Postgraduate Certificate

Post-processing, Validation and Application Techniques in CFD

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Postgraduate Certificate
Post-processing,
Validation and Application
Techniques in CFD

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

Website: **www.techtitute.com/us/engineering/postgraduate-certificate/post-processing-validation-application-techniques-cfd**

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Introduction

The demand for engineers with advanced knowledge in analysis and validation of results is high due to the complexity of the models and the need to obtain accurate and reliable information. This program offers a complete and updated training in these areas, addressing topics such as visualization of variables, statistical analysis and model testing. It is especially useful for engineers seeking to improve their skills in the field of computational fluid dynamics. Thus, the program covers topics such as visualization of variables, statistical analysis and model testing. In addition, its 100% online format and Relearning methodology allow students to adapt the pace and place of study to their needs, thus guaranteeing effective and flexible learning.
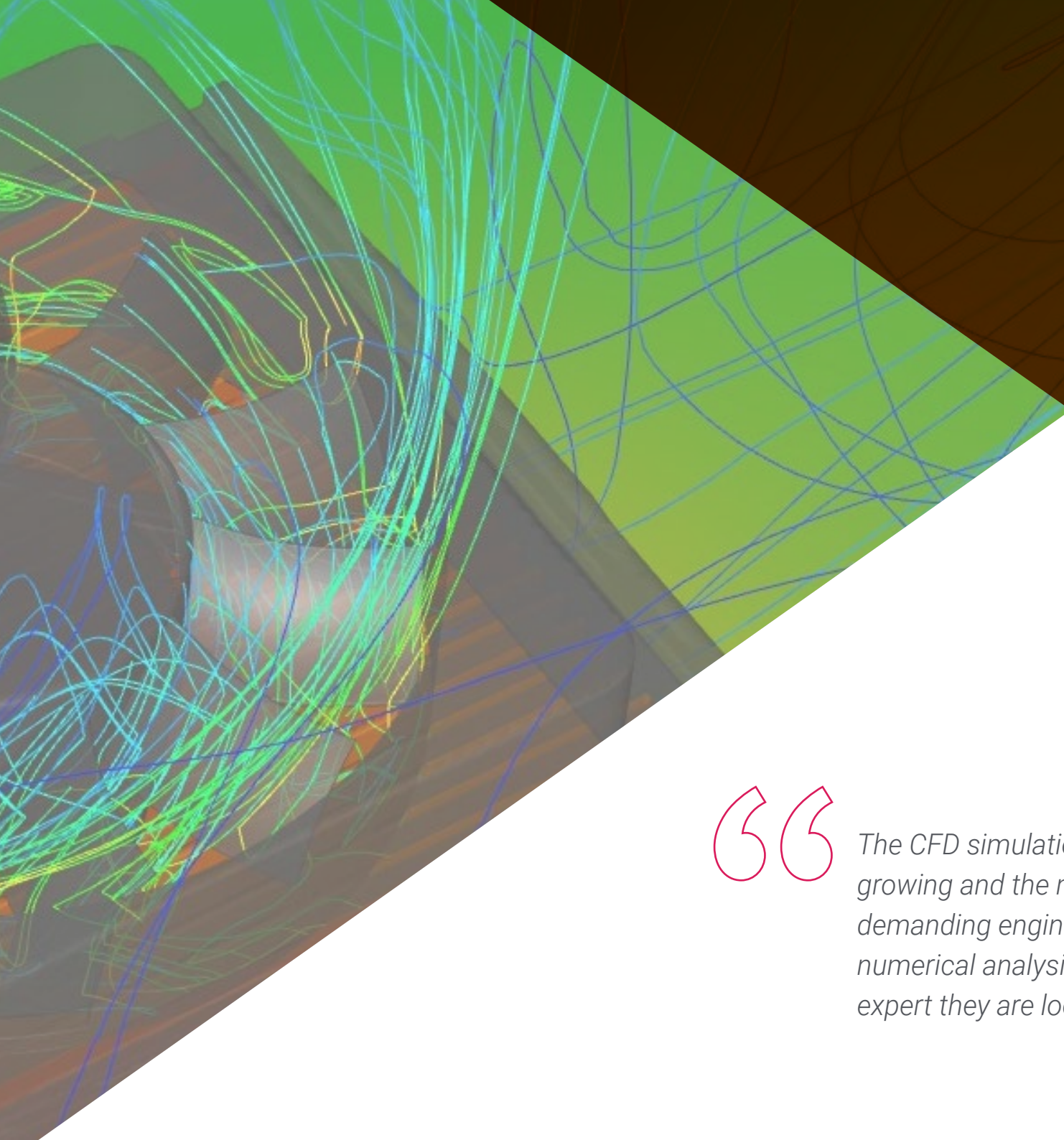
"The CFD simulation market is constantly growing and the most prestigious companies are demanding engineers specialized in advanced numerical analysis technologies. Become the expert they are looking for with this TECH program"

Currently, there is a great demand for professionals with advanced knowledge in computational fluid dynamics (CFD) analysis and validation of results, due to the growing need to optimize fluid simulation and analysis processes. In fact, a report by the consulting firm MarketsandMarkets estimates that the CFD simulation market will grow by 6.1% annually through 2025.

In response to this reality, the CFD Postprocessing, Validation and Application Techniques Diploma offers a complete academic itinerary, which delves into the specialized methods for processing and verifying data in CFD simulations, as well as their practical application in different areas of engineering. In addition, the program focuses on problem solving and critical review of results, providing competencies that can be immediately applied in the working world.

In this sense, the Postgraduate Certificate focuses on the development of practical and critical skills that allow students to evaluate and verify the results obtained in their simulations, using advanced Postprocessing tools. In addition, its syllabus includes a module dedicated to the application of the procedures learned in different areas of engineering, which allows students to acquire specialized knowledge in their area of interest.

Finally, it should be noted that the Postgraduate Certificate in CFD Postprocessing, Validation and Application Techniques is developed in a 100% online format. This facilitates access to the content from anywhere and at any time, adapting to the schedules and needs of the student. Likewise, the Relearning methodology is used, which encourages active participation in the learning process. In short, it is a highly specialized curriculum necessary for any engineer working in the field of computational fluid dynamics.

This **Postgraduate Certificate in Post-processing, Validation and Application Techniques in CFD** contains the most complete and up-to-date program on the market. The most important features include:

- ◆ The development of case studies presented by experts in Textile Engineering
- ◆ The graphic, schematic, and practical contents with which they are created, provide 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

Master advanced techniques for interpretation and validation of CFD results and help make informed decisions in your workplace"

"

Better understand fluid dynamics to stand out in the job market. With the knowledge you gain in this Postgraduate Certificate, you will be able to evaluate and verify the information properly to boost your profile towards the job you want"

Deepen in the application of advanced post-processing techniques and validation of results and acquire the tools to save time and costs in projects.

Learn how to optimize fluid simulation and simulation and fluid analysis processes and become an expert in the the data-driven approach.

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 provide the professional with situated and contextual learning, i.e., a simulated environment that will provide an immersive education programmed to learn in real situations.

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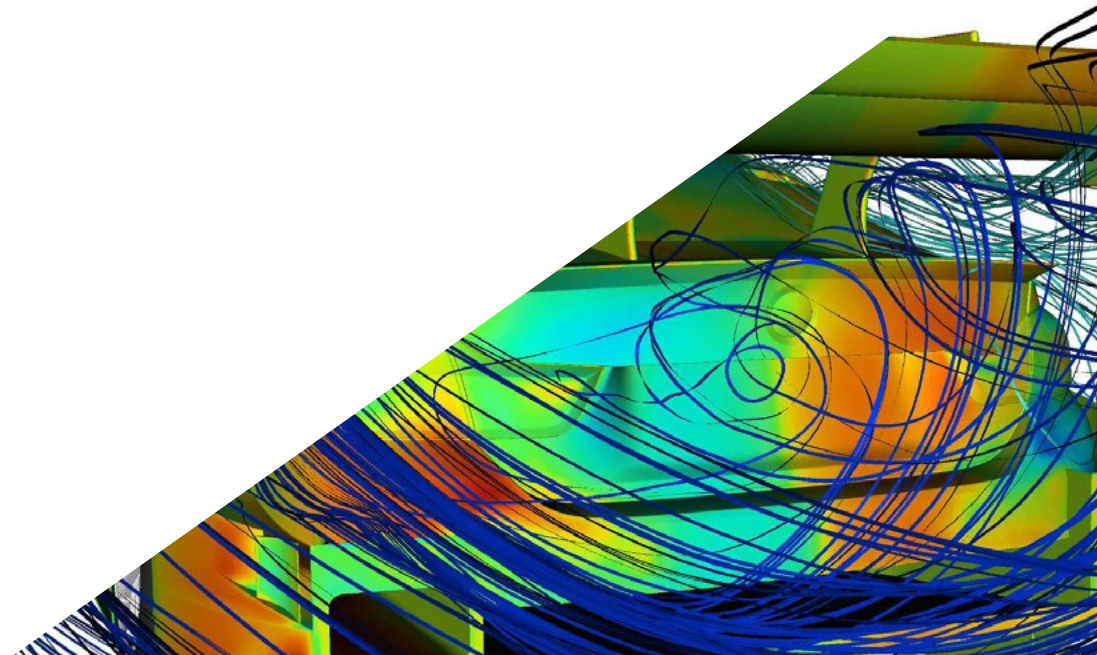
Objectives

TECH has developed the Postgraduate Certificate in Post-processing, Validation and Application Techniques in CFD, to provide engineers with state-of-the-art knowledge in the application of Postprocessing techniques on the plane and on surfaces, convergence of simulations and model validation, among other fundamental topics of the course. In addition, the program is developed in a 100% online format and uses the Relearning methodology, which allows students to improve their skills continuously and efficiently.

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CFD simulation technology is constantly evolving, update your knowledge with this program and keep up with the latest techniques in the field"

General Objectives

- Establish the basis for the study of turbulence
- Develop CFD statistical concepts
- Determine the main computational techniques in turbulence research
- Generate specialized knowledge in the method of Finite Volumes
- Acquire specialized knowledge in fluid mechanics calculation techniques
- Examine the wall units and the different regions of a turbulent wall flow
- Determine the characteristics of compressible flows
- Examine multiple models and multiphase methods
- Develop expertise on multiple models and methods in multiphysics and thermal analysis
- Interpret the results obtained by correct post-processing
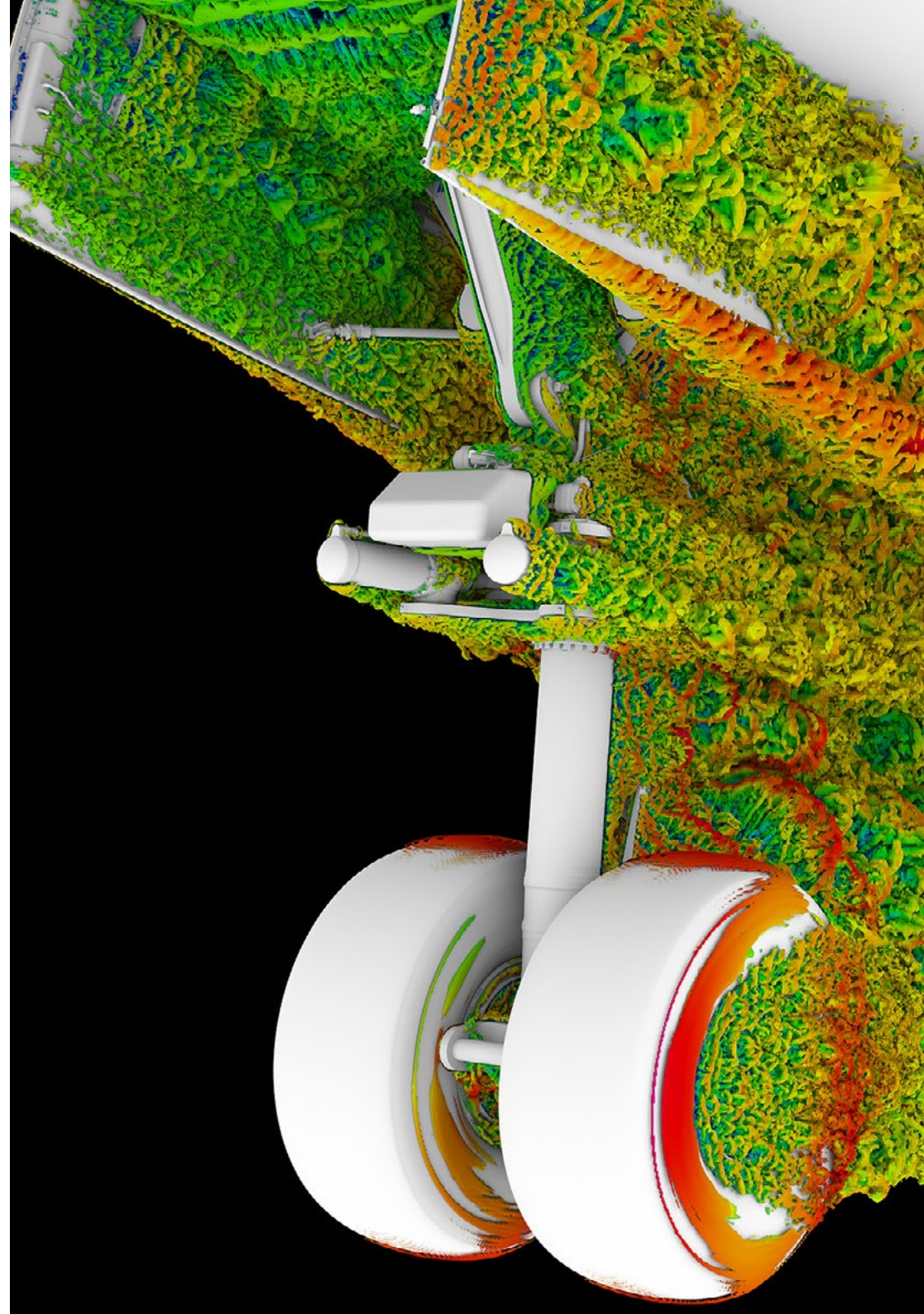
Specific Objectives

- Determine the types of post-processing according to the results to be analyzed: purely numerical, visual or a mixture of both
- Analyzing the convergence of a CFD simulation
- Establish the need for CFD validation and know basic examples of CFD validation
- Examine the different tools available on the market
- To provide a foundation for the current context of CFD simulation

Expand your skills in computational fluid dynamics and learn how to exploit its full potential in different fields of engineering"

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Course Management

TECH has gathered for this occasion, a team of teachers in Postprocessing Techniques, Validation and Application in CFD. This is a program designed by experts in the field, with a syllabus that includes everything from Postprocessing in the plane and surfaces, to the convergence of simulations and good practices in CFD simulation. In addition, the program is delivered in a 100% online format, allowing students to learn on their own schedule and at their own pace. Students of this program will have the opportunity to learn from the best professionals in the field and acquire skills that will enable them to advance their careers and stand out in today's competitive job market.

Achieve your goals with the best and acquire the knowledge and skills you need to process and validate CFD simulation results"

Management

### Dr. José Pedro García Galache

- XFlow Development Engineer at Dassault Systèmes
- PhD in Aeronautical Engineering from the Polytechnic University of Valencia
- Degree in Aeronautical Engineering from the Polytechnic University of Valencia
- Master's Degree in Research in Fluid Mechanics from the Von Kármán Institute for Fluid Dynamics
- Short Training Programme en el Von Kármán Institute for Fluid Dynamics

Professors

Mr. Enrique Mata Bueso

- Senior Thermal Conditioning and Aerodynamics Engineer at Siemens Gamesa
- Application Engineer and CFD R&D Manager at Dassault Systèmes
- Thermal Conditioning and Aerodynamics Engineer in Gamesa-Altran
- Fatigue and Damage Tolerance Engineer at Airbus-Atos
- R&D CFD Engineer at UPM
- Aeronautical Technical Engineer with specialization in Aircraft by UPM
- Master's Degree in Aerospace Engineering from the Royal Institute of Technology in Stockholm
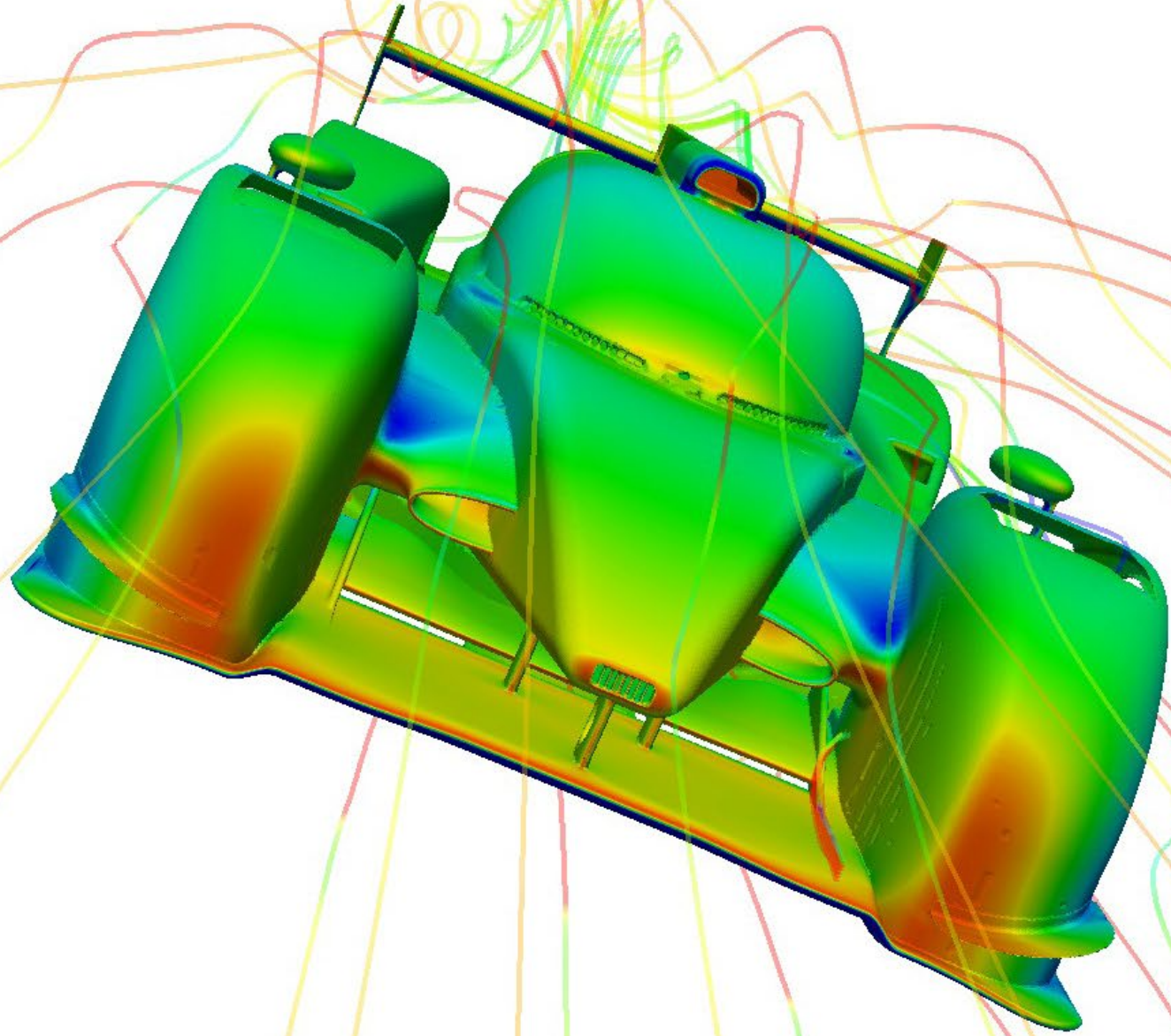
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Structure and Content

With a comprehensive curriculum ranging from CFD Postprocessing to commercial and free software, this program focuses on providing students with the necessary skills to face the most complex challenges in the world of numerical fluid simulation. Thus, thePostgraduate Certificate in Post-processing, Validation and Application Techniques in CFD consists of 150 hours of theoretical and practical content presented in different audiovisual formats, and uses the revolutionary Relearning methodology, exclusive to TECH, to allow the graduate to deepen in numerical analysis technologies in a natural and progressive way.
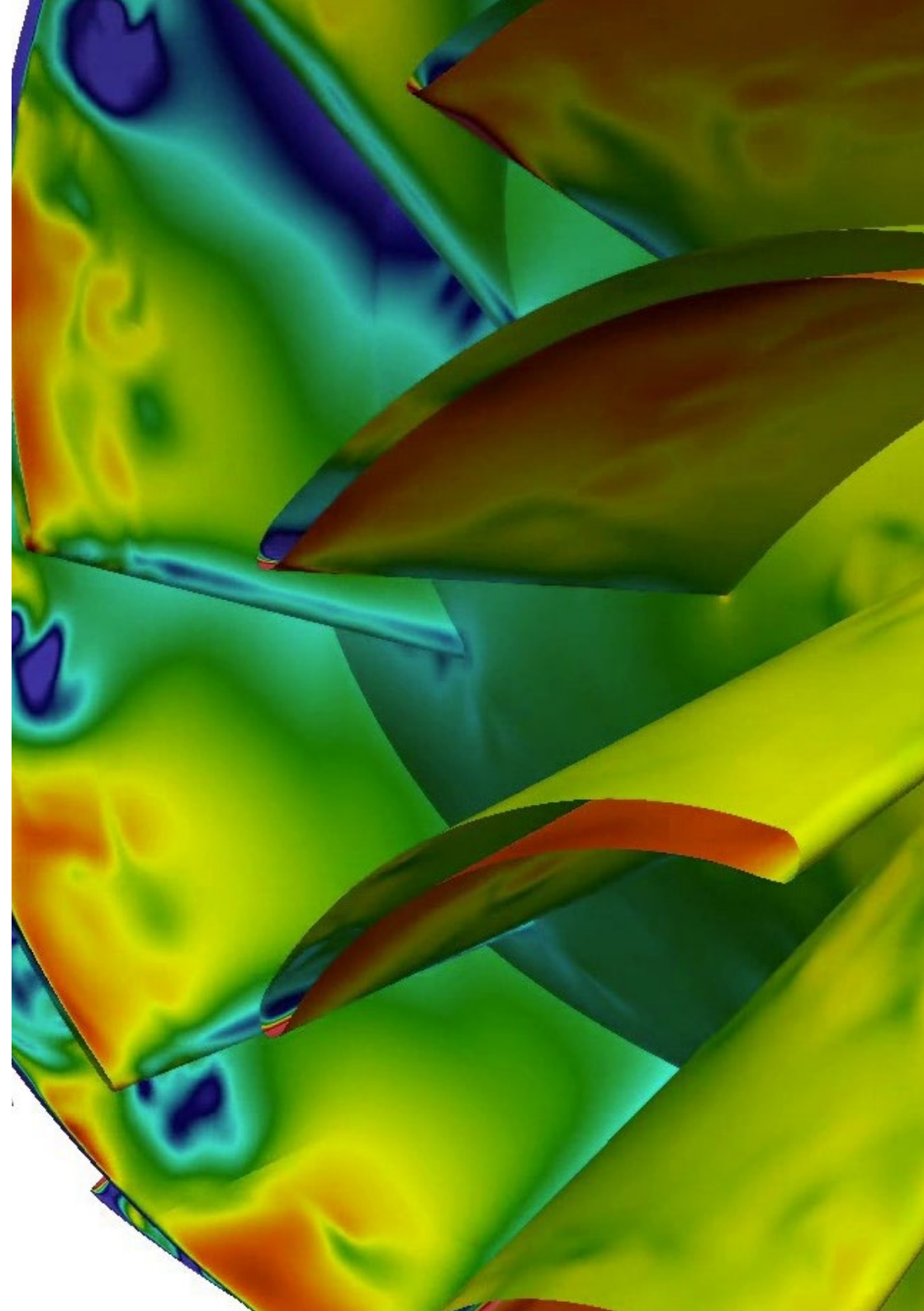
Access a syllabus rich in content, where you will find a multitude of real examples and practical analysis that contextualize the topics covered"

Module 1. Post-processing, validation and application in CFD

1.1.   Postprocessing in CFD I

    1.1.1.   Postprocessing on Plane and Surfaces

    1.1.2.   Post-processing in the plane

    1.1.3.   Post-processing on surfaces

1.2.   Postprocessing in CFD II

    1.2.1.   Volumetric Postprocessing

        1.2.1.1. Volumetric post-processing I

        1.2.1.2. Volumetric post-processing II

1.3.   Free CFD post-processing software

    1.3.1.   Free Postprocessing Software

    1.3.2.   Paraview

    1.3.3.   Paraview usage example

1.4.   Convergence of simulations

    1.4.1.   Convergence

    1.4.2.   Mesh convergence

    1.4.3.   Numerical convergence

1.5.   Classification of methods

    1.5.1.   Applications

    1.5.2.   Types of Fluid

    1.5.3.   Scales

    1.5.4.   Calculation machines

1.6.   Model validation

    1.6.1.   Need for Validation

    1.6.2.   Simulation vs Experiment

    1.6.3.   Validation examples

1.7.   Simulation methods. Advantages and Disadvantages

    1.7.1.   RANS

    1.7.2.   LES, DES, DNS

    1.7.3.   Other Methods

    1.7.4.   Advantages and disadvantages

This complete Postgraduate Certificate is completely online, which allows you to study in your free time and from anywhere in the world"

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.

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.

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

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.

01 learning from evidence

02 relearning from evidence

03 testing

04 learning from an expert

05 neurocognitive context dependent learning

06 Von-Restorff effect

07 case based learning through storytelling

08 competencies testing (retesting)

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.

30%

10%

8%

20%

25%

4%

3%
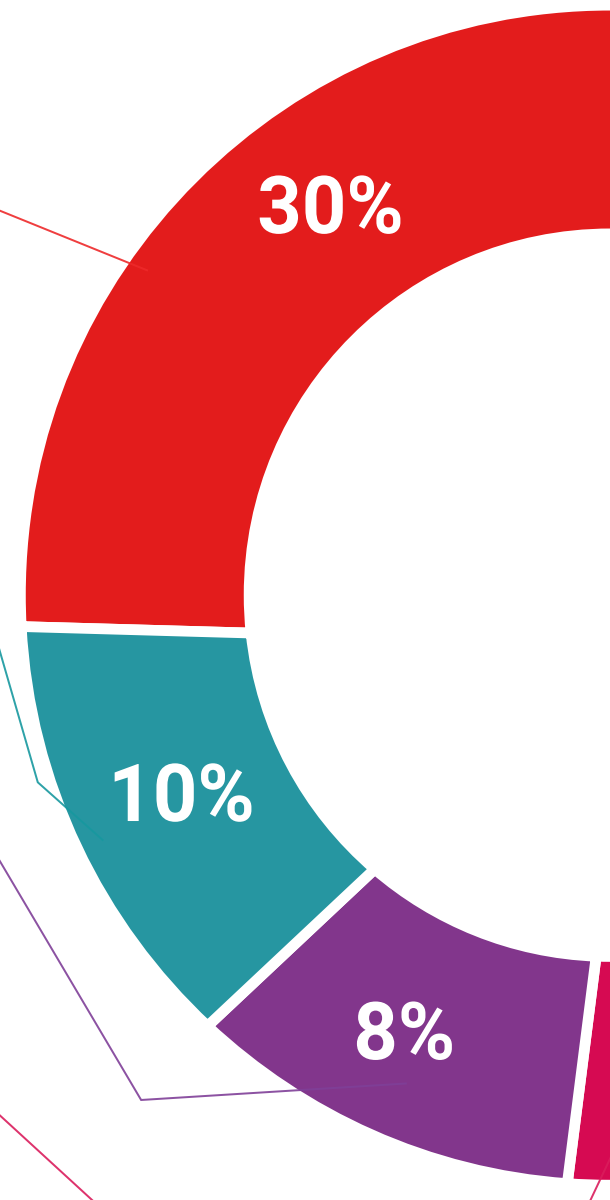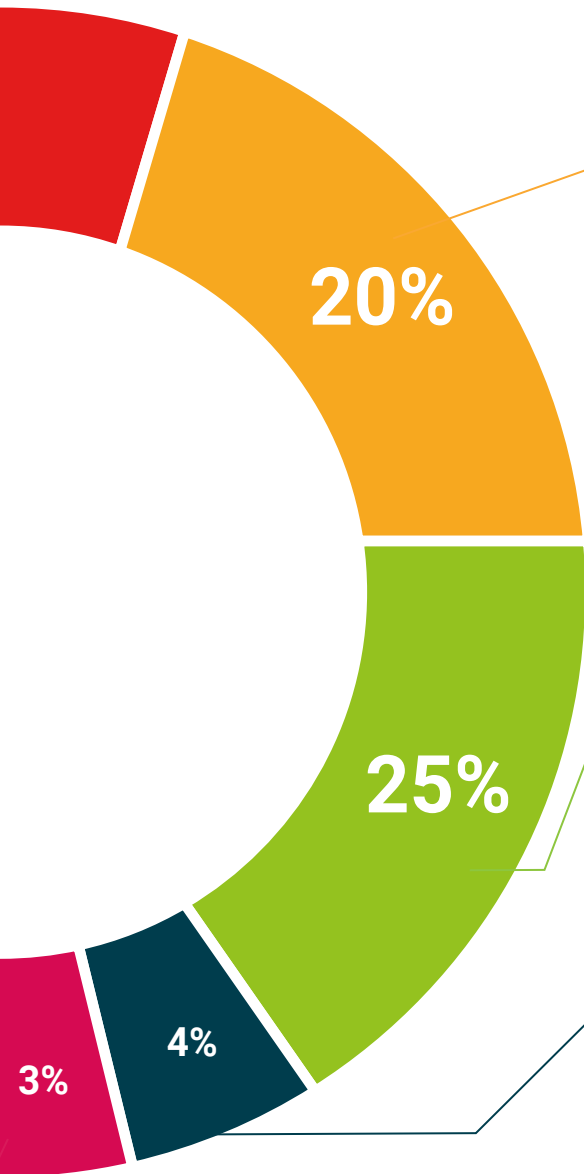
Case Studies

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 Post-processing, Validation and Application Techniques in CFD guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.

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

This **Postgraduate Certificate in Post-processing, Validation and Application Techniques in CFD** 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 diploma 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 Post-processing, Validation and Application Techniques in CFD**

Official Nº of Hours: **150 h.**

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Awards the following
DIPLOMA
to
Mr./Ms. _____, with identification number _____.
For having passed and accredited the following program

POSTGRADUATE CERTIFICATE
in
Post-processing, Validation and Application Techniques in CFD

This is a qualification awarded by this University, equivalent to 150 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro
Dean

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

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

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