- 4.8.3. Membrane Washing
- 4.8.4. Sea Water Spill

4.9. Materials
- 4.9.1. Corrosion
- 4.9.2. Selection of Materials
- 4.9.3. Collectors
- 4.9.4. Deposits
- 4.9.5. Pumping Equipment

4.10. Economic Optimization
- 4.10.1. Energy Consumption
- 4.10.2. Energetic Optimization
- 4.10.3. Energy Recuperation
- 4.10.4. Costs

Module 5. Distribution of Potable Water. Layouts and Practical Criteria in Network Design

5.1. Types of Distribution Networks
- 5.1.1. Classification Criteria
- 5.1.2. Branched Distribution Networks
- 5.1.3. Mesh Distribution Networks
- 5.1.4. Mixed Distribution Networks
- 5.1.5. High Distribution Networks
- 5.1.6. Low Distribution Networks
- 5.1.7. Hierarchy of Pipelines

5.2. Criteria for Distribution Network Design Modelling
- 5.2.1. Modulation of the Demand
- 5.2.2. Speed of Circulation
- 5.2.3. Pressure
- 5.2.4. Chlorine Concentration
- 5.2.5. Length of Stay
- 5.2.6. Epanet Modelling

5.3. Elements of a Distribution Network
- 5.3.1. Fundamental Principles
- 5.3.2. Collection Elements
- 5.3.3. Pumps
- 5.3.4. Storage Elements
- 5.3.5. Distribution Elements
- 5.3.6. Control and Regulation Elements (Suction Cups, Valves, Drains, etc.)
- 5.3.7. Measuring Elements

5.4. Pipelines
- 5.4.1. Features
- 5.4.2. Plastic Pipes
- 5.4.3. Non-Plastic Pipes

5.5. Valves
- 5.5.1. Cut-Off Valves
- 5.5.2. Manhole Valves

5.5.3. Check or Non-Return Valves
5.5.4. Regulation and Control Valves
5.6. Telecontrol and Telemanagement
5.6.1. Elements of a Telecontrol System
5.6.2. Communication Systems
5.6.3. Analog and Digital Information
5.6.4. Software Management
5.6.5. Digital Twin
5.7. Efficiency of Distribution Network
5.7.1. Fundamental Principles
5.7.2. Hydraulic Efficiency Calculation
5.7.3. Efficiency Improvement Minimizing Water Loss
5.7.4. Monitoring Indicators
5.8. Maintenance Plans
5.8.1. Objectives of Maintenance Plans
5.8.2. Creating a Preventive Maintenance Plan
5.8.3. Preventive Maintenance Tanks
5.8.4. Preventive Maintenance of the Distribution Network
5.8.5. Preventive Maintenance of Collections
5.8.6. Corrective Maintenance
5.9. Operational Record
5.9.1. Water Volumes and Flow Rates
5.9.2. Water Quality
5.9.3. Energy Consumption
5.9.4. Malfunctions
5.9.5. Pressure
5.9.6. Maintenance Plan Records
5.10. Financial Management
5.10.1. Importance of Economic Management
5.10.2. Income
5.10.3. Costs

Module 6. Sewer Networks

6.1. Importance of Sewer Networks
- 6.1.1. Needs of Sewer Networks
- 6.1.2. Types of Networks
- 6.1.3. Sewer Networks in the Integral Water Cycle
- 6.1.4. Normative Framework and Legislation

6.2. Principle Elements of Gravity Sewer Networks
- 6.2.1. General Structure
- 6.2.2. Types of Pipelines
- 6.2.3. Manholes
- 6.2.4. Service Connections and Installations

6.3. Others Principle Elements of Gravity Sewer Networks
- 6.3.1. Surface Drainage
- 6.3.2. Overflows
- 6.3.3. Other Elements
- 6.3.4. Easements

6.4. Works
- 6.4.1. Execution of Works
- 6.4.2. Safety Measures
- 6.4.3. Trenchless Renovation and Rehabilitation
- 6.4.4. Asset Management

6.5. Wastewater Elevation WWTP
- 6.5.1. Intake Work and Coarse Shaft
- 6.5.2. Grinding
- 6.5.3. Pump Well
- 6.5.4. Pumps
- 6.5.5. Pressure Piping

6.6. Complementary Elements of a WWTP
- 6.6.1. Valves and Flowmeters
- 6.6.2. CS, CT, CCM and Generator Sets
- 6.6.3. Other Elements
- 6.6.4. Operation and Maintenance

6.7. Rolling Mills and Storm Tanks
- 6.7.1. Features
- 6.7.2. Rolling Mills
- 6.7.3. Storm Tanks
- 6.7.4. Operation and Maintenance

6.8. Operation of Gravity Drainage Networks
- 6.8.1. Monitoring and Cleaning
- 6.8.2. Inspection
- 6.8.3. Cleaning
- 6.8.4. Conservation Works
- 6.8.5. Improvement Works
- 6.8.6. Common Incidences

6.9. Network Designs
- 6.9.1. Background Information
- 6.9.2. Layout
- 6.9.3. Materials
- 6.9.4. Seals and Joints
- 6.9.5. Special Pieces
- 6.9.6. Design Flow Rates
- 6.9.7. Network Analysis and Modeling with SWWM

6.10. Management Support Software Tools
- 6.10.1. Cartographic Maps, GIS
- 6.10.2. Indicident Report
- 6.10.3. WPS Support

Module 7. Urban Drinking Water Treatment Plants Design and Operation

7.1. Importance of Water Quality
- 7.1.1. Water Quality on a Global Level
- 7.1.2. Health of the Population
- 7.1.3. Water-Borne Diseases
- 7.1.4. Short-, Medium- and Long-Term Risks

7.2. Water Quality Criteria. Parameters
- 7.2.1. Microbiological Parameters
- 7.2.2. Physical Parameters
- 7.2.3. Chemical Parameters

7.3. Water Quality Modeling
- 7.3.1. Time Spent on the Network
- 7.3.2. Reaction Kinetics
- 7.3.3. Water Source

7.4. Water Disinfection
- 7.4.1. Chemical Products Used in Disinfection
- 7.4.2. Behavior of Chlorine in Water
- 7.4.3. Systems of Chlorine Dosage
- 7.4.4. Chlorine Measurement in the Network

7.5. Turbidity Treatments
- 7.5.1. Possible Causes of Turbidity
- 7.5.2. Problems of Turbidity in Water
- 7.5.3. Turbidity Measurement
- 7.5.4. Limits of Turbidity in Water
- 7.5.5. Treatment Systems

7.6. Treatment of Other Pollutants
- 7.6.1. Physiochemical Treatment
- 7.6.2. Ion Exchange Resins
- 7.6.3. Treatment with Membranes
- 7.6.4. Active Carbon

7.7. Cleaning of Tanks and Pipelines
- 7.7.1. Water Draining
- 7.7.2. Solids Dragging
- 7.7.3. Disinfection of Walls
- 7.7.4. Rinsing of Walls
- 7.7.5. Filling and Service Restitution

7.8. Quality Control Plan
- 7.8.1. Objectives of Control Plans
- 7.8.2. Sampling Points
- 7.8.3. Types of Analysis and Frequency
- 7.8.4. Laboratory Analysis

7.9. Operational Record
- 7.9.1. Chlorine Concentration
- 7.9.2. Organoleptic Examination
- 7.9.3. Other Specific Pollutants
- 7.9.4. Laboratory Analysis

7.10. Economic Considerations
- 7.10.1. Personal
- 7.10.2. Cost of Chemical Reagents
- 7.10.3. Dosing Equipment
- 7.10.4. Other Treatment Equipment
- 7.10.5. Cost of Water Analysis
- 7.10.6. Cost of Measuring Equipment
- 7.10.7. Energy

Module 8. Waste Water Treatment Plants. Engineering and Construction

8.1. Auxiliary Stages
- 8.1.1. Pumps
- 8.1.2. Header Wells
- 8.1.3. Reliefs

8.2. Follow-Up Work
- 8.2.1. Management of Subcontracts and Orders
- 8.2.2. Economic Monitoring
- 8.2.3. Budget Variances and Compliance

8.3. General Diagram of a WWTP Provisional Works
- 8.3.1. Water Line
- 8.3.2. Provisional Works
- 8.3.3. Bim Distribution of Elements and Interferences

8.4. Auxiliary Stages
- 8.4.1. Pumps
- 8.4.2. Header Wells
- 8.4.3. Reliefs

8.5. Pre-Treatment
- 8.5.1. Stakeout
- 8.5.2. Implementation and Connections
- 8.5.3. Finishes

8.6. Primary Treatment
- 8.6.1. Stakeout
- 8.6.2. Implementation and Connections
- 8.6.3. Finishes

8.7. Secondary Treatment
- 8.7.1. Stakeout
- 8.7.2. Implementation and Connections
- 8.7.3. Finishes

8.8. Tertiary Treatment
- 8.8.1. Stakeout
- 8.8.2. Implementation and Connections
- 8.8.3. Finishes

8.9. Equipment and Automation
- 8.9.1. Suitability
- 8.9.2. Variants
- 8.9.3. Put to Work

8.10. Software and Certification
- 8.10.1. Stockpile Certification
- 8.10.2. Work Certifications
- 8.10.3. Computer Programs

Module 9. Reuse

9.1. Motivation for the Generation of Water
- 9.1.1. Municipal Sector
- 9.1.2. Industrial Sector
- 9.1.3. Connections Between the Municipal and Industrial Sector

9.2. Uses of Regenerated Water
- 9.2.1. Uses of Municipal Sector
- 9.2.2. Uses of Industrial Sector
- 9.2.3. Derived Problems

9.3. Treatment Technologies
- 9.3.1. Spectrum of Current Processes
- 9.3.2. Combination of Processes to Achieve the Objectives of the New European Framework
- 9.3.3. Comparative Analysis of a Selection of Processes

9.4. Fundamental Aspects in the Municipal Sector
- 9.4.1. Patterns and Trends in the Reuse of Water on a Global Level
- 9.4.2. Agricultural Demand
- 9.4.3. Benefits Associated with Reuse in Agricultural Use

9.5. Fundamental Aspects in the Industrial Sectors
- 9.5.1. General Context of the Industrial Sector
- 9.5.2. Opportunities in the Industrial Sector
- 9.5.3. Risk Analysis. Change to the Business Model

9.6. Principle Aspects in the Exploitation and Maintenance
- 9.6.1. Cost Models
- 9.6.2. Disinfection
- 9.6.3. Fundamental Problems Brine

9.7. Level of Adoption of Reclaimed Water in Spain
- 9.7.1. Current and Potential Situation
- 9.7.2. European Green Pact Investment Proposals in the Urban Water Sector in Spain
- 9.7.3. Strategies for the Promotion of Waste Water Reuse

9.8. Reuse Projects: Experiences and Lessons Learned
- 9.8.1. Benidorm
- 9.8.2. Reuse in the Industry
- 9.8.3. Lessons Learned

9.9. Socio-Economic Aspects of Reuse and the Next Challenges
- 9.9.1. Barriers in the Implementation of Reused Water
- 9.9.2. Aquifer Recharge
- 9.9.3. Direct Reuse

Module 10. Metrology. Measurement and Instruments Used

10.1. Measuring Parameters
- 10.1.1. Metrology
- 10.1.2. Problem of Water Contamination
- 10.1.3. Selection of Parameters

10.2. Importance of Process Control
- 10.2.1. Technical Aspects
- 10.2.2. Relative Aspects of Health and Safety
- 10.2.3. Supervision and External Control

10.3. Pressure Gauges
- 10.3.1. Manometry
- 10.3.2. Transducers
- 10.3.3. Pressure Switches

10.4. Level Gauges
- 10.4.1. Direct Measurement
- 10.4.2. With Ultrasound
- 10.4.3. Limnemetros

10.5. Flow Meters
- 10.5.1. Open Channels
- 10.5.2. Closed Pipelines
- 10.5.3. Residual Water

10.6. Temperature Gauges
- 10.6.1. Effects of Temperature
- 10.6.2. Measurement of Temperature
- 10.6.3. Palliative Actions

10.7. Volumetric Flow Meters
- 10.7.1. Choice of Accountant
- 10.7.2. Main Types of Accountants
- 10.7.3. Legal Aspects

10.8. Water Quality Measurement. Analytical Equipment
- 10.8.1. Turbidity and PH
- 10.8.2. Redox
- 10.8.3. Integrated Samples

10.9. Location of Measuring Equipment Within a Plant
- 10.9.1. Inlet and Pretreatment Works
- 10.9.2. Primary and Secondary
- 10.9.3. Tertiary

10.10. Aspects to Consider With Respect to the Instruments Used in Telemeasurement and Telecontrol
- 10.10.1. Control Loops
- 10.10.2. Plcs and Communication Gateways
- 10.10.3. Remote Management

Module 11. Legislation

11.1. Agenda for the 2030 Sustainable Development
- 11.1.1. SDG 6. Clean Water and Sanitation
- 11.1.2. SDG 12. Responsible Production and Consumption

11.2. European Strategy
- 11.2.1. Municipal Waste Objective
- 11.2.2. Target Waste of Greatest Generation/Impact
- 11.2.3. Circular Economy

11.3. Main European Legislation
- 11.3.1. European Waste Directives and Circular Economy
- 11.3.2. European Directives on Potable Water
- 11.3.3. European Directives on Waste Water

11.4. National Strategy
- 11.4.1. State Inspection Plan for Transboundary Waste Shipments 2017-2019
- 11.4.2. State Program for Waste Prevention 2014-2020
- 11.4.3. State Waste Management Framework Plan (PEMAR) 2016-2022
- 11.4.4. Spanish National Integral Waste Plan (PNIR)
- 11.4.5. State Waste Management Framework Plan (PEMAR) 2016-2022
- 11.4.6. Green Paper on Water Governance
- 11.4.7. Spanish Water Technology Platform

11.5. Main National Legislation
- 11.5.1. Waste
- 11.5.2. Waste Flow
- 11.5.3. Environmental Responsibility
- 11.5.4. Water Law
- 11.5.5. Potable Water
- 11.5.6. Residual Water

11.6. Regional Master Plans
- 11.6.1. Waste Master Plans
- 11.6.2. Water Master Plans

11.7. Main Regional Legal Differences
- 11.7.1. Distribution of Skills
- 11.7.2. Case Laws

11.8. Procedures as a Waste Producer
- 11.8.1. Discharge Procedures
- 11.8.2. Generation Control. Declarations
- 11.8.3. Minimization

11.9. Procedures as a Waste Manager
- 11.9.1. Types of Manager and Discharge Procedures
- 11.9.2. Transport Control and Management
- 11.9.3. Final Destination of Waste. Declarations

11.10. International Framework
- 11.10.1. Environmental Management Systems
- 11.10.2. ISO 14001
- 11.10.3. EMAS

Module 12. Circular Economy

12.1. Aspects and Characteristics of Circular Economy
- 12.1.1. Origin of Circular Economy
- 12.1.2. Principles of Circular Economy
- 12.1.3. Key Features

12.2. Adapting to Climate Change
- 12.2.1. Circular Economy as a Strategy
- 12.2.2. Economic Advantages
- 12.2.3. Social Advantages
- 12.2.4. Business Advantages
- 12.2.5. Environmental Advantages

12.3. Efficient and Sustainable Water Use
- 12.3.1. Rain Water
- 12.3.2. Gray Water
- 12.3.3. Irrigation Water Agriculture and Gardening
- 12.3.4. Processed Water. Agri-Food Industry

12.4. Revaluation of Wastes and By-Products
- 12.4.1. Water Footprint of Waste
- 12.4.2. From Waste to By-Product
- 12.4.3. Classification According to Production Sector
- 12.4.4. Revaluation of Enterprises

12.5. Life Cycle Assessment
- 12.5.1. Life Cycle Assessment (LCA)
- 12.5.2. Stages
- 12.5.3. Reference Guidelines
- 12.5.4. Methodology

12.5.5. Tools
12.6. Eco Design
12.6.1. Principles and Criteria of Eco Design
12.6.2. Product Characteristics
12.6.3. Methodology of Eco Design
12.6.4. Eco Design Tools
12.6.5. Success Stories
12.7. Zero Discharge
12.7.1. Principles of Zero Discharge
12.7.2. Benefits
12.7.3. Systems and Processes
12.7.4. Success Stories
12.8. Green Public Procurement
12.8.1. Legislation
12.8.2. Green Procurement Manual
12.8.3. Guidelines for Public Procurement
12.8.4. Public Procurement Plan 2018-2025
12.9. Innovative Public Procurement
12.9.1. Types of Innovative Public Procurement
12.9.2. Procurement Process
12.9.3. Sheet Design
12.10. Environmental Accountability
12.10.1. Best Available Environmental Technologies (BAT)
12.10.2. Ecotaxes
12.10.3. Ecological Account
12.10.4. Environmental Cost

Module 13. Residual Water Treatment

13.1. Water Pollution Assessment
13.1.1. Water Transparency
13.1.2. Water Pollution
13.1.3. Effects of Water Pollution
13.1.4. Pollution Parameters
13.2. Sample Collection
13.2.1. Collection Procedure and Conditions
13.2.2. Sample Size
13.2.3. Sample Frequency
13.2.4. Sampling Program
13.3. WWTP Pre-Treatment
13.3.1. Water Reception
13.3.2. Dimensioning
13.3.3. Physical Processes
13.4. WWTP Primary Treatment
13.4.1. Sedimentation
13.4.2. Flocculation-Coagulation
13.4.3. Types of Decanters
13.4.4. Design of Decanters
13.5. WWTP Secondary Treatment (I)
13.5.1. Biological Processes
13.5.2. Factors Affecting the Biological Process
13.5.3. Active Sludge
13.5.4. Percolating Sludge
13.5.5. Rotary Biological Contact Reactor
13.6. WWTP Secondary Treatment (II)
13.6.1. Biofiltration
13.6.2. Digesters

13.6.3. Agitation Systems
13.6.4. Aerobic Digesters: Perfect Mixing and Piston Flow
13.6.5. Active Sludge Digesters
13.6.6. Secondary Decanter
13.6.7. Active Sludge Systems
13.7. Tertiary Treatment (I)
13.7.1. Removal of Nitrogen
13.7.2. Removal of Phosphorus
13.7.3. Membrane Technology
13.7.4. Oxidation Technologies Applied to Generated Wastes
13.7.5. Disinfection
13.8. Tertiary Treatment (II)
13.8.1. Absorption With Active Carbon
13.8.2. Steam or Air Entrainment
13.8.3. Flushing of Gases: Stripping
13.8.4. Ionic Exchange
13.8.5. PH Regulation
13.9. Sludge Study
13.9.1. Sludge Treatment
13.9.2. Flotation
13.9.3. Assisted Flotation
13.9.4. Dosing and Mixing Tank for Coagulants and Flocculants
13.9.5. Sludge Stabilization
13.9.6. High-Load Digester
13.9.7. Low-Load Digester
13.9.8. Biogas
13.10. Low Cost Purification Technologies
13.10.1. Septic Tanks
13.10.2. Digester-Decanter Tanks
13.10.3. Aerobic Lagooning
13.10.4. Anaerobic Lagooning
13.10.5. Green Filter
13.10.6. Sand Filter
13.10.7. Peat Bed

Module 14. Energy Production

14.1. Obtaining Biogas
14.1.1. Active Sludge Process Products
14.1.2. Anaerobic Digestion
14.1.3. Fermenting Stage
14.1.4. Biodigester
14.1.5. Production and Characterization of Generated Biogas
14.2. Conditioning of Biogas
14.2.1. Hydrogen Sulfide Removal
14.2.2. Humidity Removal
14.2.3. CO2 Removal
14.2.4. Siloxanes Removal
14.2.5. Removal of Oxygen and Halogenated Organic Compounds
14.3. Biogas Storage
14.3.1. Gasometer
14.3.2. Biogas Storage
14.3.3. High-Pressure Systems
14.3.4. Low-Pressure Systems
14.4. Biogas Burning
14.4.1. Burners
14.4.2. Features of Burners
14.4.3. Installation of Burners
14.4.4. Flame Control
14.4.5. Low-Cost Burners
14.5. Uses of Biogas
14.5.1. Biogas Boiler
14.5.2. Gas Motor-Generator
14.5.3. Turbine
14.5.4. Gas Rotary Machine
14.5.5. Injection into the Natural Gas Grid
14.5.6. Energy Calculations From Natural Gas Usage

14.6. Current Energy Scene
- 14.6.1. Use of Fossil Fuels
- 14.6.2. Nuclear Energy
- 14.6.3. Renewable Energies

14.7. Renewable Energies
- 14.7.1. Photovoltaic Solar Energy
- 14.7.2. Wind Energy
- 14.7.3. Hydraulic Energy
- 14.7.4. Geothermal Energy
- 14.7.5. Energy Storage

14.8. Hydrogen as an Energy Carrier
- 14.8.1. Integration with Renewable Energy
- 14.8.2. Hydrogen Economy
- 14.8.3. Hydrogen Production
- 14.8.4. Use of Hydrogen
- 14.8.5. Electric Energy Production

14.9. Fuel Cells
- 14.9.1. Operation
- 14.9.2. Types of Fuel Cells
- 14.9.3. Microbial Fuel Cells

14.10. Gas Handling Safety
- 14.10.1. Risks: Biogas and Hydrogen
- 14.10.2. Safety against Explosions
- 14.10.3. Safety Measures
- 14.10.4. Inspection

Module 15. Chemistry of Water

15.1. Chemistry of Water
- 15.1.1. Alchemy
- 15.1.2. Evolution of the Chemistry

15.2. The Water Molecule
- 15.2.1. Crystallography
- 15.2.2. Crystalline Structure of Water
- 15.2.3. Aggregation States
- 15.2.4. Links and Properties

15.3. Physicochemical Properties of Water
- 15.3.1. Physical Properties of Water
- 15.3.2. Chemical Properties of Water

15.4. Water as a Solvent
- 15.4.1. Ion Solubility
- 15.4.2. Solubility of Neutral Molecules
- 15.4.3. Hydrophilic and Hydrophobic Interactions

15.5. Organic Chemistry of Water
- 15.5.1. The Water Molecule in Organic Reactions
- 15.5.2. Hydration Reactions
- 15.5.3. Hydrolysis Reactions
- 15.5.4. Hydrolysis of Amides and Esters
- 15.5.5. Other Reactions of Water. Enzymatic Hydrolysis

15.6. Inorganic Chemistry of Water
- 15.6.1. Reaction of Hydrogen
- 15.6.2. Reaction of Oxygen
- 15.6.3. Reactions to Obtain Hydroxides
- 15.6.4. Reactions to Obtain Acids
- 15.6.5. Reactions to Obtain Salts

15.7. Analytical Water Chemistry
- 15.7.1. Analytical Techniques
- 15.7.2. Water Analysis

15.8. Thermodynamics of the Phases of Water
- 15.8.1. Laws of Thermodynamics
- 15.8.2. Phase Diagram. Phase Balance
- 15.8.3. Triple Point of Water

15.9. Water Quality
- 15.9.1. Organoleptic Characteristics
- 15.9.2. Physiochemical Characteristics
- 15.9.3. Anions and Cations
- 15.9.4. Undesirable Components
- 15.9.5. Toxic Components
- 15.9.6. Radioactivity

15.10. Chemical Processes in the Purification of Water
- 15.10.1. Demineralization of Water
- 15.10.2. Reverse Osmosis
- 15.10.3. Decalcification
- 15.10.4. Distillation
- 15.10.5. Ozone and UV Disinfection
- 15.10.6. Filtration

Module 16. Drinking and Process Water Treatment

16.1. The Cycle of Water
- 16.1.1. The Hydrological Water Cycle
- 16.1.2. Contamination of Potable Water
  - 16.1.2.1. Chemical Contamination
  - 16.1.2.2. Biological Contamination
- 16.1.3. Effects of Potable Water Contamination

16.2. Drinking Water Treatment Plants (DWTP)
- 16.2.1. The Water Purification Process
- 16.2.2. Diagram of a DWTP. Stages and Processes
- 16.2.3. Functional Calculations and Process Design
- 16.2.4. Study of Environmental Impact

16.3. Flocculation and Coagulation in DWTPs
- 16.3.1. Flocculation and Coagulation
- 16.3.2. Types of Flocculants and Coagulants
- 16.3.3. Mixing Plant Design
- 16.3.4. Parameters and Control Strategies

16.4. Chlorine- Derived Treatment
- 16.4.1. Residual Products in Chlorine Treatment
- 16.4.2. Disinfection Products
- 16.4.3. Chlorine Application Points in DWTP
- 16.4.4. Other Forms of Disinfection

16.5. Water Purification Equipment
- 16.5.1. Demineralization Equipment
- 16.5.2. Reverse Osmosis Equipment
- 16.5.3. Decalcification Equipment
- 16.5.4. Filtration Equipment

16.6. Water Desalination
- 16.6.1. Types of Desalination
- 16.6.2. Selection of Desalination Method
- 16.6.3. Design of a Desalination Plant
- 16.6.4. Economic Study

16.7. Analysis Methods of Potable and Residual Water
- 16.7.1. Sample Collection
- 16.7.2. Description of Analysis Methods
- 16.7.3. Analysis Frequency
- 16.7.4. Quality Control
- 16.7.5. Results Presentation

16.8. Water in Industrial Processes
- 16.8.1. Water in the Food Industry
- 16.8.2. Water in the Pharmaceutical Industry
- 16.8.3. Water in the Mining Industry
- 16.8.4. Water in the Agricultural Industry

16.9. Management of Potable Water
- 16.9.1. Infrastructures Used in Water Collection
- 16.9.2. Costs of Potable Water Production
- 16.9.3. Technology for the Storage and Distribution of Potable Water
- 16.9.4. Management Tools for Water Shortages

16.10. Economy of Potable Water
- 16.10.1. Economic Considerations
- 16.10.2. Service Costs
- 16.10.3. Shortage of Freshwater
- 16.10.4. The 2030 Agenda

Module 17. Waste Management

17.1. What is Considered as Waste?
- 17.1.1. Evolution of Waste
- 17.1.2. Current Situation
- 17.1.3. Future Perspectives

17.2. Existing Waste Flow
- 17.2.1. Waste Flow Analysis
- 17.2.2. Grouping of Flows
- 17.2.3. Flow Characteristics

17.3. Classification of Waste and Characteristics
- 17.3.1. Classification According to Standards
- 17.3.2. Classification According to Management
- 17.3.3. Classification According to Origin

17.4. Characteristics and Properties
- 17.4.1. Chemical Characteristics
- 17.4.2. Physical Characteristics
  - 17.4.2.1. Humidity
  - 17.4.2.2. Specific Weight
  - 17.4.2.3. Grading
- 17.4.3. Hazard Characteristics

17.5. Problems of Waste. Origin and Type of Waste
- 17.5.1. Main Problems in Waste Management

17.5.2. Problems in Generation
17.5.3. Problems in Transport and Final Treatment
17.6. Environmental Responsibility
17.6.1. Responsibility for Damage to the Environment
17.6.2. Prevention, Mitigation and Reparation of Damage
17.6.3. Financial Guarantees
17.6.4. Demanding Environmental Procedures
17.7. Integrated Pollution Prevention and Control
17.7.1. Fundamental Aspects
17.7.2. Demanding Environmental Procedures
17.7.3. Integrated Environmental Authorization (IEA) and Review of IEAs
17.7.4. Information and Communication
17.7.5. Best Available Environmental Technologies (BAT)
17.8. European Emission Source Inventory
17.8.1. Emission Inventory Background
17.8.2. European Pollutant Emission Inventory
17.8.3. European Pollutant Release and Transfer Register (E-PRTR)
17.8.4. Legal Framework of PRTR in Spain
17.8.5. PRTR- Spain
17.9. Environmental Impact Assessment
17.9.1. Environmental Impact Assessment (EIA)
17.9.2. Administrative Procedures of EIA
17.9.3. Study of Environmental Impact
17.9.4. Abbreviated Procedures
17.10. Climate Change and the Fight Against Climate Change
17.10.1. Elements and Factors Which Determine the Weather
17.10.2. Definition of Climate Change. Effects of Climate Change
17.10.3. Actions to Combat Climate Change
17.10.4. Organizations Fighting Climate Change
17.10.5. Predictions of Climate Change
17.10.6. Bibliographical References

Module 18. Solid Urban Waste Management

18.1. Sources and Production
18.1.1. Sources of Origin
18.1.2. Composition Analysis
18.1.3. Evolution of Production
18.2. Solid Urban Waste Management
18.2.1. Classification According to Standards
18.2.2. Solid Urban Waste Characteristics
18.3. Effects on Public Health and the Environment
18.3.1. Health Effects of Air Pollution
18.3.2. Health Effects of Chemical Substances
18.3.3. Effects on Flora and Fauna
18.4. Importance of Minimization
18.4.1. Waste Reduction
18.4.2. The 5Rs and Their Benefits
18.4.3. Fractionation and Problems
18.5. Phases of Operational Waste Management
18.5.1. Waste Containerization
18.5.2. Types and Systems of Waste Collection
18.5.3. Transfer and Transport
18.6. Types of Urban Waste Treatment I
18.6.1. Classification Plants
18.6.2. Compost
18.6.3. Biomethanization
18.6.4. Energy Valuation
18.7. Types of Urban Waste Treatment II
18.7.1. Landfills
18.7.2. Environmental Consequences of Landfills
18.7.3. Landfill Sealing

18.8. Municipal Management of MSW Landfills
- 18.8.1. Social Perception and Physical Location
- 18.8.2. Models of MSW Landfill Management
- 18.8.3. Current Problem of MSW Landfills

18.9. Waste as a Business Source
- 18.9.1. From Health Protection to Circular Economy
- 18.9.2. Economic Activity of Waste Management
- 18.9.3. From Waste to Resource
- 18.9.4. Waste as a Substitute for Raw Materials

18.10. Digitalization of the Management Process
- 18.10.1. Classification Based on Deep Learning
- 18.10.2. Sensorization of Containers
- 18.10.3. Smart Bins

Module 19. Industrial Waste Management

19.1. Characterization of Industrial Waste
- 19.1.1. Classification According to the Proposal at Origin According to RD 833/88 and RD 952/97
- 19.1.2. Classification According to Regulation 1357/2014, Based on the Amendments Introduced by Regulation 1272/08 (CLP) and Regulation 1907/06 (REACH)
- 19.1.3. Classification According to the European Waste List

19.2. Industrial Waste Management
- 19.2.1. Industrial Waste Producer
- 19.2.2. Industrial Waste Management
- 19.2.3. Fines

19.3. Internal Management of Industrial Waste
- 19.3.1. Compatability and Intitial Segregation
- 19.3.2. Internal Waste Transport
- 19.3.3. Internal Waste Storage

19.4. Waste Minimization
- 19.4.1. Minimization Methods and Techniques
- 19.4.2. Minimization Plan

19.5. Fines
- 19.5.1. Application of Environmental Legislation According to the Nature of the Waste
- 19.5.2. Application of Environmental Legislation Whether it's Local, Regional or National

19.6. Waste Flow I
- 19.6.1. Used Oil Management
- 19.6.2. Packaging Waste Management
- 19.6.3. Construction and Demolition Waste Management

19.7. Waste Flow II
- 19.7.1. Batteries and Accumulators Management
- 19.7.2. Packaging Waste Management

19.8. Waste Flow III
- 19.8.1. Management of Vehicles at the End of Their Life
- 19.8.2. Decontamination Methods, Treatment and Management

19.9. Non- Hazardous Industrial Waste
- 19.9.1. Type and Characterization of Non-Hazardous Industrial Waste
- 19.9.2. Transportation of Goods According to Their Volume

19.10. By-Product Market
- 19.10.1. Industrial By-Products
- 19.10.2. National and European Situation Analysis
- 19.10.3. By-Product Exchange

Module 20. Hazardous Waste

20.1. Agriculture and Livestock
- 20.1.1. Agricultural Waste
- 20.1.2. Types of Agricultural Waste
- 20.1.3. Types of Livestock Waste
- 20.1.4. Valuation of Agricultural Waste
- 20.1.5. Valuation of Livestock Waste

20.2. Trade, Office and Related Activities
- 20.2.1. Commercial, Office and Related Waste
- 20.2.2. Types Commercial, Office and Related Waste
- 20.2.3. Valuation of Commercial, Office and Related Waste

20.3. Construction and Civil Works
- 20.3.1. Construction and Demolition Waste (CDW)
- 20.3.2. Types of CDW Waste
- 20.3.3. CDW Valuation

20.4. Integral Water Cycle
- 20.4.1. Integral Water Cycle Waste
- 20.4.2. Types of Integral Water Cycle Waste
- 20.4.3. Valuation of Integral Water Cycle Waste

20.5. Chemical and Plastic Industry
- 20.5.1. Chemical and Plastic Industry Waste
- 20.5.2. Types of Chemical and Plastic Industry Waste
- 20.5.3. Valuation of Chemical and Plastic Industry Waste

20.6. Metal and Mechanical Industry
- 20.6.1. Metal and Mechanical Industry Waste
- 20.6.2. Types of Metal and Mechanical Industry Waste
- 20.6.3. Valuation of Metal and Mechanical Industry Waste

20.7. Sanitary
- 20.7.1. Sanitary Waste
- 20.7.2. Types of Sanitary Waste
- 20.7.3. Valuation of Sanitary Waste

20.8. IT and Telecommunications
- 20.8.1. IT and Telecommunications Waste
- 20.8.2. Types of IT and Telecommunications Waste
- 20.8.3. Valuation of IT and Telecommunications Waste

20.9. Energy Industry
- 20.9.1. Energy Industry Waste
- 20.9.2. Types of Energy Industry Waste
- 20.9.3. Valuation of Energy Industry Waste

20.10. Transport
- 20.10.1. Transport Waste
- 20.10.2. Types of Transport Waste
- 20.10.3. Valuation of Transport Waste

This program will help you get to grips with water service management so you can help guarantee it continues to be distributed in the future"

06

Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning.**

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.

Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"

Case Study to contextualize all content

Our program offers a revolutionary approach to developing skills and knowledge. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.

At TECH, you will experience a learning methodology that is shaking the foundations of traditional universities around the world"

You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.

The student will learn to solve complex situations in real business environments through collaborative activities and real cases.

A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

> *Our program prepares you to face new challenges in uncertain environments and achieve success in your career"*

The case method is the most widely used learning system in the best faculties in the world. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question that you are presented with in the case method, an action-oriented learning method. Throughout the program, the studies will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

Relearning Methodology

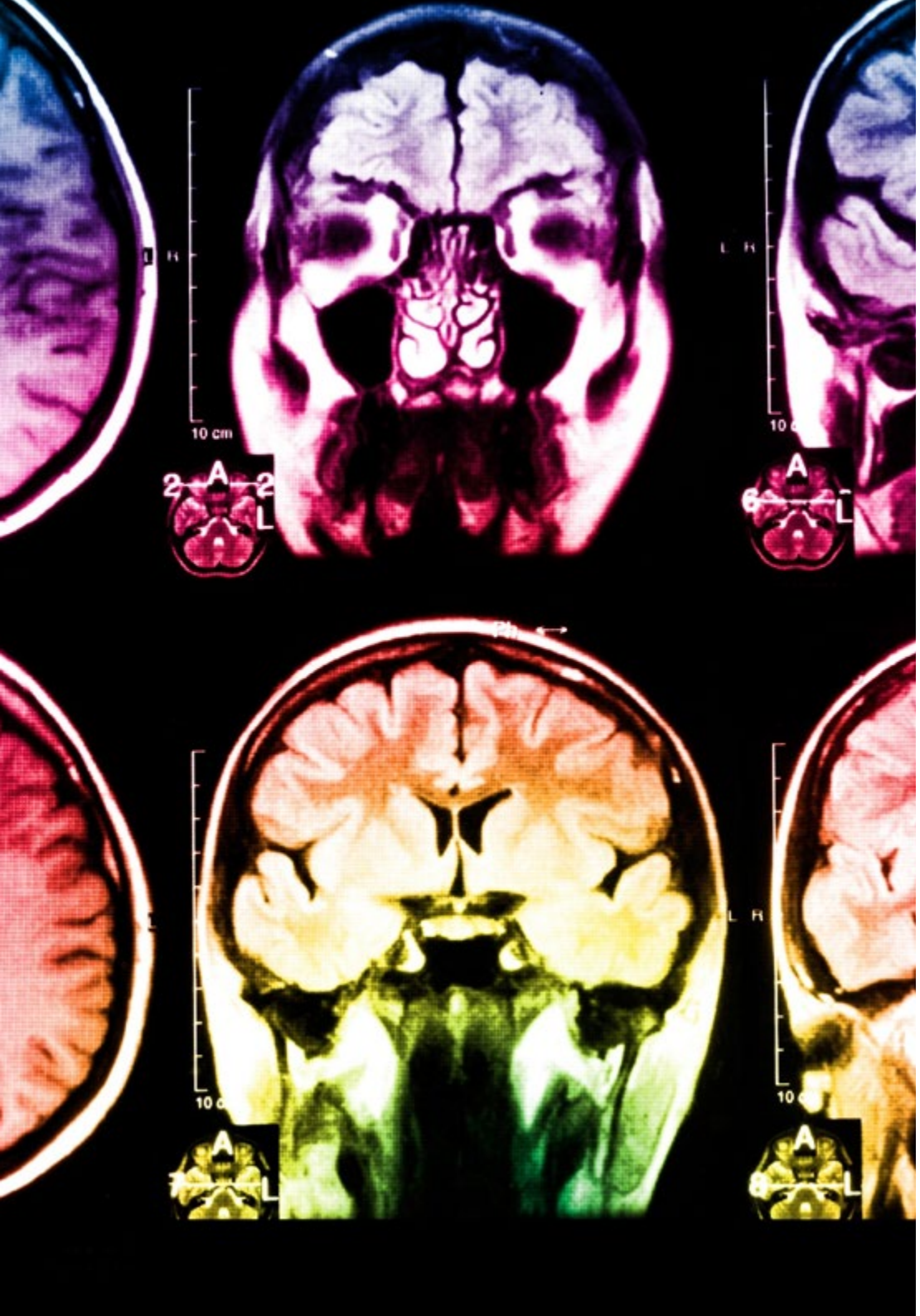
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

We enhance the Case Study with the best 100% online teaching method: Relearning.

In 2019, we obtained the best learning results of all online universities in the world.

At TECH, you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only one in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.



In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically. This methodology has trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, and financial markets and instruments. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

Relearning will allow you to learn with less effort and better performance, involving you more in your training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.

From the latest scientific evidence in the field of neuroscience, not only do we know how to organize information, ideas, images and memories, but we know that the place and context where we have learned something is fundamental for us to be able to remember it and store it in the hippocampus, to retain it in our long-term memory.

In this way, and in what is called neurocognitive context-dependent e-learning, the different elements in our program are connected to the context where the individual carries out their professional activity.

This program offers the best educational material, prepared with professionals in mind:

Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.

Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

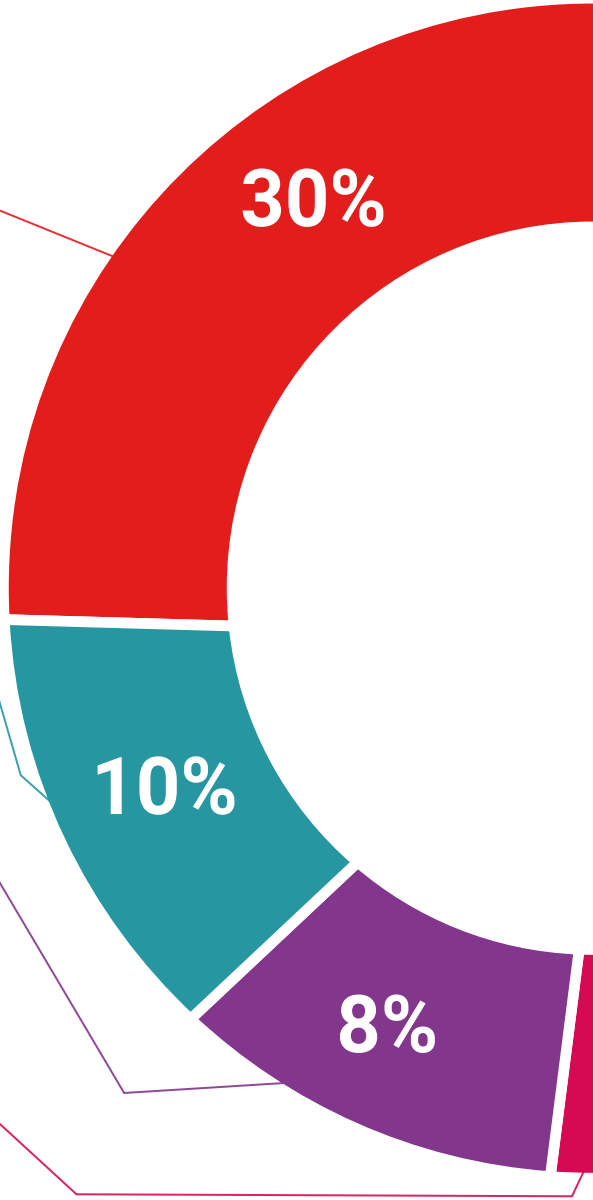
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

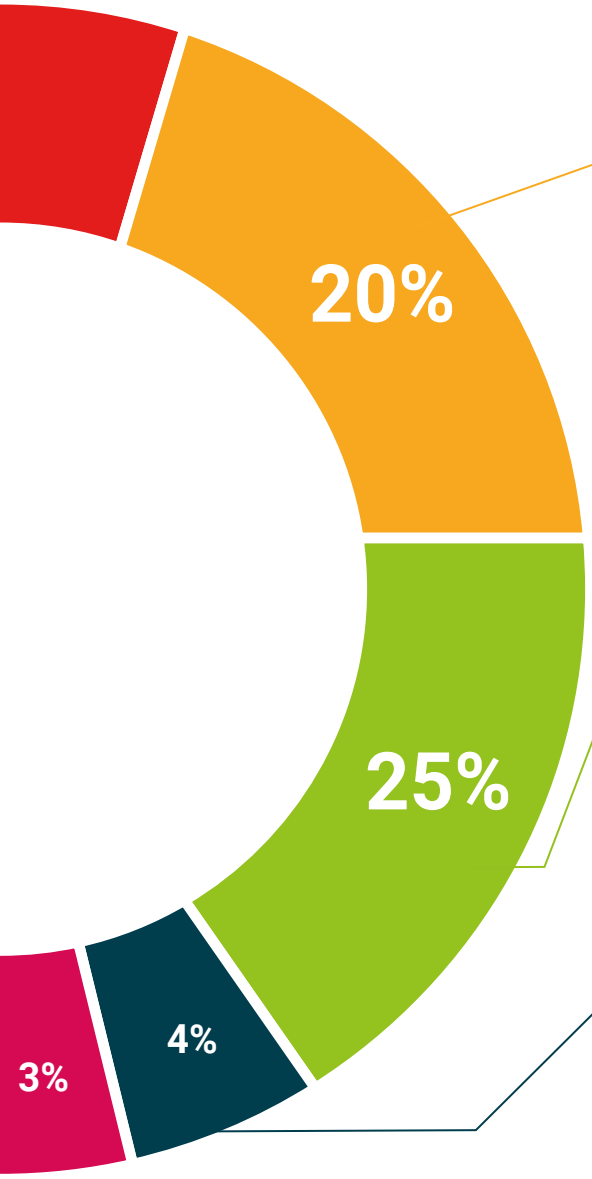
Practising Skills and Abilities

They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.

Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





Case Studies

Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best specialists in the world.

Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".

Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.

07

Certificate

The Advanced Master's Degree in Water and Urban Waste Services Engineering guarantees you, in addition to the most rigorous and up-to-date training, access to a Advanced Master's Degree issued by TECH Global University.

Successfully complete this program and receive your university degree without travel or laborious paperwork"

This program will allow you to obtain your **Advanced Master's Degree diploma in Water and Urban Waste Services Engineering** endorsed by **TECH Global University**, the world's largest online university.

TECH Global University is an official European University publicly recognized by the Government of Andorra (***official bulletin***). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Advanced Master's Degree in Water and Urban Waste Services Engineering**

Modality: **online**

Duration: **2 years**

Accreditation: **120 ECTS**


tech global university

Mr./Ms. _____, with identification document _____
has successfully passed and obtained the title of:

Advanced Master's Degree in Water and Urban Waste Services Engineering

This is a program of 3,000 hours of duration equivalent to 120 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

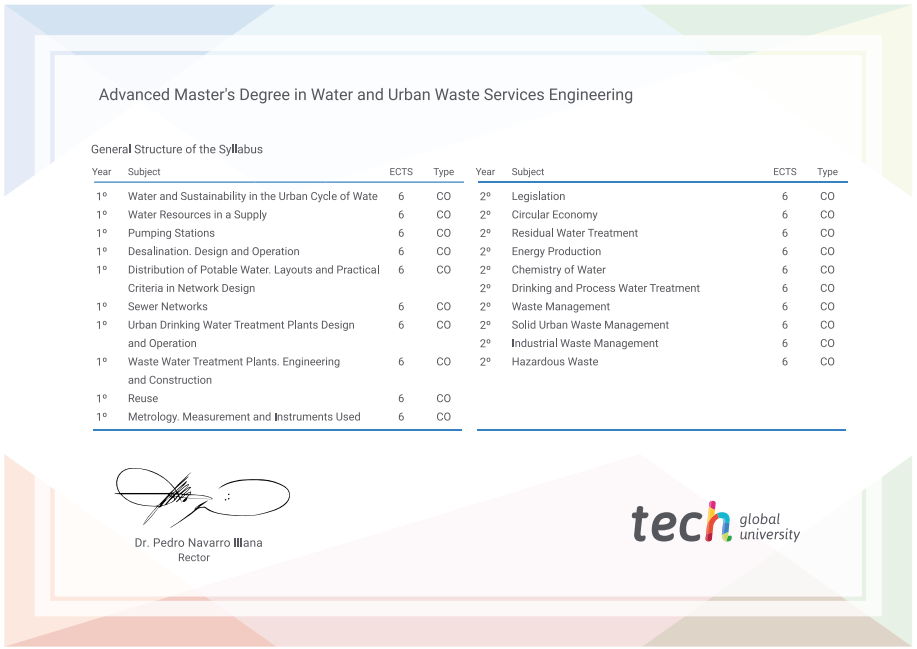
TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024

Dr. Pedro Navarro Illana
Rector

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country.

Unique TECH Code: AFWORD23S techtitute.com/certificates


Advanced Master's Degree in Water and Urban Waste Services Engineering

General Structure of the Syllabus

Year	Subject	ECTS	Type
1º	Water and Sustainability in the Urban Cycle of Wate	6	CO
1º	Water Resources in a Supply	6	CO
1º	Pumping Stations	6	CO
1º	Desalination. Design and Operation	6	CO
1º	Distribution of Potable Water. Layouts and Practical Criteria in Network Design	6	CO
1º	Sewer Networks	6	CO
1º	Urban Drinking Water Treatment Plants Design and Operation	6	CO
1º	Waste Water Treatment Plants. Engineering and Construction	6	CO
1º	Reuse	6	CO
1º	Metrology. Measurement and Instruments Used	6	CO
2º	Legislation	6	CO
2º	Circular Economy	6	CO
2º	Residual Water Treatment	6	CO
2º	Energy Production	6	CO
2º	Chemistry of Water	6	CO
2º	Drinking and Process Water Treatment	6	CO
2º	Waste Management	6	CO
2º	Solid Urban Waste Management	6	CO
2º	Industrial Waste Management	6	CO
2º	Hazardous Waste	6	CO

Dr. Pedro Navarro Illana
Rector

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*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH Global University will make the necessary arrangements to obtain it, at an additional cost.

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Advanced Master's Degree

Water and Urban Waste Services Engineering

- Modality: **online**
- Duration: **2 years**
- Certificate: **TECH Global University**
- Credits: **120 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Advanced Master's Degree

Water and Urban Waste Services Engineering

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