

# Postgraduate Certificate Fluid Mechanics



## Postgraduate Certificate Fluid Mechanics

- » 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/fluid-mechanics](http://www.techtitute.com/in/engineering/postgraduate-certificate/fluid-mechanics)

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# 01

# Introduction

Irrigation systems, turbines, pressure pumps or shower faucets have in common, for their proper functioning, the application of the concepts of fluid mechanics. Thanks to this branch of physics, it has been possible to develop large engineering projects. Therefore, the study of the movements of bodies is indispensable for any professional who wishes to prosper in this field. For this reason, this academic institution has created this 100% online program, which will take you comfortably into the physics of fluids, statics and kinematics or the application of the Navier-Stokes equations. In addition, students will have innovative multimedia resources that can be easily accessed 24 hours a day from any electronic device with Internet connection.





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*With this 100% online course, you will be able to master the main concepts and equations of Fluid Mechanics. Enroll now”*

The development of aerodynamics, aeroelasticity, hydrodynamics, oleohydraulics or hydraulic machines is mainly due to an exhaustive knowledge of the behavior of fluids, whether they are in motion or at rest. These are decisive concepts, especially in the field of engineering, which has allowed creating wind turbines, hydraulic dams or improving the quality of materials and reducing manufacturing costs.

Thus, having the appropriate information about fluid mechanics can make the difference in the career of an engineer and therefore, in the projects he/she carries out. Therefore, mastering this discipline will allow engineers to propose new machinery to companies, present solutions and repair those systems that present problems. To provide the necessary knowledge base, TECH has created this Postgraduate Certificate in Fluid Mechanics, which will allow the professional to master the key concepts of this branch of physics in 6 weeks.

A program consisting of teaching tools, in which the latest technology applied to educational teaching has been used. Thanks to this, students will delve, in a more dynamic way, into the classification and properties of flows, the Reynolds transport theorem or the Bernoulli, Cauchy and Navier-Stokes equations, which are essential in fluid mechanics. In addition, the Relearning System, based on the repetition of content, health personnel will be able to advance, in a much more natural and progressive way, through the syllabus of this program.

TECH offers a 100% online university program that students can access conveniently whenever and wherever they wish. Students only need an electronic device with an Internet connection to be able to visualize, at any time, the contents hosted on the virtual platform. Therefore, the professionals have a program that allows them balancing quality education with the most demanding responsibilities.

This **Postgraduate Certificate in Fluids Mechanics** contains the most complete and up-to-date program on the market. The most important features include:

- ◆ Practical case studies are presented by experts in Physics
- ◆ 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 the self-assessment process can be carried out 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 Internet connection



*Whether it is a fluid in motion or at rest, this Postgraduate Certificate will allow you understanding its behavior”*

“

*The multimedia resource library will be available 24 hours a day. Access it easily from your computer with internet connection"*

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.

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 throughout the program. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.

*Obtain the most relevant information about fluid statics and kinematics and their application in the field of engineering, whenever you wish.*

*Over 150 teaching hours, you will learn the key concepts of fluid physics and how to solve its main problems.*



# 02

# Objectives

TECH has created this Postgraduate Certificate in Fluid Mechanics with the main objective of bringing students the most advanced knowledge in this field of physics. For this purpose, it provides the most attractive multimedia resources, with which you can acquire the necessary learning about the behavior of a fluid in different conditions, solve problems regarding the movement of bodies or apply the different equations, appropriately.





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*The Relearning system, used by TECH, will undoubtedly help you to reduce the hours of memorization and study"*



## General Objectives

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- ◆ Understand the general concepts of Fluid Physics
- ◆ Know the basic characteristics of fluids
- ◆ Understand the fluid analysis

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*Would you like to master Navier-Stokes Equations? Then, this is the right education program. Enroll now”*





## Specific Objectives

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- ◆ Effectively solve problems related to fluids.
- ◆ Understand the behavior of fluids under various conditions
- ◆ Acquire confidence in the handling of the Navier-Stokes equations

# 03

## Structure and Content

In its maxim to offer quality teaching, TECH provides in all its programs the most advanced and current information. Thus, in this program, students will be able to delve into the physics of fluids or the properties of bodies in motion or at rest through video summaries, videos in detail, diagrams or complementary readings. Likewise, the case studies elaborated by specialists in this field will lead them to handle the different equations applied in Fluid Mechanics.

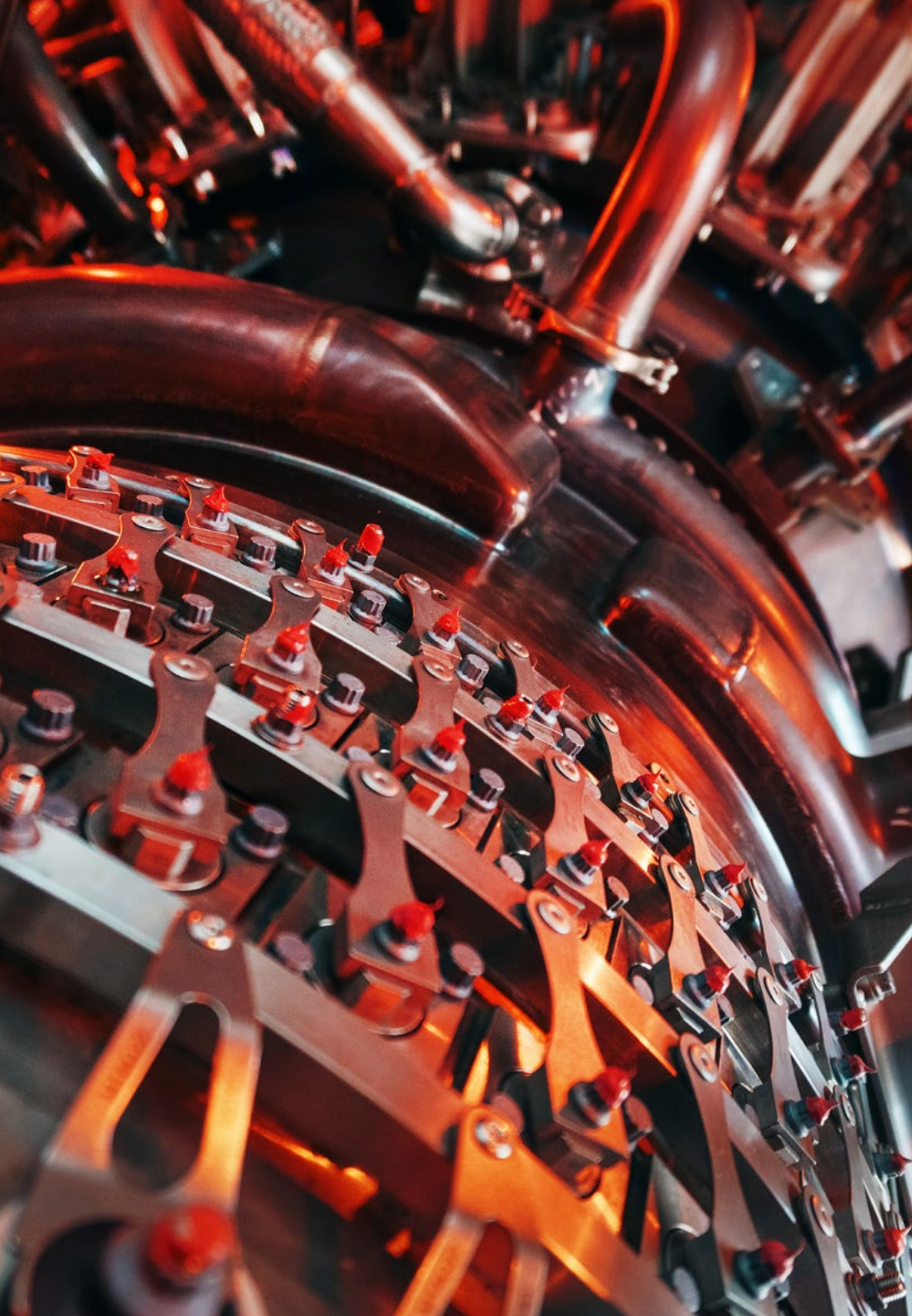


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*The case studies provided by the specialized teaching team will provide you a more practical view of Fluid Mechanics”*

## Module 1. Fluid Mechanics

- 1.1. Introduction to Fluid Physics
  - 1.1.1. No-Slip Condition
  - 1.1.2. Classification of Flows
  - 1.1.3. Control System and Volume
  - 1.1.4. Fluid Properties
    - 1.1.4.1. Density
    - 1.1.4.2. Specific Gravity
    - 1.1.4.3. Vapor Pressure
    - 1.1.4.4. Cavitation
    - 1.1.4.5. Specific Heat
    - 1.1.4.6. Compressibility
    - 1.1.4.7. Speed of Sound
    - 1.1.4.8. Viscosity
    - 1.1.4.9. Surface Tension
- 1.2. Fluid Statics and Kinematics
  - 1.2.1. Pressure
  - 1.2.2. Pressure Measuring Devices
  - 1.2.3. Hydrostatic Forces on Submerged Surfaces
  - 1.2.4. Buoyancy, Stability and Motion of Rigid Solids
  - 1.2.5. Lagrangian and Eulerian Description
  - 1.2.6. Flow Patterns
  - 1.2.7. Kinematic Tensors
  - 1.2.8. Vorticity
  - 1.2.9. Rotationality
  - 1.2.10. Reynolds Transport Theorem
- 1.3. Bernoulli and Energy Equations
  - 1.3.1. Conservation of Mass
  - 1.3.2. Mechanical Energy and Efficiency
  - 1.3.3. Bernoulli's Equation
  - 1.3.4. General Energy Equation
  - 1.3.5. Stationary Flow Energy Analysis
- 1.4. Fluid Analysis
  - 1.4.1. Conservation of Linear Momentum Equations
  - 1.4.2. Conservation of Angular Momentum Equations
  - 1.4.3. Dimensional Homogeneity
  - 1.4.4. Variable Repetition Method
  - 1.4.5. Buckingham's Pi Theorem
- 1.5. Flow in Pipes
  - 1.5.1. Laminar and Turbulent Flow
  - 1.5.2. Inlet Region
  - 1.5.3. Minor Losses
  - 1.5.4. Networks
- 1.6. Differential Analysis and Navier-Stokes Equations
  - 1.6.1. Conservation of Mass
  - 1.6.2. Current Function
  - 1.6.3. Cauchy Equation
  - 1.6.4. Navier-Stokes Equation
  - 1.6.5. Dimensionless Navier-Stokes Equations of Motion
  - 1.6.6. Stokes Flow
  - 1.6.7. Inviscid Flow
  - 1.6.8. Irrotational Flow
  - 1.6.9. Boundary Layer Theory. Clausius Equation



- 1.7. External Flow
  - 1.7.1. Drag and Lift
  - 1.7.2. Friction and Pressure
  - 1.7.3. Coefficients
  - 1.7.4. Cylinders and Spheres
  - 1.7.5. Aerodynamic Profiles
- 1.8. Compressible Flow
  - 1.8.1. Stagnation Properties
  - 1.8.2. One-Dimensional Isentropic Flow
  - 1.8.3. Nozzles
  - 1.8.4. Shock Waves
  - 1.8.5. Expansion Waves
  - 1.8.6. Rayleigh Flow
  - 1.8.7. Fanno Flow
- 1.9. Open Channel Flow
  - 1.9.1. Classification
  - 1.9.2. Froude Number
  - 1.9.3. Wave Speed
  - 1.9.4. Uniform Flow
  - 1.9.5. Gradually Varying Flow
  - 1.9.6. Rapidly Varying Flow
  - 1.9.7. Hydraulic Jump
- 1.10. Non-Newtonian Fluids
  - 1.10.1. Standard Flows
  - 1.10.2. Material Functions
  - 1.10.3. Experiments
  - 1.10.4. Generalized Newtonian Fluid Model
  - 1.10.5. Generalized Linear Viscoelastic Fluid Model
  - 1.10.6. Advanced Constitutive Equations and Rheometry

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.







“

*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.



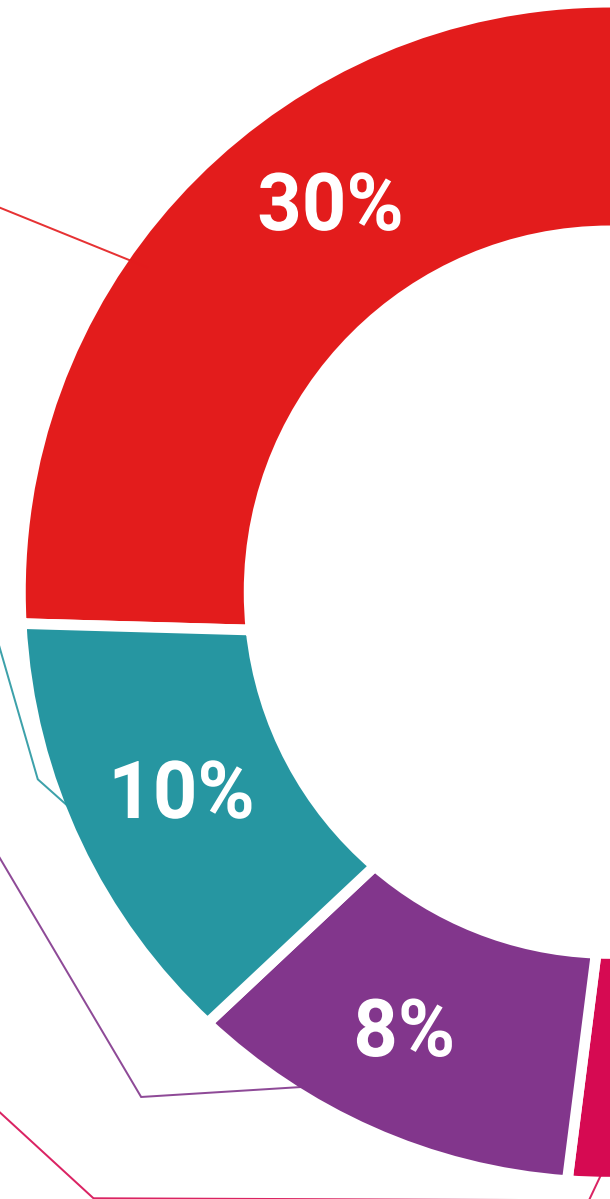
### Practising Skills and Abilities

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.



05

# Certificate

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





The image features two black graduation caps (mortarboards) against a bright blue sky with scattered white clouds. One cap is in the foreground on the left, and another is slightly behind it to the right. The caps are positioned diagonally across the frame. The background is split into a white lower-right section and a dark red upper-right section.

“

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

This **Postgraduate Certificate in Fluids Mechanics** 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 Fluid Mechanics**

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  
personalized service innovation  
knowledge present  
development language  
virtual classroom



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