Internship Program
Computational Fluid Dynamics

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Internship Program

Computational Fluid Dynamics

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Introduction to the Program

Advances in computer technology have taken fluid simulation to unprecedented levels of accuracy. In this sense, computational fluid mechanics depends not only on robust physical fundamentals, but also on algorithmic developments, code optimization, and efficient data management, which are natural skills for computer scientists. Therefore, it is essential that professionals stay at the forefront of the most innovative modeling techniques to lead the development of innovative solutions in highly complex simulations. With the aim of facilitating this task, TECH presents this program, where graduates will spend 3 weeks working with an experienced team in Computational Fluid Mechanics to analyze the latest advances in this field.

Thanks to this Internship Program, you will master the principles of Fluid Mechanics and its mathematical formulation for Computational treatment"

A new report by the International Monetary Fund recognizes that Computational Fluid Dynamics is a fundamental pillar in the simulation of transport phenomena. In this regard, the institution highlights that its global market has exceeded $2 billion and is estimated to grow at a compound annual rate of 8.5% in the coming years. This progress is driven by the demand for more accurate and faster simulations in sectors such as automotive, energy, and biomedicine. To this end, IT professionals need to acquire advanced skills to develop optimized algorithms, master parallel computing techniques, and efficiently handle large volumes of data.

In this context, TECH has created a cutting-edge program consisting of a 120-hour placement at a leading center in the field of Computational Fluid Dynamics. Over the course of 3 weeks, graduates will become part of a team of top-level specialists, with whom they will actively work on the development of simulation algorithms, the optimization of CFD models, and the advanced processing of large volumes of data. This experience will allow computer scientists to apply their technical skills in a highly demanding technological environment and specialize in one of the most strategic fields of Computational engineering.

It should be noted that during the internship, participants will have the support of an assistant tutor, who will ensure that all the requirements for which this Internship Program has been designed are met. Based on this, the specialist will work with complete confidence and assurance in the use of CFD simulation tools, the implementation of advanced numerical models, and the accurate interpretation of complex flow results.

02

Why Study at TECH?

TECH is the world's largest online university. With an impressive catalog of more than 14,000 university programs, available in 11 languages, it is positioned as a leader in employability, with a 99% job placement rate. In addition, it has a huge faculty of more than 6,000 professors of the highest international prestige.

TECH combines Relearning and the Case Method in all its university programs to guarantee excellent theoretical and practical learning by studying when you want and from wherever you want"

Study at the largest online university in the world and ensure your professional success. The future begins at TECH"

The world's best online university, according to FORBES

The prestigious Forbes magazine, specialized in business and finance, has highlighted TECH as "the best online university in the world" This is what they have recently stated in an article in their digital edition in which they echo the success story of this institution, "thanks to the academic offer it provides, the selection of its teaching staff, and an innovative learning method oriented to form the professionals of the future".

The best top international faculty

TECH's faculty is made up of more than 6,000 professors of the highest international prestige. Professors, researchers and top executives of multinational companies, including Isaiah Covington, performance coach of the Boston Celtics; Magda Romanska, principal investigator at Harvard MetaLAB; Ignacio Wistumba, chairman of the department of translational molecular pathology at MD Anderson Cancer Center; and D.W. Pine, creative director of TIME magazine, among others.

The world's largest online university

TECH is the world's largest online university. We are the largest educational institution, with the best and widest digital educational catalog, one hundred percent online and covering most areas of knowledge. We offer the largest selection of our own degrees and accredited online undergraduate and postgraduate degrees. In total, more than 14,000 university programs, in ten different languages, making us the largest educational institution in the world.

The most complete syllabuses on the university scene

TECH offers the most complete syllabuses on the university scene, with programs that cover fundamental concepts and, at the same time, the main scientific advances in their specific scientific areas. In addition, these programs are continuously updated to guarantee students the academic vanguard and the most demanded professional skills. and the most in-demand professional competencies. In this way, the university's qualifications provide its graduates with a significant advantage to propel their careers to success.

A unique learning method

TECH is the first university to use Relearning in all its programs. This is the best online learning methodology, accredited with international teaching quality certifications, provided by prestigious educational agencies. In addition, this innovative academic model is complemented by the "Case Method", thereby configuring a unique online teaching strategy. Innovative teaching resources are also implemented, including detailed videos, infographics and interactive summaries.

The official online university of the NBA

TECH is the official online university of the NBA. Thanks to our agreement with the biggest league in basketball, we offer our students exclusive university programs, as well as a wide variety of educational resources focused on the business of the league and other areas of the sports industry. Each program is made up of a uniquely designed syllabus and features exceptional guest hosts: professionals with a distinguished sports background who will offer their expertise on the most relevant topics.

Leaders in employability

TECH has become the leading university in employability. Ninety-nine percent of its students obtain jobs in the academic field they have studied within one year of completing any of the university's programs. A similar number achieve immediate career enhancement. All this thanks to a study methodology that bases its effectiveness on the acquisition of practical skills, which are absolutely necessary for professional development.

Google Premier Partner

The American technology giant has awarded TECH the Google Premier Partner badge. This award, which is only available to 3% of the world's companies, highlights the efficient, flexible and tailored experience that this university provides to students. The recognition not only accredits the maximum rigor, performance and investment in TECH's digital infrastructures, but also places this university as one of the world's leading technology companies.

The top-rated university by its students

Students have positioned TECH as the world's top-rated university on the main review websites, with a highest rating of 4.9 out of 5, obtained from more than 1,000 reviews. These results consolidate TECH as the benchmark university institution at an international level, reflecting the excellence and positive impact of its educational model.

03

Teaching Objectives

Through this Internship Program, IT professionals will develop key skills in modeling, programming, and flow simulation. They will also acquire advanced skills in implementing numerical methods, optimizing CFD algorithms, and managing large volumes of data. They will also strengthen their skills in validating results, analyzing complex phenomena, and advanced Fluid visualization. As a result, experts will be prepared to lead simulation projects in highly demanding technological and industrial environments.

General Objectives

- Understand the physical fundamentals of fluid mechanics and its computational representation
- Use various CFD simulation tools and apply them in development environments used in industry
- Apply programming concepts to implement and customize fluid simulation algorithms
- Develop skills in computational modeling and meshing, which are essential for accurate and efficient simulations
- Interpret and analyze simulation results, identifying common errors and proposing optimization solutions
- Integrate data visualization techniques to represent flow fields and other relevant parameters in CFD

Specific Objectives

- Implement highly efficient computational methods for fluid simulation
- Develop mathematical techniques for stability and convergence in simulations
- Model experimental scenarios to predict results and validate hypotheses
- Apply method optimization techniques in high-resolution simulations
- Analyze the implementation of optimization algorithms in fluid simulations
- Validate turbulent simulations with experiments and real data
- Evaluate the effects of compressibility in transonic and supersonic flows
- Apply modeling and simulation techniques for multiphase systems
- Implement advanced models for reactive and heat transfer flows
- Use advanced CFD result post-processing techniques

"You will master the use of mesh tools, adapting them to the requirements of flow phenomena"

04
Internship

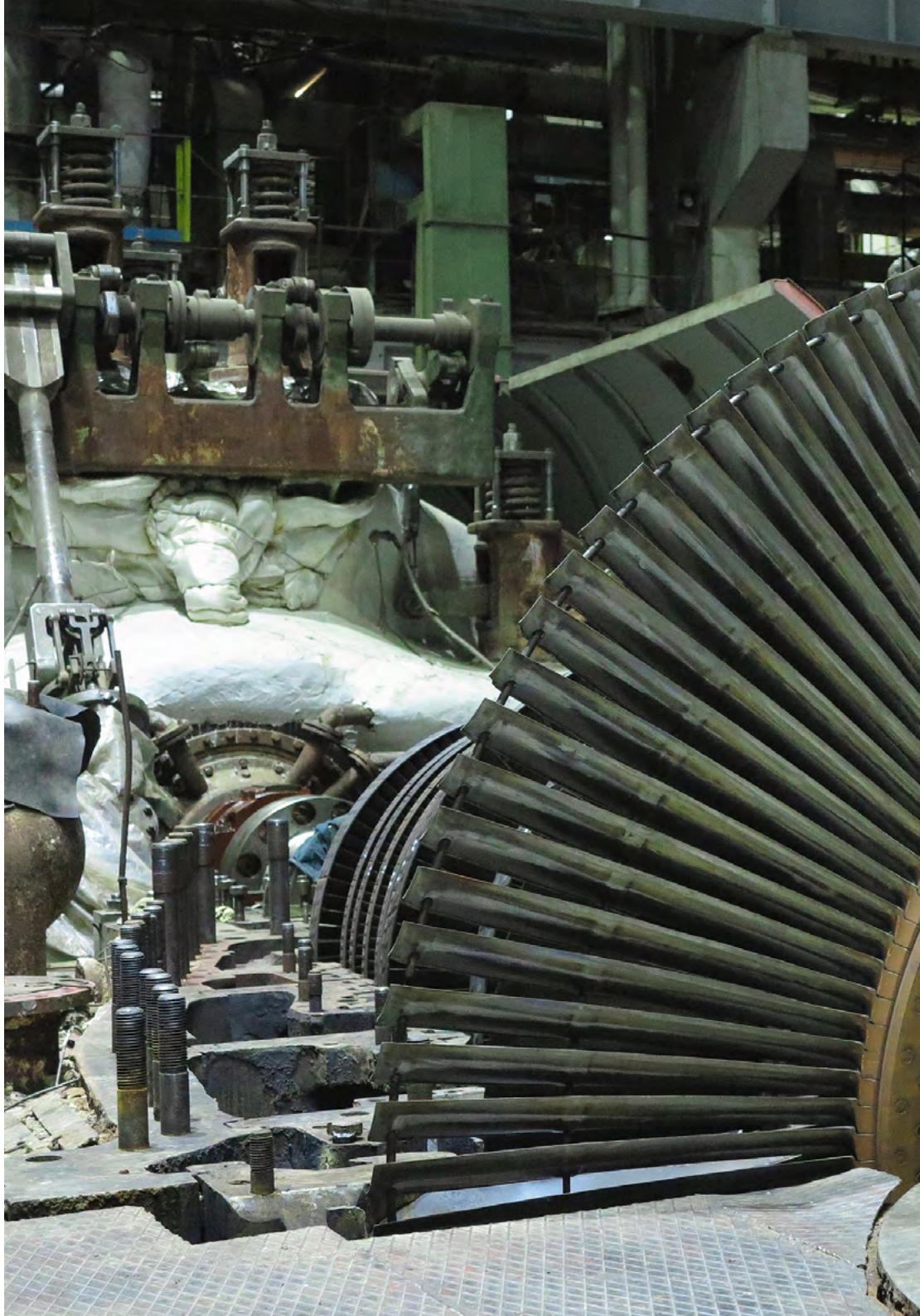
The Internship Program in Computational Fluid Dynamics consists of a 3-week placement at a prestigious institution, from Monday to Friday with 8-hour consecutive shifts of hands-on training alongside a supervising specialist. This internship will allow students to apply their knowledge of programming, modeling, and data analysis to the development of real CFD simulations.

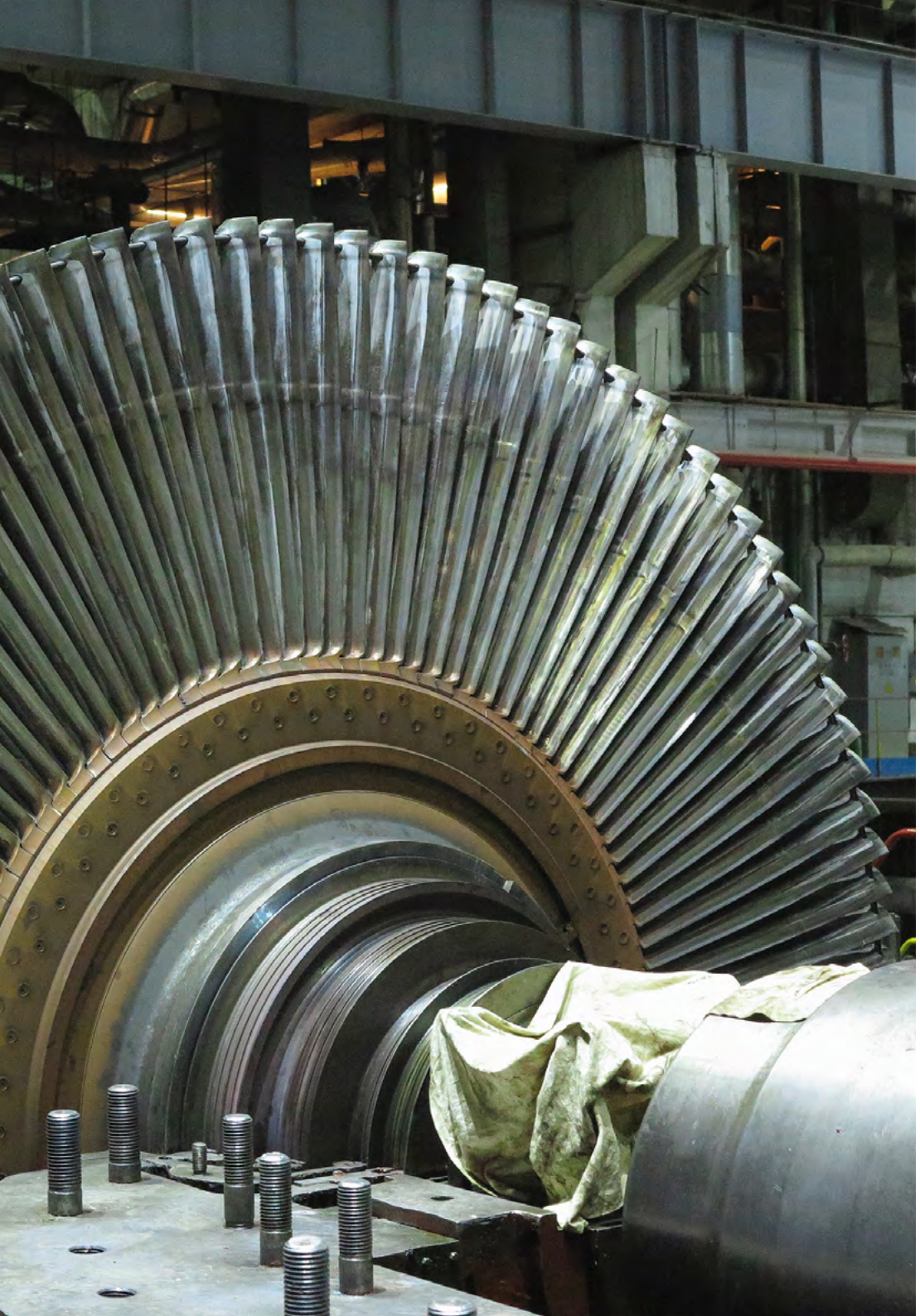
In this completely practical Internship Program, activities are aimed at developing and perfecting the skills necessary for professional performance in the field of fluid simulation using computational methods. It is geared toward specific training in the implementation, analysis, and validation of CFD models in environments that require a high level of technical specialization and guarantee safe, efficient, and high-performance problem solving in fluid dynamics.

This is an ideal opportunity to learn by working in an environment of technological innovation, where advanced fluid simulation and computational modeling are at the heart of the digital culture of its professionals.

The practical part will be carried out with the active participation of the student performing the activities and procedures of each area of competence (learning to learn and learning to do), with the support and guidance of teachers and other training colleagues who facilitate teamwork and multidisciplinary integration as cross-cutting skills for the practice of Computational Fluid Dynamics (learning to be and learning to relate).

The procedures described below will be the basis of the practical part of the Internship Program, and its realization will be subject to the center's own availability and workload, being the proposed activities the following:





Module	Practical Activity
Finite Volume Method	Develop and program custom CFD codes based on the finite volume method
	Optimize numerical solution algorithms, improving the efficiency of iterative methods such as SIMPLE, PISO, etc.
	Create advanced CFD result visualization modules using libraries such as ParaView, VTK, or matplotlib
	Integrate machine learning or model reduction techniques to accelerate CFD simulations or improve predictions
Fluid turbulence simulation	Optimize turbulence calculation algorithms, accelerating their convergence or reducing computational cost
	Program and adapt closure schemes for turbulence equations
	Develop high-fidelity simulations in supercomputing environments
	Create and validate specific wall functions for turbulent flows near solid surfaces
Multiphase flow	Implement multiphase flow models in CFD software
	Program phase interface tracking algorithms (e.g., Level Set, Front Tracking, or VOF methods)
	Develop and optimize numerical schemes that handle sudden changes in properties between phases
	Create fluid-structure interaction simulations in multiphase systems, such as moving bubbles or droplets
Results processing and quality control	Master automatic post-processing tools to extract relevant results such as pressure, velocity, and temperature
	Program CFD data analysis scripts using Python, MATLAB, or tools such as ParaView and Tecplot
	Implement feature extraction algorithms such as vortex detection or recirculation zone analysis
	Automate the generation of technical reports and graphs from simulation results

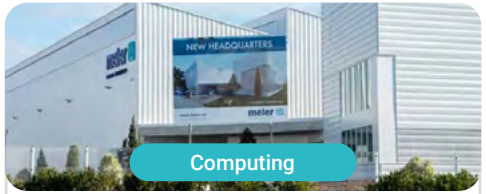
05

Internship Centers

In its strong commitment to providing First quality university programs that are accessible to most people, TECH has expanded its academic horizons so that this Internship Program can be carried out in various Institution, globally. This is undoubtedly a unique opportunity that allows graduates to experience a remarkable leap in quality in their professional careers, guided by the best experts in Computational Fluid Dynamics.

> *You will complete an Internship Program at a leading institution in Computational Fluid Dynamics"*

The student will be able to do this program at the following centers:



Meler

Country
Spain

City
Navarra

Address: Pol. Ind. Arazuri-Orcoyen, c/B, nº3 A (31170 Arazuri-Navarra)

Private company specializing in the development and optimization of adhesive bonding processes.

Related internship programs:
- Computational Fluid Dynamics

06
General Conditions

Civil Liability Insurance

The university's main concern is to guarantee the safety of the interns, other collaborating professionals involved in the internship process at the center. Among the measures dedicated to achieve this is the response to any incident that may occur during the entire teaching-learning process.

To this end, the university commits to purchasing a civil liability insurance policy to cover any eventuality that may arise during the stay at the internship center.

This liability policy for interns will have broad coverage and will be taken out prior to the start of the Internship Program period. That way professionals will not have to worry in case of having to face an unexpected situation and will be covered until the end of the internship program at the center.

General Conditions of the Internship Program

The general terms and conditions of the internship agreement for the program are as follows:

1. TUTOR: During the Internship Program, students will be assigned two tutors who will accompany them throughout the process, answering any doubts and questions that may arise. On the one hand, there will be a professional tutor belonging to the internship center who will have the purpose of guiding and supporting the student at all times. On the other hand, they will also be assigned an academic tutor, whose mission will be to coordinate and help the students during the whole process, solving doubts and facilitating everything they may need. In this way, the student will be accompanied and will be able to discuss any doubts that may arise, both clinical and academic.

2. DURATION: The internship program will have a duration of three continuous weeks, in 8-hour days, 5 days a week. The days of attendance and the schedule will be the responsibility of the center and the professional will be informed well in advance so that they can make the appropriate arrangements.

3. ABSENCE: If the student does not show up on the start date of the Internship Program, they will lose the right to it, without the possibility of reimbursement or change of dates. Absence for more than two days from the internship, without justification or a medical reason, will result in the professional's withdrawal from the internship, therefore, automatic termination of the internship. Any problems that may arise during the course of the internship must be urgently reported to the academic tutor.

4. CERTIFICATION: Professionals who pass the Internship Program will receive a certificate accrediting their stay at the center.

5. EMPLOYMENT RELATIONSHIP: The Internship Program shall not constitute an employment relationship of any kind.

6. PRIOR EDUCATION Some centers may require a certificate of prior education for the Internship Program. In these cases, it will be necessary to submit it to the TECH internship department so that the assignment of the chosen center can be confirmed.

7. DOES NOT INCLUDE: The Internship Program will not include any element not described in the present conditions. Therefore, it does not include accommodation, transportation to the city where the internship takes place, visas or any other items not listed.

However, students may consult with their academic tutor for any questions or recommendations in this regard. The academic tutor will provide the student with all the necessary information to facilitate the procedures in any case.

07
Certificate

This private qualification will allow you to obtain a diploma for the **Internship Program in Computational Fluid Dynamics** 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.

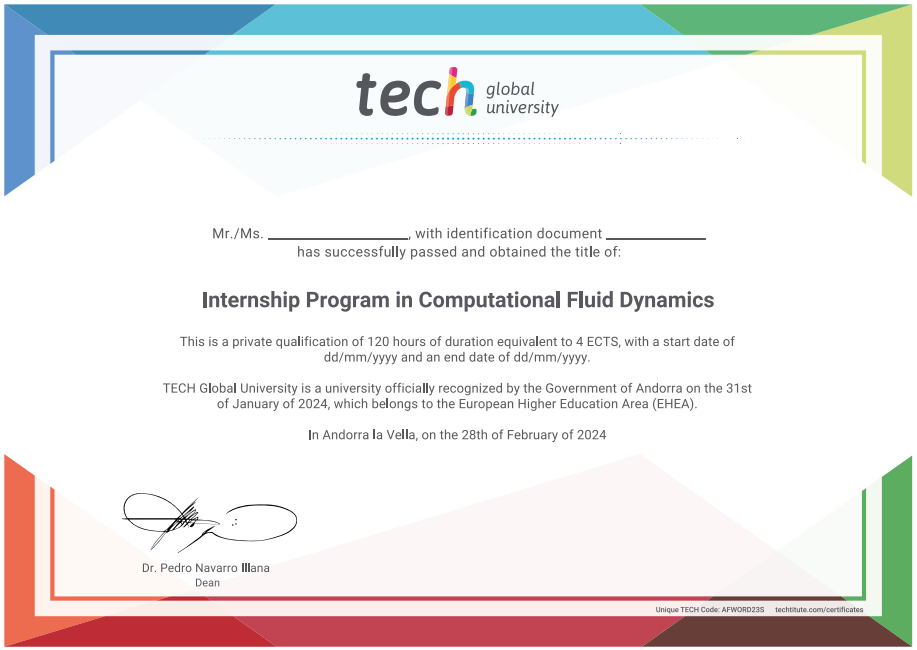
This **TECH Global University** private qualification, is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Internship Program in Computational Fluid Dynamics**

Modality: **online**

Duration: **3 weeks**

Accreditation: **4 ECTS**


tech global university

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

Internship Program in Computational Fluid Dynamics

This is a private qualification of 120 hours of duration equivalent to 4 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
Dean

Unique TECH Code: AFWORD23S techtitute.com/certificates

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