

# Postgraduate Certificate

## Green Technologies and Processes in Chemical Engineering



## Postgraduate Certificate Green Technologies and Processes in Chemical Engineering

- » Modality: **online**
- » Duration: **6 weeks**
- » Certificate: **TECH Technological University**
- » Dedication: **16h/week**
- » Schedule: **at your own pace**
- » Exams: **online**

Website: [www.techtitute.com/in/engineering/postgraduate-certificate/green-technologies-processes-chemical-engineering](http://www.techtitute.com/in/engineering/postgraduate-certificate/green-technologies-processes-chemical-engineering)

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# 01

# Introduction

With the premise of finding more sustainable solutions for the development of industry productions, Green Chemistry has promoted an advanced and more nature-friendly approach. This trend promotes the design and development of processes that minimize environmental impact and health risks by, for example, making less use of toxic substances. In this TECH program, engineers will be able to update their skills in this innovative field. For this purpose, they will have a syllabus prepared by the best experts where, in addition, digitalization, automation, and robotics technologies for these tasks will be addressed. Furthermore, the mastery of these contents will be strengthened through the exclusive and cutting-edge Relearning methodology.





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*This Postgraduate Certificate will provide you with a comprehensive approach to catalytic and particle technologies that facilitate the management of environmental processes affected by the Chemical Industry"*



Until a few years ago, the chemical industry was only concerned with the development of its production from the point of view of economic management and the necessary inputs. However, in recent years, and given greater public concern about climate change and care for nature, this approach has been modified. Therefore, trends and procedures have emerged that seek greater sustainability in this sector, avoiding the discharge of toxic substances into aquifers and other ecosystems, and reducing risks to human health. Some of them, such as effluent treatment and soil remediation, are based on the design and development of substances for this specific purpose.

TECH wants to promote in its graduates an exhaustive mastery of the techniques and mechanisms of action of green Chemistry. For this reason, this Postgraduate Certificate integrates the main innovations in this field, addressing specific approaches and technologies. At the same time, the syllabus delves into emerging digital resources such as Blockchain or Artificial Intelligence. It also delves into the automation and robotics models that promote a continuous evolution of work mechanisms in this sector. Another relevant point within the syllabus is the analysis of agile methodologies that promote a permanent boost to 4.0 Industry

To guarantee the holistic handling of cutting-edge concepts and tools in this field, the program is supported by the Relearning methodology. This unique learning system facilitates the incorporation of competencies based on the practical needs of the professional environment in a fast and flexible way. Furthermore, this educational pathway will be 100% online, allowing each students to choose the best time to access the materials, according to their personal objectives and responsibilities.

This **Postgraduate Certificate in Green Technologies and Processes in Chemical Engineering** contains the most complete and up-to-date program on the market.

The most important features include:

- ◆ The development of practical cases presented by experts in Chemistry Engineering
- ◆ The graphic, schematic, and 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
- ◆ Its special emphasis on innovative methodologies
- ◆ 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



*Take advantage of this opportunity to update your skills through TECH's innovative Relearning methodology"*

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*In this Postgraduate Certificate program, you will analyze the applications of Artificial Intelligence for process modeling in the Chemical Industry”*

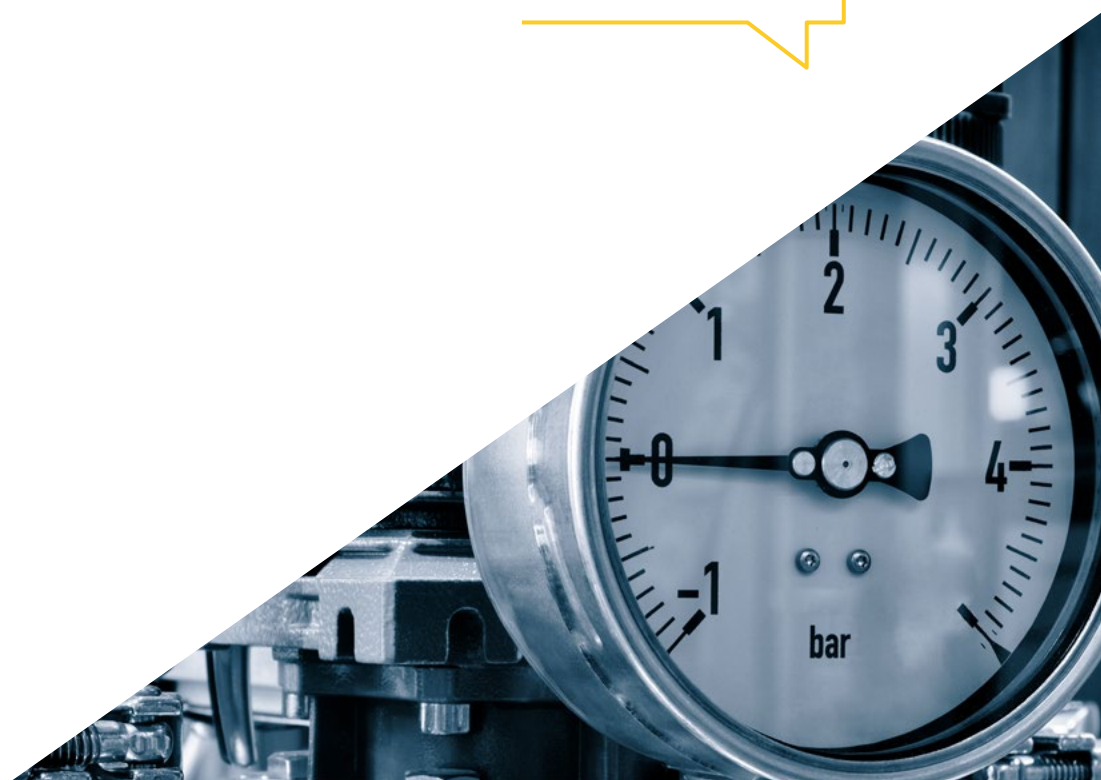
*A syllabus accessible from the portable device of your choice 24 hours a day, 7 days a week.*

*You will analyze the nanotechnological and biotechnological tools that today facilitate greater sustainability of chemical processes.*

The program's teaching staff includes professionals from the sector who contribute their work 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 immersive education programmed to learn in real situations.

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



# 02

# Objectives

By pursuing this TECH program, engineers will have advanced theoretical knowledge and practical skills in demand in the Chemical Industry. Through these competencies, they will not only achieve their objectives of improvement and updating, but will also be able to incorporate new technologies and trends into their daily practices. In this way, they will be able to address the most pressing challenges of this sector and take advantage of the most diverse opportunities in an area of science and labor that is constantly evolving towards sustainability and efficiency.







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*You will achieve all of your educational goals around green processes in Chemical Engineering with this 6-week program”*



## General Objectives

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- ◆ Apply fundamental concepts in the design of chemical products and processes
- ◆ Integrate environmental considerations in the design of chemical processes
- ◆ Analyze optimization techniques and simulation of chemical processes
- ◆ Raise awareness of the importance of sustainability in terms of economy, environment, and society
- ◆ Promote environmental management in the chemical industry
- ◆ Develop competencies in sustainability and industrial quality
- ◆ Compile technological advances in Chemical Engineering





## Specific Objectives

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- ◆ Analyze the relevant technologies in the treatment of industrial effluents
- ◆ Compile catalytic technologies applied to environmental processes of interest
- ◆ Explore those involved in the treatment of solid particulate materials
- ◆ Develop innovative chemical synthesis strategies
- ◆ Compile the latest advances in Biotechnology and Nanotechnology
- ◆ Analyze the importance of digitalization in the chemical industry
- ◆ Evaluate the impact of Blockchain and artificial intelligence on the chemical industry

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*This Postgraduate Certificate contains the most comprehensive analysis of the applications of agile methodologies and robotics in the Chemical Industry”*



# 03

# Course Management

The students of this Postgraduate Certificate will have access to a prestigious international faculty. Among its members are Chemical Engineering professionals who have accumulated numerous research results, published in high impact scientific journals. At the same time, the faculty is made up of experts in sustainable policies and management of the production processes that facilitate the operation of this industry. In this way, these specialists will provide the most advanced and personalized guidance in the 100% online educational landscape.





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*TECH faculty are up-to-date on digitization and automation tools that boost green Chemical Engineering”*



## Management



### Dr. Barroso Martín, Isabel

- ♦ Expert in Inorganic Chemistry, Crystallography and Mineralogy
- ♦ Postdoctoral researcher of the I Own Research and Transfer Plan of the University of Málaga
- ♦ Research Staff at the University of Málaga
- ♦ ORACLE Programmer in CMV Consultants Accenture
- ♦ PhD in Sciences from the University of Málaga
- ♦ Master's Degree in Applied Chemistry - specialization in materials characterization - from the University of Málaga
- ♦ Master's Degree in SE, High School, Vocational Training, and Language Teaching - specializing in Physics and Chemistry University of Malaga

## Professors

### Dr. Barroso Martín, Santiago

- ♦ Legal Advisor in Paralegal at Vicox Legal
- ♦ Legal Content Editor at Engineering and Advanced Integration S.A. / BABEL
- ♦ Administrative Lawyer at the Illustrious College of Lawyers of Málaga
- ♦ Paralegal Advisor at Garcia de la Vega Attorneys
- ♦ Law Degree from the University of Málaga
- ♦ Master's Degree in Corporate Legal Consultancy (MAJE) from the University of Málaga
- ♦ Expert Master's Degree in Labor, Tax and Accounting Consulting by Help T Pyme





# 04

# Structure and Content

This TECH program integrates the most advanced concepts and technologies to implement green and sustainable strategies in chemical production. Specifically, engineers will address effluent treatment tools, soil remediation, and catalytic methods for environmental process management. Furthermore, they will delve into robotic and computerized equipment, such as Blockchain, which are leading the industry to the 4.0 industrial revolution. In order to master these innovative contents, graduates will be supported by the Relearning methodology and a 100% online platform with different teaching resources.





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*TECH's multimedia resources will allow you to build practical skills for the Chemical Industry with speed and flexibility"*

## Module 1. Technological Advances in Chemical Engineering

- 1.1. Green Technologies and Processes in the Chemical Industry
  - 1.1.1. Green Chemistry
  - 1.1.2. Industrial Liquid Effluent Treatment Technologies
  - 1.1.3. Industrial Gaseous Effluent Treatment Technologies
  - 1.1.4. Contaminated Soil Rehabilitation
- 1.2. Catalytic Technology for Environmental Processes
  - 1.2.1. Emerging Technologies in Automotive Catalysts
  - 1.2.2. Water Remediation Using Photocatalysts
  - 1.2.3. Technologies of Production and Purification of Hydrogen
- 1.3. Particle Technology
  - 1.3.1. Particle Characterization
  - 1.3.2. Solids Disintegration
  - 1.3.3. Solids Storage
  - 1.3.4. Solids Transportation
  - 1.3.5. Solids Drying Technology
- 1.4. Innovative Chemical Synthesis Technologies
  - 1.4.1. Microwave-Assisted Synthesis
  - 1.4.2. Photoresponse-Assisted Synthesis
  - 1.4.3. Synthesis by Electrochemical Technology
  - 1.4.4. Biocatalytic Technology for Ester Synthesis
- 1.5. Advances in Biotechnology
  - 1.5.1. Microbial Biotechnology
  - 1.5.2. Obtaining Bioproducts
  - 1.5.3. Biosensors
  - 1.5.4. Biomaterials
  - 1.5.5. Biotechnology and Food Safety
- 1.6. Advances in Nanotechnology
  - 1.6.1. Types and Nanoparticles Properties
  - 1.6.2. Inorganic Nanomaterials
  - 1.6.3. Carbon-Based Nanomaterials
  - 1.6.4. Nanocompounds
  - 1.6.5. Applications of Nanotechnology in the Chemical Industry





- 1.7. Digitization Technologies in the Chemical Industry
  - 1.7.1. Chemical Industry 4.0
  - 1.7.2. Impact of Chemical Industry 4.0 on Processes and Systems
  - 1.7.3. Agile and Scrum Methodologies in the Chemical Industry
- 1.8. Process Robotization
  - 1.8.1. Automation in the Chemical Industry
  - 1.8.2. Collaborative Robots and Technical Specifications
  - 1.8.3. Industrial Applications
  - 1.8.4. Use of Industrial Robots
  - 1.8.5. Integration of Industrial Robots
- 1.9. Blockchain in Chemical Engineering
  - 1.9.1. Blockchain for Sustainable Management of Chemical Processes
  - 1.9.2. Blockchain in Supply Chain Transparency
  - 1.9.3. Improving Security with Blockchain
  - 1.9.4. Chemical Traceability with Blockchain
- 1.10. Artificial Intelligence in Chemical Engineering
  - 1.10.1. Application of Artificial Intelligence in the Industry 4.0
  - 1.10.2. Modeling of Chemical Processes with Artificial Intelligence
  - 1.10.3. Artificial Chemical Technology



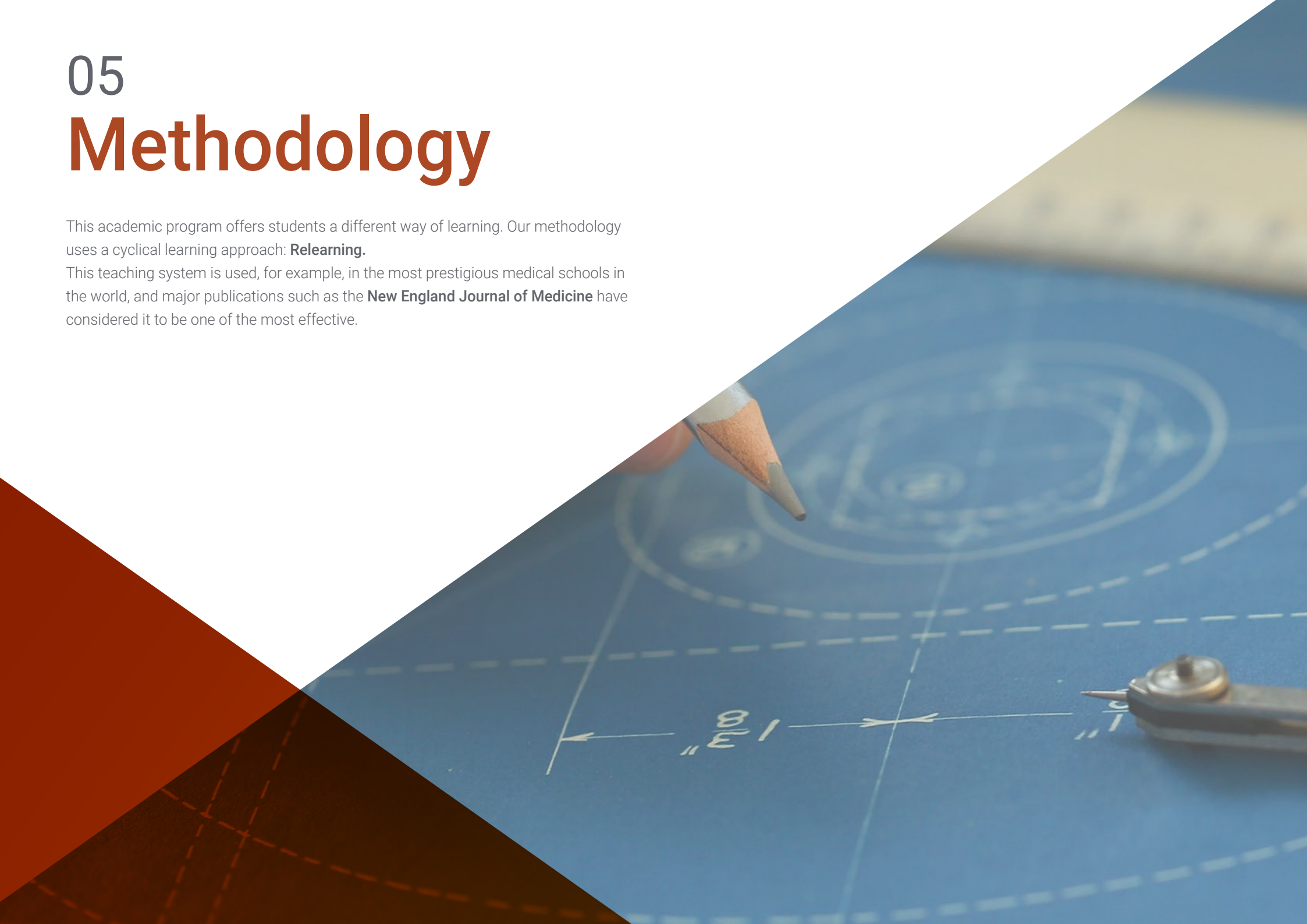
*A 100% online program where you will choose the ideal time and place to study without unnecessary travel. Enroll now!"*

05

# 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.





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*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.

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*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.



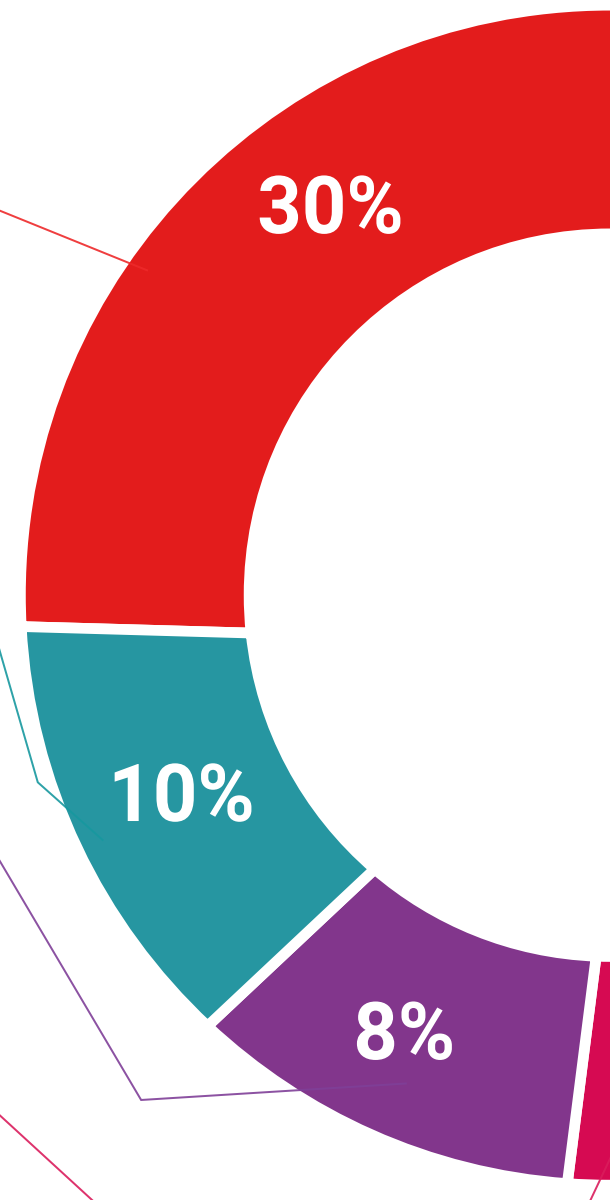
### Practising Skills and Abilities

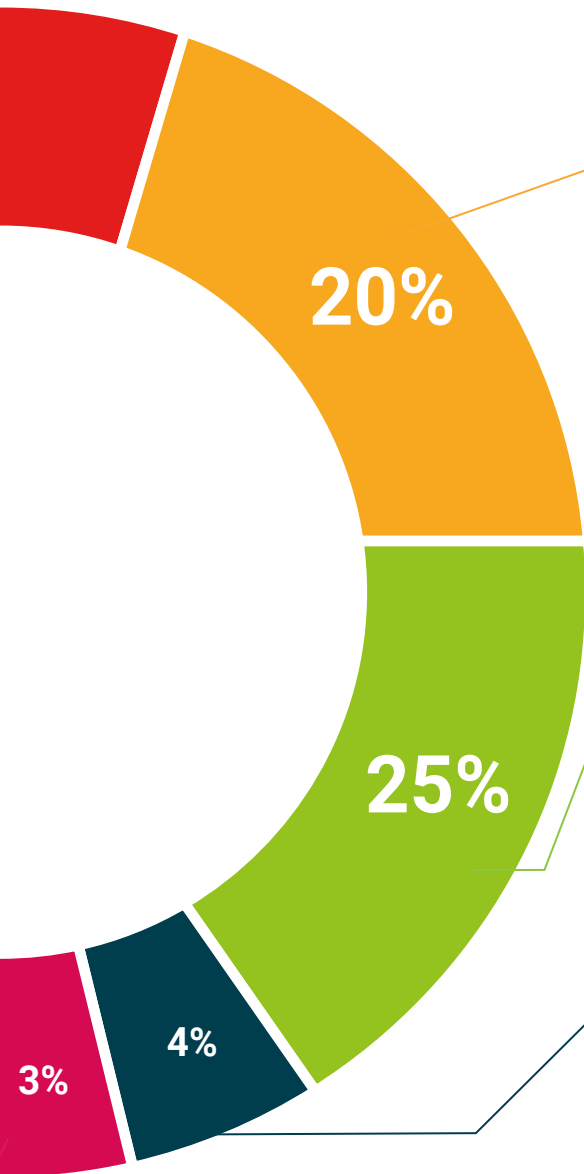
They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



### 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.





06

# Certificate

The Postgraduate Certificate in Green Technologies and Processes in Chemical Engineering guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.





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*Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork”*

This **Postgraduate Certificate in Green Technologies and Processes in Chemical Engineering** contains the most complete and up-to-date program on the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Certificate** issued by **TECH Technological University** via tracked delivery\*.

The certificate issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Certificate, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Postgraduate Certificate in Green Technologies and Processes in Chemical Engineering**

Official N° of Hours: **150 h.**



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

future

health confidence people

education information tutors

guarantee accreditation teaching

institutions technology learning

community commitment

**tech** technological  
university

personalized service innovation

knowledge present

online training

development languages

virtual classroom

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