

# Postgraduate Diploma

Modern Front-End Development  
with Frameworks



## Postgraduate Diploma Modern Front-End Development with Frameworks

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Global University
- » Accreditation: 18 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/us/information-technology/postgraduate-diploma/postgraduate-diploma-modern-front-end-development-frameworks](http://www.techtute.com/us/information-technology/postgraduate-diploma/postgraduate-diploma-modern-front-end-development-frameworks)

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# 01

# Introduction

Modern Front-End Development with Frameworks, such as React, Angular or Vue, provide a solid and modular structure, which streamlines the development process by allowing the reuse of components and the clear separation of responsibilities. In addition, they facilitate the creation of interactive and highly responsive user interfaces, thus enhancing the end-user experience. The adoption of these frameworks also encourages development best practices, such as the use of state management and routing tools. In this context, TECH has developed a comprehensive 100% online program, based on the Relearning methodology and in a totally flexible format, which only requires an electronic device with an Internet connection to access all the didactic materials.







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*Thanks to this Postgraduate Diploma, you will master frameworks such as React, Angular or Vue, accelerating the development process, optimizing the performance of applications and ensuring an exceptional user experience"*

Modern Front-End Development with Frameworks, such as React, Angular and Vue, facilitates the creation of highly interactive and responsive applications, thus enhancing the user experience. Also, thanks to its focus on efficiency and scalability, it allows developers to create more robust and maintainable web applications in record time.

Hence, this Postgraduate Diploma is created, which will equip computer scientists with the ability to implement custom hooks and explore advanced architectures in React, thus ensuring the creation of robust and efficient applications. In addition, the focus on performance optimization and the implementation of Server-Side Rendering (SSR) and static generation with Next.js will ensure smooth and fast user experiences.

You will also delve into Vue.js, applying the Composition API, developing dynamic applications with Vue Router and optimizing the performance of your projects. It will also focus on security and advanced testing in Vue, as well as the adoption of Vue 3 and its innovations, preparing professionals to face challenges in frontend development with confidence and skill.

Finally, the program will address Angular application architecture principles, with an emphasis on implementing RxJS for reactive state management and comprehensive testing. In turn, graduates will be able to secure Angular applications against common vulnerabilities and integrate internationalization for greater accessibility. With this comprehensive approach to the main front-end development frameworks, experts will be prepared to tackle any project with knowledge and skill.

In this sense, TECH has launched a 100% online and highly adaptable academic program, so that students only need an electronic device with an Internet connection to access all educational resources. In addition, you can take advantage of the revolutionary Relearning methodology, which focuses on the repetition of essential concepts for a deep and natural understanding of the content.

This **Postgraduate Diploma in Modern Front-End Development with Frameworks** contains the most complete and up-to-date educational program on the market. The most important features include:

- ♦ The development of practical cases presented by experts in Modern Front-End Development with Frameworks
- ♦ The graphic, schematic, and practical content 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 an Internet connection



*Specialize in Modern Front-End Development with Frameworks! You will not only accelerate the time to market of applications, but also contribute to their quality and robustness"*

“

*You'll implement the Composition API and develop dynamic applications with Vue Router, focusing on advanced testing techniques, all through an extensive library of innovative multimedia resources"*

The program's teaching staff includes professionals from the field 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 during the academic year. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.

*You will master comprehensive testing and security, ensuring stability and protection against common vulnerabilities. Benefit from the best didactic materials, at the forefront of technology and education!*

*You will delve into optimization strategies by exploring advanced architectures and the use of Server-Side Rendering (SSR), in an agile and simple way, thanks to the Relearning methodology.*



# 02 Objectives

The main objective of this Postgraduate Diploma is to provide computer scientists with comprehensive and specialized knowledge in the most relevant technologies and tools for frontend development. Therefore, among its specific goals will be to specialize professionals in the mastery of modern frameworks, such as React, Angular and Vue, allowing them to build dynamic, efficient and attractive user interfaces. It will also equip them with the necessary skills to optimize application performance, implement comprehensive testing practices and ensure the accessibility and internationalization of their projects.







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*This academic program aims to specialize highly qualified professionals ready to face the challenges of front-end development in a constantly evolving technological environment”*



## General Objectives

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- ♦ Equip you with the skills necessary to integrate TypeScript into different working environments, including projects using frameworks such as React, Vue and Angular
- ♦ Specialize in best practices for security, testing, internationalization, and accessibility, ensuring the development of React applications that are secure, reliable and accessible
- ♦ Develop specialized knowledge in web security, performance optimization, internationalization, and testing best practices to ensure the creation of secure, efficient, and globally accessible Vue applications
- ♦ Provide a solid and advanced foundation in Angular, from its internal architecture to its integration with other modern web development technologies and tools



*You will delve into the best practices and current trends in Front-End Web Development. With all the quality guarantees that characterize TECH, the best online university in the world according to Forbes!"*





## Specific Objectives

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### Module 1. Advanced React Front-End Development

- ◆ Implement custom hooks
- ◆ Optimize React applications for superior performance
- ◆ Explore advanced React architectures and patterns
- ◆ Apply Server-Side Rendering (SSR) and static generation with Next.js
- ◆ Perform extensive testing on React applications
- ◆ Improve internationalization and accessibility in React

### Module 2. Advanced Vue Front-End Development

- ◆ Implement the Composition API in Vue applications
- ◆ Develop dynamic applications with Vue Router
- ◆ Perform advanced Vue testing
- ◆ Secure Vue applications
- ◆ Optimize the performance of Vue applications
- ◆ Adopt Vue 3 and explore its capabilities

### Module 3. Advanced Angular Front-End Development

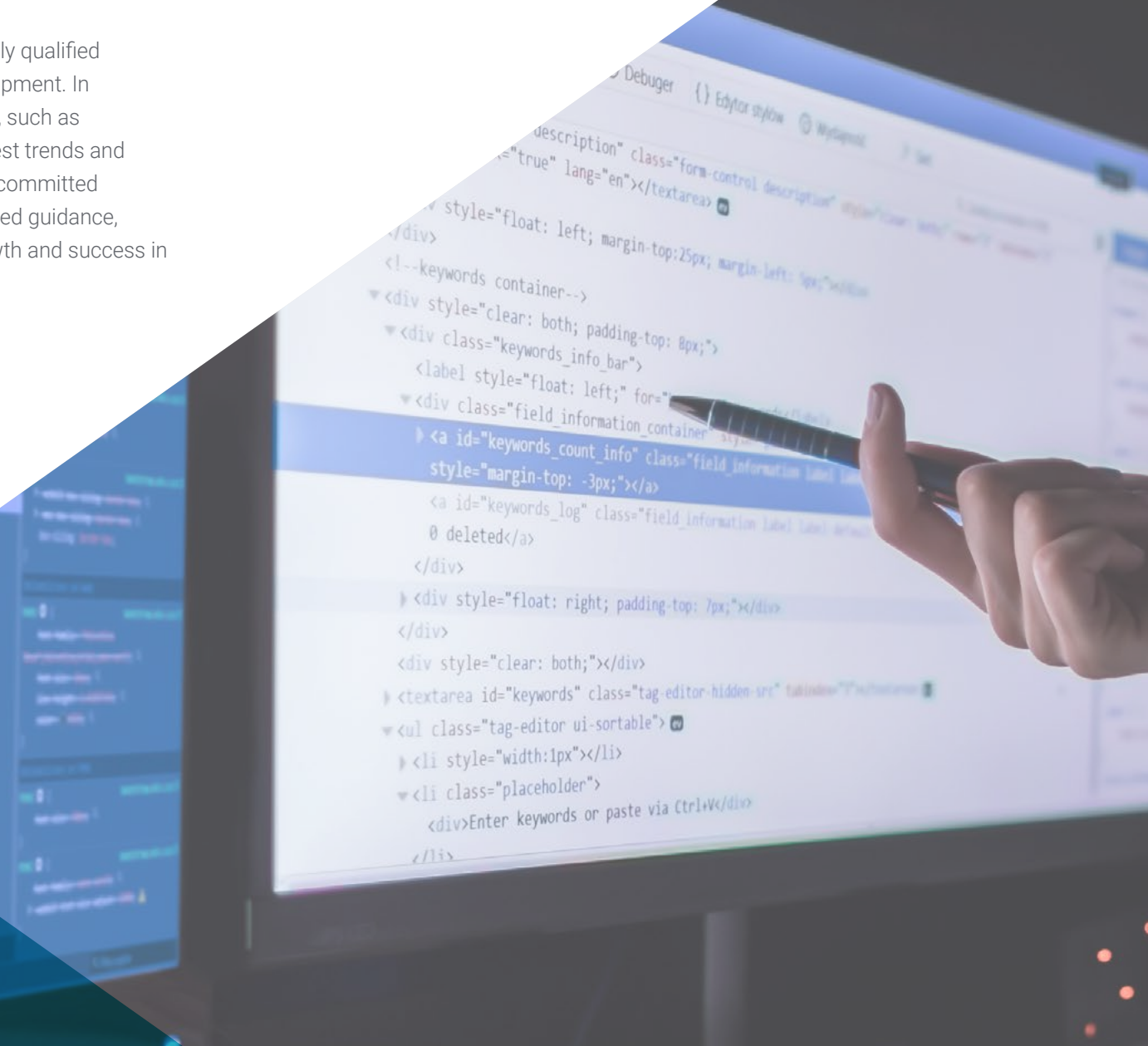
- ◆ Apply Angular application architecture principles
- ◆ Implement RxJS for reactive state management
- ◆ Optimize Angular applications for superior performance
- ◆ Perform comprehensive testing on Angular applications
- ◆ Secure Angular applications against common vulnerabilities
- ◆ Integrate internationalization into Angular



# 03

# Course Management

The faculty behind this Postgraduate Diploma is composed of highly qualified and experienced professionals in the field of Front-End Web Development. In fact, they have a deep knowledge of the most relevant frameworks, such as React, Angular and Vue, as well as a solid understanding of the latest trends and emerging technologies in the front-end arena. In addition, they are committed to the professional development of graduates, providing personalized guidance, constructive feedback and additional resources to foster their growth and success in the field of modern frontend development.





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*Faculty members come from diverse backgrounds, such as web development, mobile application development and computer engineering, allowing them to provide a comprehensive and up-to-date perspective of the front-end landscape.”*

## Management



### Mr. Utrilla Utrilla, Rubén

- ♦ Technology Project Manager at Serquo
- ♦ Full-Stack Developer at ESSP
- ♦ Junior Full-stack Developer at Sinis Technology S.L.
- ♦ Junior Full-stack Developer at Escuela Politécnica Cantoblanco Campus
- ♦ Master in AI and Innovation by Founderz
- ♦ Degree in Computer Engineering from Universidad Autónoma de Madrid
- ♦ Google Cloud Developer course in Google Academic Program

## Professors

### Ms. Del Vado Puell, Andrea

- ♦ Web Developer at Serquo
- ♦ Web Developer at Ribera Salud
- ♦ Software Developer at FutuRS
- ♦ Master's Degree university in Web Services and Applications Development from the International University of Valencia
- ♦ Degree in Computer Engineering from Universidad Complutense de Madrid
- ♦ Full Stack Developer MEAN Bootcamp at GeeksHubs Academy
- ♦ Full Stack Developer MEAN Certification

### Mr. Gallegos Quishpe, Darío Fernando

- ♦ Senior iOS Developer at Tecdata
- ♦ iOS Developer at Sandav Consulting
- ♦ iOS Developer at BBVA
- ♦ Hybrid Developer at IMBox
- ♦ Degree in Computer Engineering from Universidad Complutense de Madrid
- ♦ Certification in Development for Mobile Devices with Android from Comunidad de Madrid
- ♦ Certificate in Big Data & Machine Learning from Universidad Complutense de Madrid

```
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```

```
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```

```
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```

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```
</head>
```

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<body>
```

```
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```

```
<div class="ktk0">
```

```
{...}
```



# 04

# Structure and Content

From mastering leading frameworks such as React, Angular and Vue, to implementing advanced techniques such as Server-Side Rendering (SSR), and static generation with Next.js, computer scientists will gain an in-depth understanding of how to build robust and efficient web applications. In addition, fundamental concepts such as performance optimization, internationalization, accessibility and security will be delved into, ensuring that future developers are equipped to tackle current and future front-end development challenges with confidence and proficiency.



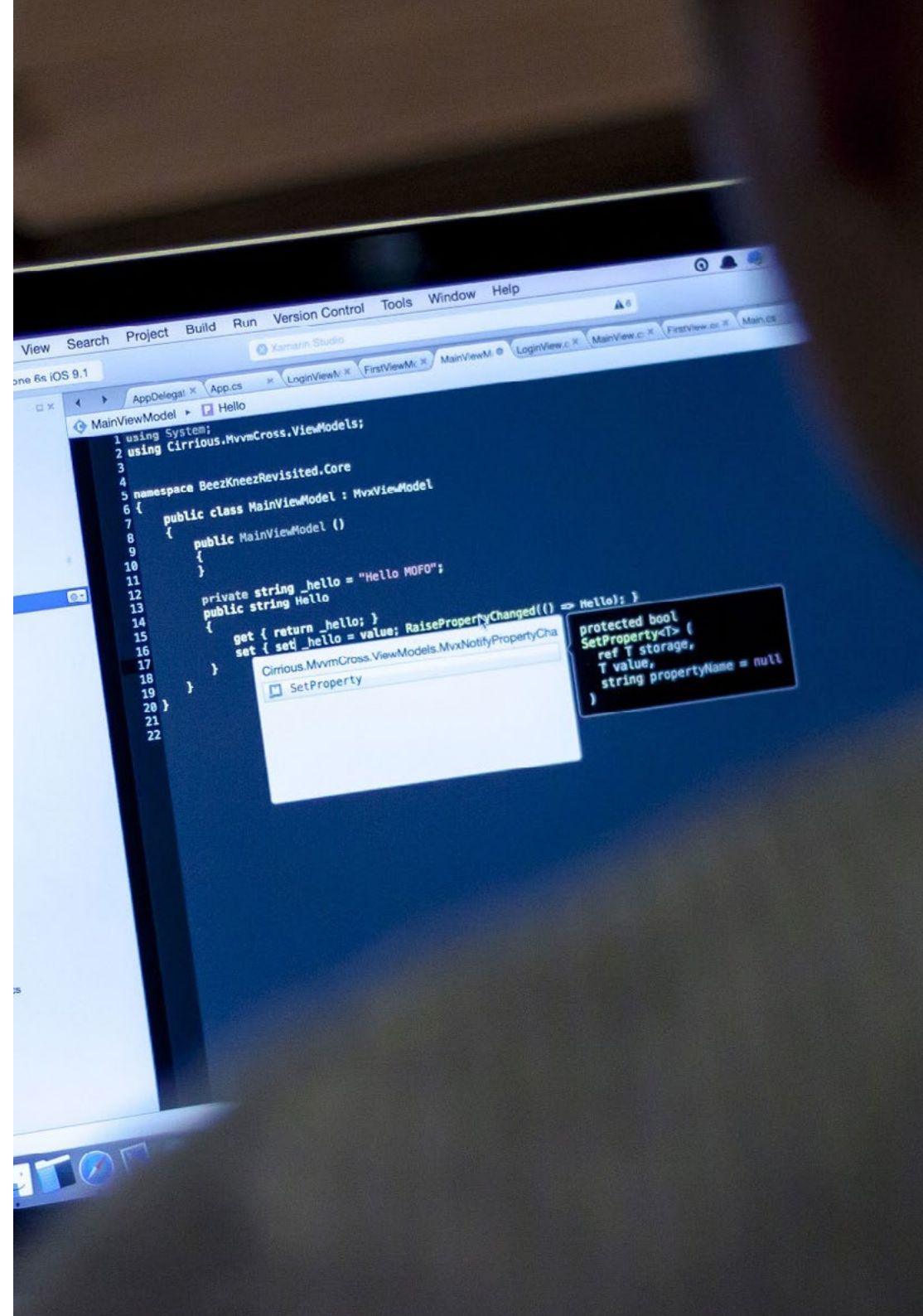


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*The contents of this Postgraduate Diploma will include advanced techniques, such as implementing custom hooks, performance optimization and application security"*

## Module 1. Advanced React Front-End Development

- 1.1. Custom Hooks with React Advanced in Front-End Web Development
  - 1.1.1. Creating Custom Hooks
  - 1.1.2. Composing and Reusing Logic
  - 1.1.3. Best Practices and Advanced Usage Examples
- 1.2. Context API with React in Web Front-End Development
  - 1.2.1. Implementing Context API for Global State Management
  - 1.2.2. Design Patterns and Optimization Strategies
  - 1.2.3. Data Accessibility and Localization
- 1.3. Performance Optimization in Front-End Web Development
  - 1.3.1. Memoization Techniques and Pure Components
  - 1.3.2. Application Profiling and Bottleneck Diagnostics
  - 1.3.3. Deferred Loading and Code-Splitting Strategies
- 1.4. Advanced Architectures and Patterns with React in Front-End Web Development
  - 1.4.1. Micro Front Ends with React
  - 1.4.2. Advanced Architectural Patterns
  - 1.4.3. Design Strategies for Large and Complex Systems
- 1.5. SSR (Server Side Rendering) and Static Generation with Next.js
  - 1.5.1. Advanced Configuration of Next.js for Optimization and SEO
  - 1.5.2. Dynamic Routing and Static Page Generation
  - 1.5.3. Internationalization and Localization in Complex SSR Applications
- 1.6. Testing React Applications in Front-End Web Development
  - 1.6.1. Strategies and Tools for Effective Testing
  - 1.6.2. Mocking and Simulation of APIs and Contexts
  - 1.6.3. Testing Hooks and High Order Components
- 1.7. Complex State Handling in Front-End Web Development
  - 1.7.1. Strategies for Handling Complex and Global States
  - 1.7.2. Use of Libraries such as Redux, MobX, or Zustand
  - 1.7.3. Patterns for State Synchronization and Side Effects



- 1.8. Security in React Applications in Front-End Web Development
  - 1.8.1. Security Strategies in React
    - 1.8.1.1. XSS Vulnerabilities and Data Escapes
    - 1.8.1.2. Use of PropTypes and Typescript
  - 1.8.2. Security in State Handling and Context APIs
    - 1.8.2.1. Sensitive States
    - 1.8.2.2. Data Encryption
  - 1.8.3. Authentication and Access Control Implementation
    - 1.8.3.1. Auth0 or Firebase Auth
    - 1.8.3.2. Custom HOCs and Hooks
- 1.9. Integration with APIs and Microservices in Front-End Web Development
  - 1.9.1. Design Patterns for Efficient Integration with Back Ends
  - 1.9.2. Handling Authentication, Caching and Load States
  - 1.9.3. Strategies for Error and Fallback Handling
- 1.10. State of the Art and Trends of the React Ecosystem in Front-End Web Development
  - 1.10.1. New Features of the React Ecosystem
  - 1.10.2. React and the Future of Web Development
  - 1.10.3. Community, Resources and Emerging Tools

## Module 2. Advanced Vue Front-End Development

- 2.1. Composition API in Front-End Web Development
  - 2.1.1. Composition API Compared to Options API
  - 2.1.2. Design Patterns and Logic Reuse
  - 2.1.3. Practical Examples and Advanced Applications
- 2.2. Vue Router in Front-End Web Development
  - 2.2.1. Advanced Routing Strategies
  - 2.2.2. Lazy Loading and Code Splitting with Vue
  - 2.2.3. Integrating Vue Router with Transitions and Animations
- 2.3. State Management with Vue in Front-End Web Development
  - 2.3.1. Architecture and Modularity in Vuex
  - 2.3.2. Advanced Patterns and Complex State Management
  - 2.3.3. Performance Optimizations in Vuex
- 2.4. Testing with Vue in Front-End Web Development
  - 2.4.1. Configuration of Test Environments with Vue Test Utils
  - 2.4.2. Unit and Integration Tests
  - 2.4.3. Mocking and Dependency Simulation
- 2.5. Security in Vue Applications
  - 2.5.1. Security in Vue
    - 2.5.1.1. Risk Identification and Mitigation
    - 2.5.1.2. Content Escape and Injection Prevention
  - 2.5.2. Safe State Handling and Local Storage
    - 2.5.2.1. Safe Practices
    - 2.5.2.2. Encryption of Sensitive Data
    - 2.5.2.3. Session Token Management
  - 2.5.3. Authentication and Route Protection
    - 2.5.3.1. Vue Router Configuration
    - 2.5.3.2. Creating Secure Browsing and Redirection
- 2.6. Development of Advanced Components with Vue in Front-End Web Development
  - 2.6.1. Design and Architecture of Reusable Components
  - 2.6.2. Advanced Slots and Composition Patterns
  - 2.6.3. Component Libraries and System Design
- 2.7. Performance Optimization with Vue in Front-End Web Development
  - 2.7.1. Analyzing and Improving the Performance of Vue Applications
  - 2.7.2. Deferred Loading and Code-Splitting Strategies
  - 2.7.3. Efficient Use of Watchers and Computers
- 2.8. Vue 3 and Application Composition in Front-End Web Development
  - 2.8.1. New Features of Vue 3
  - 2.8.2. Migration from Vue 2 to Vue 3
  - 2.8.3. Using Vue 3 for Large-Scale Applications
- 2.9. Server Side Rendering and SSR with Nuxt.js
  - 2.9.1. Configuring and Optimizing Nuxt.js for SSR
  - 2.9.2. SEO and Static Site Generation
  - 2.9.3. Transition from SPA to Universal Applications
- 2.10. State of the Art and Trends with Vue in Front-End Web Development
  - 2.10.1. Vue Ecosystem and Emerging Tools
  - 2.10.2. Vue and PWA Development
  - 2.10.3. Community, Continuous Learning and Resources



### Module 3. Advanced Angular Front-End Development

- 3.1. Angular Architecture and Modules in Front-End Web Development
  - 3.1.1. Angular Application Architecture
  - 3.1.2. *Lazy Loading* and Module Organization
  - 3.1.3. Dependency Injection and Providers
- 3.2. Advanced Path Management with Angular Applications in Front-End Web Development
  - 3.2.1. Dynamic Configuration of Routes
  - 3.2.2. Lazy Loading Tactics
  - 3.2.3. Advanced Navigation Strategies
- 3.3. RxJS and Reactive State Management with Angular Applications in Front-End Web Development
  - 3.3.1. Reactive Patterns with RxJS
  - 3.3.2. Advanced Strategies for Event and Data Handling
  - 3.3.3. RxJS Integration with Angular and HTTP Forms
- 3.4. Optimization of Angular Applications in Front-End Web Development
  - 3.4.1. Optimization Techniques and Performance Analysis
  - 3.4.2. AOT Compilation and Tree Shaking
  - 3.4.3. Caching and Service Worker Strategies
- 3.5. Testing in Angular in Front-End Web Development
  - 3.5.1. Test Environment Configuration with Jasmine and Karma
  - 3.5.2. Testing Components, Services and Pipes
  - 3.5.3. Mocking and Dependency Management in Test
- 3.6. Dynamic Forms and Validation with Angular Applications in Front-End Web Development
  - 3.6.1. Reactive Forms vs. *Template-Driven*
  - 3.6.2. Custom Validators and Form State Handling
  - 3.6.3. Integration with External Libraries and Error Handling
- 3.7. Angular Application Security in Front-End Web Development
  - 3.7.1. Security in Angular
    - 3.7.1.1. Common Vulnerabilities
    - 3.7.1.2. XSS and CSRF Sanitization and Prevention
  - 3.7.2. Authentication and Authorization Strategies
    - 3.7.2.1. JWT and OAuth2
    - 3.7.2.2. Route Guards
  - 3.7.3. Security Enhancements with HTTP Client







- 3.8. Development of Angular Libraries in Front-End Web Development
  - 3.8.1. Creating and Publishing Reusable Libraries
  - 3.8.2. Best Practices and Versioning
  - 3.8.3. Library Integration and Documentation
- 3.9. Angular Universal for SSR in Front-End Web Development
  - 3.9.1. Configuration and Optimization of Angular Universal
  - 3.9.2. SEO and Load Time Improvements
  - 3.9.3. Prerendering Strategies and Static Content Generation
- 3.10. State of the Art and Trends in Front-End Web Development
  - 3.10.1. Recent Updates and Angular Roadmap
  - 3.10.2. Angular Tools and Ecosystem
  - 3.10.3. Integration with Emerging Technologies

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*With a focus on practice and application of theoretical knowledge, this program will prepare you to excel in a dynamic and highly competitive job market"*

# 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.





““

*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 has been the most widely used learning system among the world's leading Information Technology schools for as long as they have existed. 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 course, students 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 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.



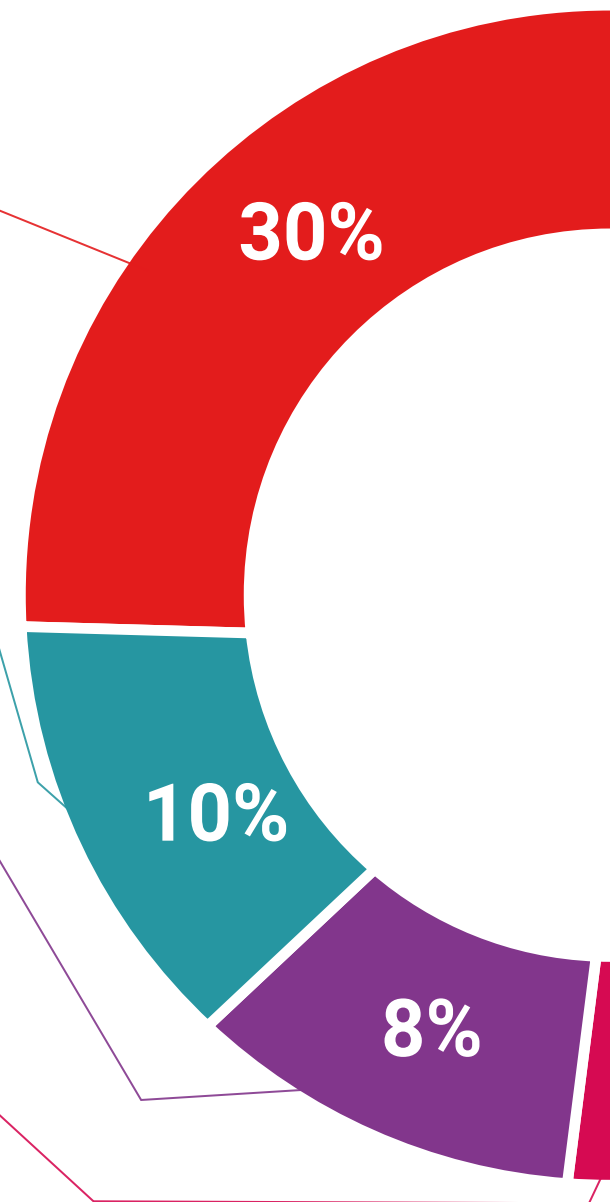
### Practising Skills and Abilities

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 Diploma in Modern Front-End Development with Frameworks guarantee students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma 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 a **Postgraduate Diploma in Modern Front-End Development with Frameworks** 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.

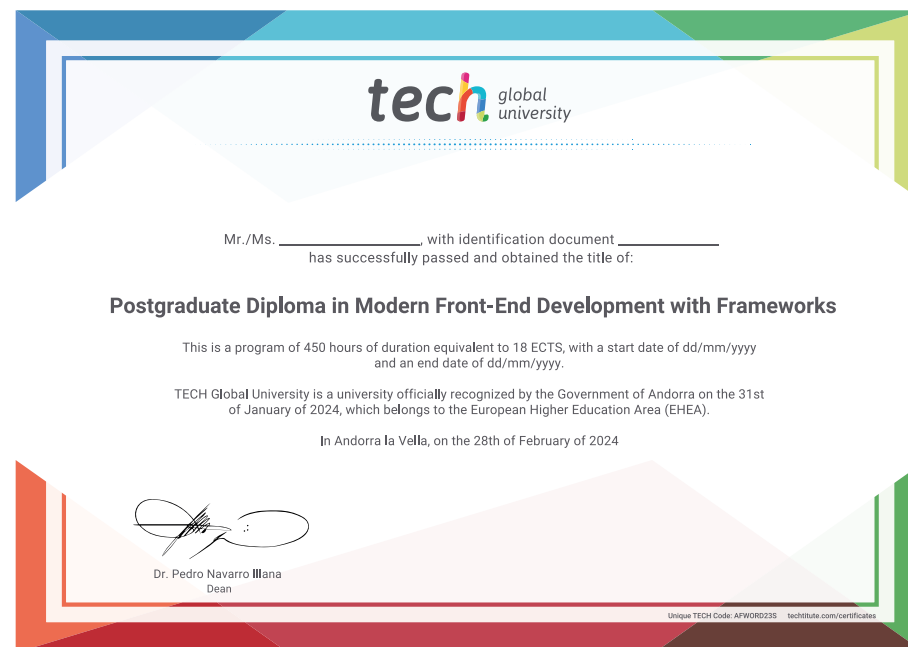
This **Tech Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Diploma in Modern Front-End Development with Frameworks**

Modality: **online**

Duration: **6 months**

Accreditation: **18 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.



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