

# Postgraduate Certificate Thermodynamics and Fluid Mechanics



## Postgraduate Certificate Thermodynamics and Fluid Mechanics

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Global University
- » Credits: 6 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/us/engineering/postgraduate-certificate/thermodynamics-fluid-mechanics](http://www.techtute.com/us/engineering/postgraduate-certificate/thermodynamics-fluid-mechanics)

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# 01

# Introduction

The vast majority of industrial processes require the application of the principles of thermodynamics and fluid mechanics, which are essential in thermal engineering, mechanical engineering, hydraulics and construction for the design of new processes and for the development of advanced and efficient solutions. Meeting these demands of the industrial sector requires specialized professionals who are in need of adequate knowledge and practical skills. That is why this specific program was created, which aims to provide students with the fundamental principles in the area. With a 100% online modality, based on the most innovative Relearning methodology, achievable in 6 weeks.





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*Fluid mechanics is directly linked to engineering, from mechanical engineering, to hydraulics, to construction. Acquire up-to-date knowledge in this 100% online Postgraduate Certificate and graduate in 6 weeks”*

Both fluid mechanics and thermodynamics are essential for the proper development of everyday life. The principles of thermodynamics are of fundamental importance for all branches of science and engineering. Specifically for its applications in such essential areas as medicine, for example, since it makes possible basic tools such as x-rays or laser operations; even other objects such as telephones, televisions and almost all electronic devices, as well as electricity, an indispensable service for subsistence in society.

Today's organizational environments require effective and evolved processes that reduce risks and increase benefits. That is why being an expert in such specific topics that help to develop advanced solutions in basic processes of the industry is a unique opportunity for today's professionals who want to make their way in the labor field, or improve their performance in productive and project areas.

This Postgraduate Certificate in Thermodynamics and Fluid Mechanics presents a syllabus through which it will be possible to understand and master the basic concepts of the general laws of fluid mechanics, thermodynamics and its application to solve engineering problems. Through an avant-garde study methodology based on 100% online Relearning.

A total of 180 hours of learning, with a variety of multimedia resources and formats of theoretical and practical content, available from the first day for consultation or download, allowing a continuous and comfortable learning process adjusted to the needs of today's professionals.

This **Postgraduate Certificate in Thermodynamics and Fluid Mechanics** 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 Industrial 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



*As a professional specialized in thermodynamics and fluid mechanics, countless job opportunities will open up for you. Enroll now and stand out"*

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*The principles of thermodynamics are of fundamental importance for all branches of science and engineering. Get specialized now and start your career in this important sector"*

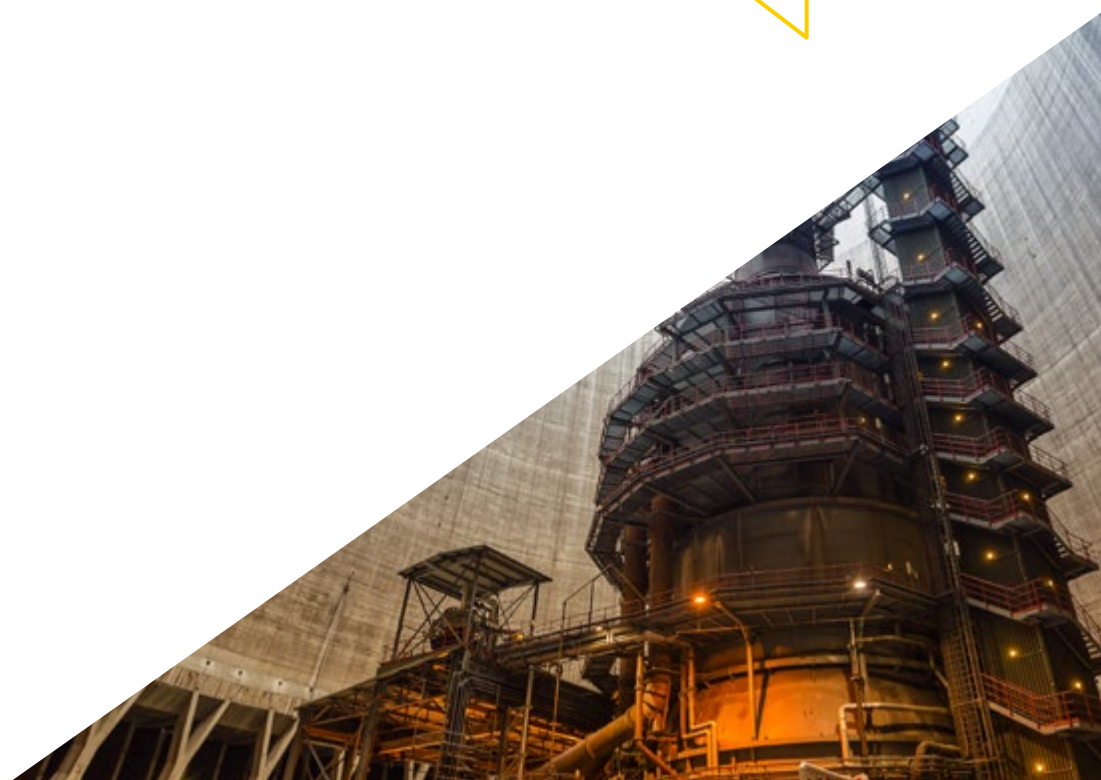
The program's teaching staff includes professionals from the sector who contribute their work experience to this educational program, as well as renowned specialists from leading societies and prestigious universities.

Its multimedia content, developed with the latest educational technology, will allow professionals to learn in a contextual and situated learning environment, i.e., a simulated environment that will provide immersive education programmed to prepare in real situations.

The design of this program focuses on Problem-Based Learning, by means of which professionals must try to solve the different professional practice situations that are presented to them throughout the academic year. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.

*Learn the methods of analysis and fundamental laws that govern the behavior of fluids.*

*TECH offers you the ease of studying from wherever, however and whenever you want.*



# 02

# Objectives

This Postgraduate Certificate in Thermodynamics and Fluid Mechanics presents a syllabus through which it will be possible to understand and master the basic concepts of the general laws of fluid mechanics, thermodynamics and its application to solve engineering problems. In this way, the most advanced technology and 100% online study methodology are combined.







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*Upgrade yourself with the Postgraduate Certificate in Thermodynamics and Fluid Mechanics and be able to offer innovative solutions in the industry”*



## General Objectives

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- ◆ Obtain knowledge about thermodynamics and fluid mechanics to develop projects that optimize industrial processes
- ◆ Analyze the fundamental principles of general mechanics applied to the behavior of fluids
- ◆ Understand the principles of thermodynamics for its application in industrial projects
- ◆ Understand the fundamental equation of the different disciplines of thermodynamics and fluid mechanics
- ◆ Develop the ability to perform piping calculations, interpret data and results according to fundamental techniques



*You will have multiple resources for training that is in high demand in today's job market. Enroll now"*





## Specific Objectives

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- ◆ Understand and master the basic concepts of the general laws of fluid mechanics, thermodynamics and their application to solve engineering problems
- ◆ Use the concepts of temperature and heat transfer
- ◆ Apply the first and second principles of thermodynamics to processes, basic cycles and thermal machines
- ◆ Identify and assess the basic properties of fluids and fundamental flow parameters
- ◆ Get to know methods of analysis and fundamental laws governing the behavior of fluids
- ◆ Perform mass and energy balances in fluid motions in the presence of basic devices
- ◆ Calculate channel and piping systems
- ◆ Present and interpret data and results



# 03

## Structure and Content

TECH has designed this program under the Relearning methodology, of which it is a pioneer, which has been recognized as an efficient method to understand and memorize knowledge, so it is a breakthrough in the current university system focused on professionals who want to continue preparing academically. This, together with the design of the programs and their content, facilitates the students' learning by providing them with the most important concepts for the correct use in their careers.



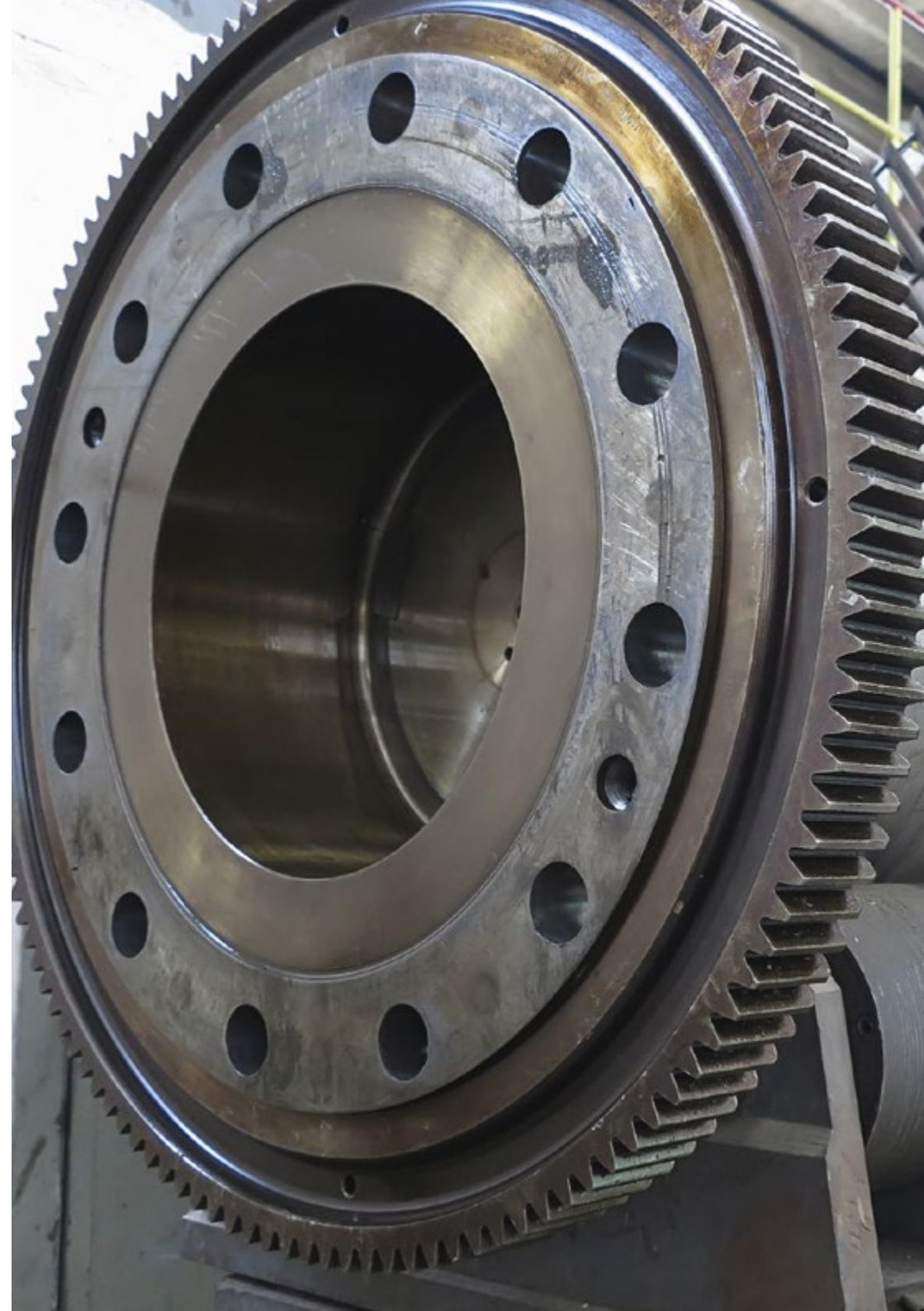


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*You will never be alone. TECH has a specialized technical team that will provide you with the support you need at any time"*

## Module 1. Principles of Thermodynamics and Fluid Mechanics

- 1.1. Thermodynamic Systems
  - 1.1.1. Equation of State
  - 1.1.2. Zero Principle in Thermodynamics
  - 1.1.3. Temperature
  - 1.1.4. Thermal Coefficients in Hydrostatic Systems
- 1.2. Heat and Work
  - 1.2.1. Equation of Perfect Gases
  - 1.2.2. Reversible and Irreversible Processes
  - 1.2.3. Thermodynamic Cycles
  - 1.2.4. Principles in Thermal Engines
- 1.3. First Principle of Thermodynamics
  - 1.3.1. Joule's Experiment
  - 1.3.2. Born and First Principle of Thermodynamics
  - 1.3.3. Heat and Heat Capacities
  - 1.3.4. Enthalpy
- 1.4. Second Principle of Thermodynamics
  - 1.4.1. Entropy. Clausius Theorem
  - 1.4.2. Entropy in Reversible Processes
  - 1.4.3. Entropy in Irreversible Processes
  - 1.4.4. Equivalence between Statements of the Second Principle
- 1.5. Heat Transfer. Basic Principles
  - 1.5.1. Thermal Conductivity
  - 1.5.2. Convection Heat Transfer
  - 1.5.3. Radiation Heat Transfer
  - 1.5.4. Combined Heat Transfer Mechanisms
- 1.6. Stationary Unidirectional Heat Conduction
  - 1.6.1. Heat Transfer by Conduction in Steady State and Unidirectional Flow
  - 1.6.2. Flat Walls in Series
  - 1.6.3. Parallel Walls
  - 1.6.4. Contact Resistance







- 1.7. Fluid Properties
  - 1.7.1. Density and Specific Gravity
  - 1.7.2. Surface Tension and Vapor Pressure
  - 1.7.3. Compressibility
  - 1.7.4. Viscosity. Newtonian and Non-Newtonian Fluids
- 1.8. Hydrostatics
  - 1.8.1. Fundamental Equation of Hydrostatics
  - 1.8.2. Buoyancy. Archimedes' Principle. Buoyancy Force
  - 1.8.3. Stability
  - 1.8.4. Forces on Walls or Gates
- 1.9. Fluid Dynamics
  - 1.9.1. Continuity Equation and Current Regime
  - 1.9.2. Bernoulli's Equation. Energy Conservation
  - 1.9.3. Torricelli's Theorem
  - 1.9.4. Flow Measurement
  - 1.9.5. Dimensional Analysis
- 1.10. Piping Calculation
  - 1.10.1. Laminar and Turbulent Regime
  - 1.10.2. Reynolds Number
  - 1.10.3. Darcy-Weisbach Equation
  - 1.10.4. Types of Losses
  - 1.10.5. Hazen-Williams Formula for Water Flow



*Enroll now and get your qualification in  
Thermodynamics and Fluid Mechanics  
in only 6 weeks and 100% online"*

04

# 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.





05

# Certificate

The Postgraduate Certificate in Thermodynamics and Fluid Mechanics guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Global University.



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

This program will allow you to obtain your **Postgraduate Certificate in Thermodynamics and Fluid Mechanics** 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.

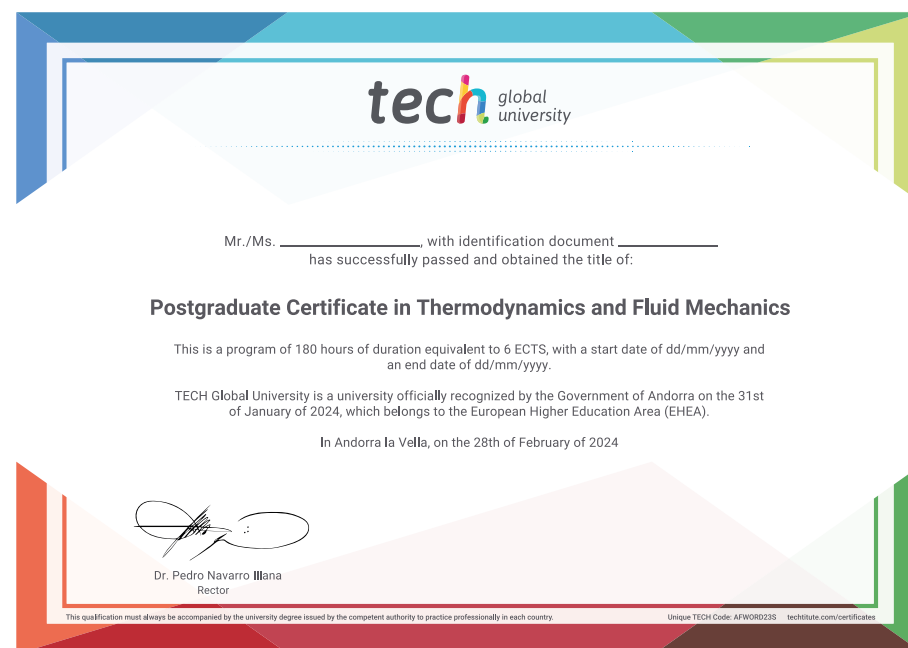
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Thermodynamics and Fluid Mechanics**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**



\*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.



future

health confidence people

education information tutors

guarantee accreditation teaching

institutions technology learning

community commitment

personalized service innovation

knowledge present

online training

development language

classroom

**tech** global  
university

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- » Schedule: at your own pace
- » Exams: online

# Postgraduate Certificate

## Thermodynamics and Fluid Mechanics