

Master's Degree

Front-End Web Development



Master's Degree Front-End Web Development

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Global University
- » Credits: 60 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: www.techtute.com/us/information-technology/master-degree/master-front-end-web-development

Index

01

Introduction

p. 4

02

Objectives

p. 8

03

Skills

p. 14

04

Course Management

p. 18

05

Structure and Content

p. 22

06

Methodology

p. 32

07

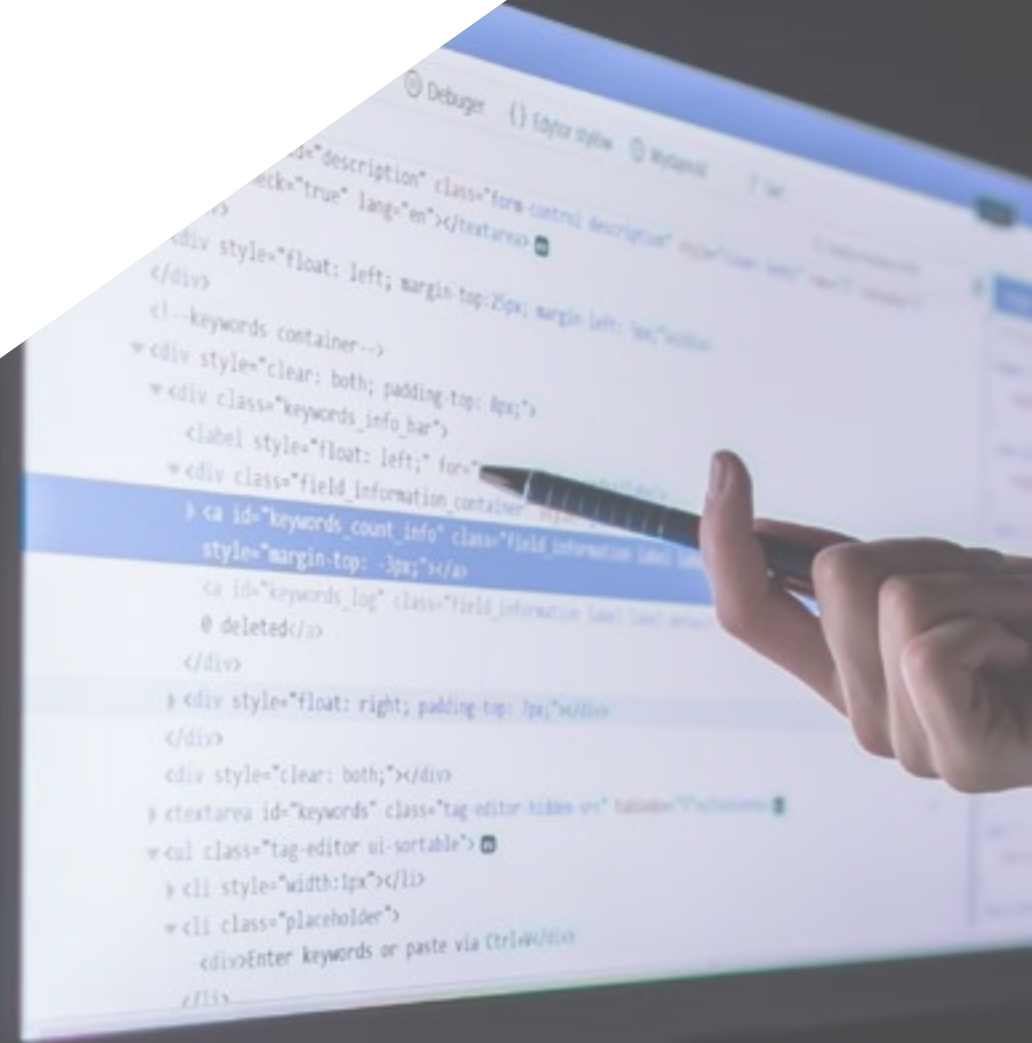
Certificate

p. 40

01

Introduction

Front-end Web Development offers a number of fundamental benefits in the creation of websites and web applications. First, it enables an exceptional user experience by ensuring an attractive design and smooth navigation, increasing visitor retention and interaction with the content. In addition, it enables rapid content updates, which is crucial in a constantly evolving web environment. For this reason, highly qualified professionals in this field are increasingly in demand to ensure the effective development of applications and user interfaces. Therefore, TECH has developed this comprehensive 100% online program, based on the Relearning methodology, a revolutionary learning method that reduces the long hours of study and memorization.



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Thanks to this 100% online Master's Degree, you will use Front-end Web Development to significantly contribute to building strong brands and achieving online business goals"

Front-end Web Development provides a smooth and engaging user experience, which increases user retention and satisfaction. It also facilitates content accessibility, allowing websites to be usable by a wide range of people, including those with disabilities. It is also crucial for search engine optimization (SEO), as a well-built structure and responsive design improve visibility.

This is how this Master's Degree was conceived, which will offer a complete immersion in advanced strategies and techniques, which are essential in front-end architecture. From state management, to performance optimization and security, computer scientists will acquire practical skills to build applications that meet today's requirements and are ready for future demands. A thorough understanding of CSS architecture will also be developed.

Emphasis will also be placed on the application of best practices and standards, such as WCAG and ARIA, to ensure the accessibility of applications to all users. In addition, professionals will gain advanced knowledge in TypeScript and its integration in different work environments, including projects using frameworks, such as React, Vue and Angular.

Finally, specialized aspects such as web security, performance optimization, internationalization and testing best practices will be addressed, ensuring that graduates are equipped to develop secure, efficient and accessible applications. Likewise, they will delve into the knowledge of specific frameworks, such as React, Vue and Angular, as well as advanced techniques for responsive design and optimization for mobile devices, including Progressive Web Apps.

In this sense, TECH has implemented a 100% online and totally flexible academic degree, to the point that students will only need an electronic device with an Internet connection to access all teaching materials. At the same time, you will benefit from the revolutionary Relearning methodology, which consists of the reiteration of fundamental concepts for an optimal and organic assimilation of content.

This **Master's Degree in Front-End Web Development** contains the most complete and up-to-date program on the market. The most important features include:

- ♦ The development of practical cases presented by experts in Front-End Web Development
- ♦ The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- ♦ Practical exercises where self-assessment can be used to improve learning
- ♦ Its special emphasis on innovative methodologies
- ♦ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ♦ Content that is accessible from any fixed or portable device with an Internet connection



You will delve into technologies and tools relevant to the creation of attractive and functional user interfaces, such as HTML, CSS and JavaScript, through didactic materials at the forefront of technology and education"

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You'll master emerging technologies such as WebXR, Artificial Intelligence and Machine Learning, giving you a solid foundation for creating innovative user experiences on the frontend”

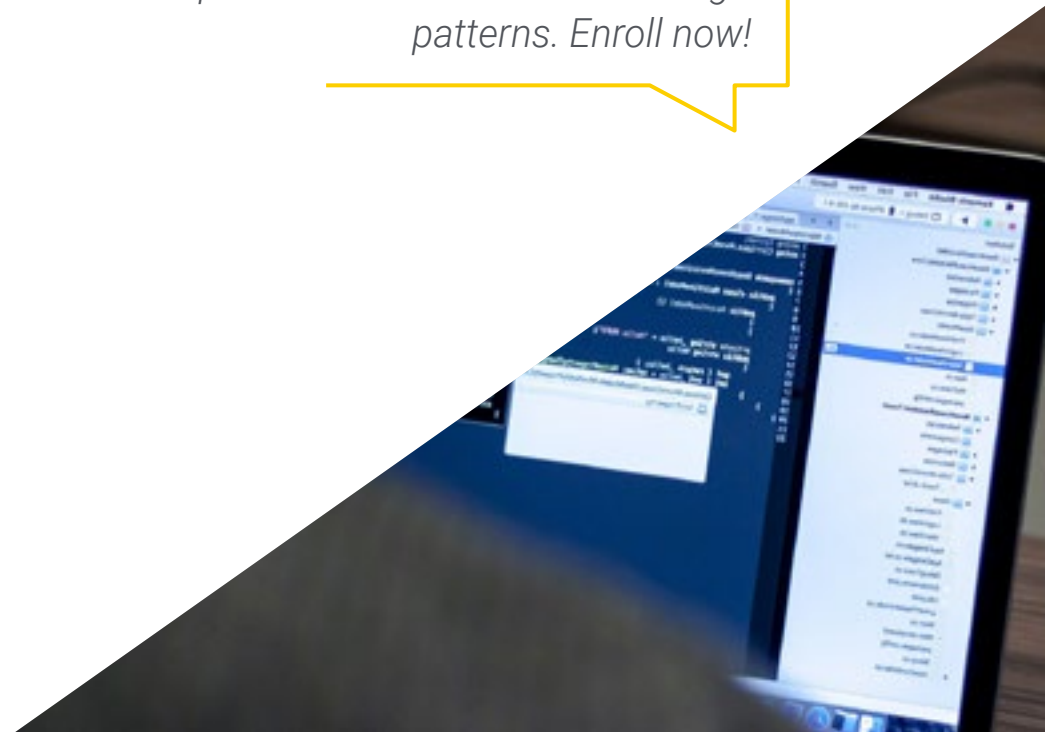
The program's teaching staff includes professionals from the field who contribute their work experience to this educational program, as well as renowned specialists from leading societies and prestigious universities.

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 create aesthetically pleasing and functionally rich user interfaces by applying user-centered UX design principles. Don't miss this unique opportunity that only TECH offers you!

Specialize in the complete mastery of Front-End Web Development technologies, from the use of custom hooks to the implementation of advanced design patterns. Enroll now!



02 Objectives

Through a hands-on, project-oriented approach, the program will specialize computer scientists to master advanced strategies in frontend architecture, including state management, performance optimization, and security. In addition, the creation of functional and aesthetically appealing web applications will be encouraged, applying UX design principles. With an emphasis on current best practices and exploration of emerging technologies, such as WebXR, Artificial Intelligence and Machine Learning, this program will prepare professionals to meet the challenges of modern web development and lead innovation in the front-end field.



“

This Master's Degree aims to prepare you in the fundamental technologies, tools and practices to excel in the industry. What are you waiting for to enroll?"



General Objectives

- ♦ Facilitate hands-on learning of advanced strategies and techniques in frontend architecture, including state management, performance and security
- ♦ Develop a comprehensive knowledge of CSS architecture, including understanding and application of advanced methodologies for structuring the code efficiently
- ♦ Apply best practices and standards (such as WCAG and ARIA) in their projects, ensuring that applications are accessible to all users
- ♦ Equip you with the skills necessary to integrate TypeScript into different working environments, including projects using frameworks such as React, Vue and Angular
- ♦ Train 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
- ♦ Develop skills to optimize applications for mobile devices, improving performance, accessibility and user experience, with a special focus on Progressive Web Apps
- ♦ Develop specialized knowledge of WCAG and ARIA, as well as testing and validation strategies, to ensure that applications comply with legal and ethical web accessibility standards
- ♦ Provide a solid understanding of WebXR, including its APIs, and the fundamental differences between AR and VR, to develop applications that leverage these technologies on the frontend
- ♦ Use specific frameworks and libraries to create web AR experiences and interactive VR environments, focusing on design principles, usability, and performance optimization
- ♦ Provide a solid foundation in Artificial Intelligence (AI) and Machine Learning (ML) concepts, preparing developers to integrate these technologies into the creation of user interfaces and user experiences



Specific Objectives

Module 1. Advanced Front-End Web Architecture and Development

- ♦ Master the principles of front-end architecture
- ♦ Analyze advanced state management in front-end applications
- ♦ Examine performance optimization in front-end applications
- ♦ Ensure front-end security policies
- ♦ Compile testing techniques and tools
- ♦ Explore micro front-end architectures and event-driven architectures

Module 2. CSS Architecture, Preprocessors and Front-End Interface Design and User Experience

- ♦ Master CSS methodologies
- ♦ Implement modern CSS and layouts
- ♦ Create animations and microinteractions
- ♦ Select and customize CSS frameworks
- ♦ Ensure web accessibility
- ♦ Develop design systems that appeal to users

Module 3. Using Advanced TypeScript in Front-End Web Development

- ♦ Master advanced types and utilities in TypeScript
- ♦ Integrate TypeScript with popular front-end frameworks
- ♦ Implement advanced error handling and debugging
- ♦ Apply decorators and metaprogramming concepts
- ♦ Optimize TypeScript code for production
- ♦ Develop reactive front-end applications with TypeScript

Module 4. 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 5. 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 6. 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

Module 7. Mobile Development and Advanced Responsive Design in Front-End

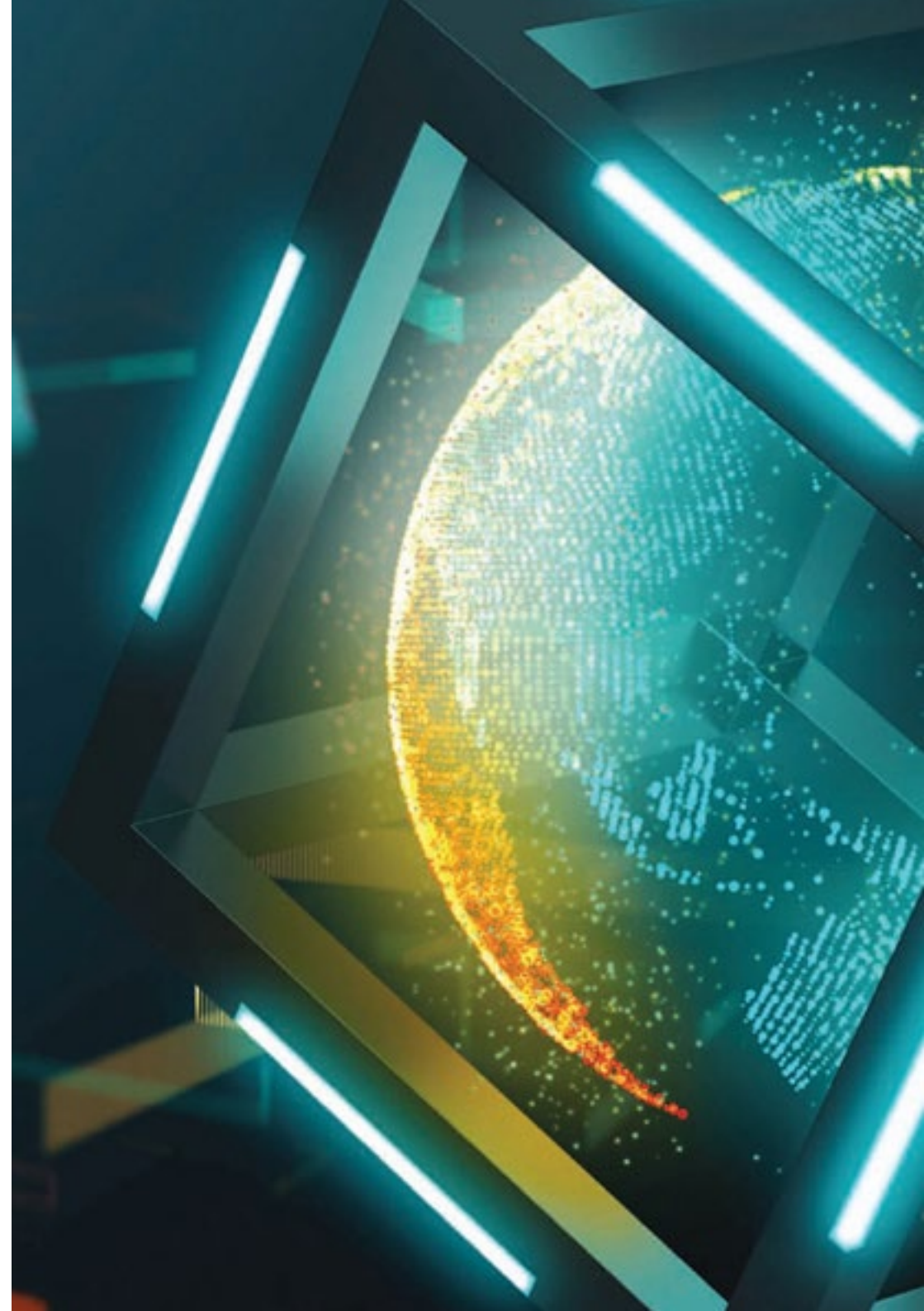
- ♦ Implement advanced media queries techniques
- ♦ Use frameworks and tools for responsive design
- ♦ Develop Progressive Web Apps (PWA)
- ♦ Ensure accessibility in mobile applications
- ♦ Incorporate adaptive navigation and design patterns
- ♦ Explore development with native application frameworks

Module 8. Internationalization and Front-End Web Accessibility

- ♦ Implement effective localization and globalization strategies
- ♦ Integrate web accessibility principles from the initial design stage
- ♦ Use tools and frameworks to facilitate i18n
- ♦ Develop accessible multimedia content techniques
- ♦ Ensure accessibility in SPAs and PWAs
- ♦ Keep up to date with accessibility legislation and regulations

Module 9. Augmented and Virtual Reality in Front-End Web Development

- ♦ Master the basics of WebXR and its API
- ♦ Develop AR experiences on the web
- ♦ Create interactive VR environments
- ♦ Design UI/UX for WebXR applications
- ♦ Optimize performance for WebXR experiences
- ♦ Ensure Accessibility in WebXR Applications



Module 10. Artificial Intelligence and Machine Learning in Front-End Web Development

- ♦ Develop specialized knowledge on Artificial Intelligence (AI) and Machine Learning (ML)
- ♦ Integrate ML models in front-end applications
- ♦ Personalize content and recommendations with AI
- ♦ Implement image recognition and NLP in front-end applications
- ♦ Optimize application performance with AI
- ♦ Secure and validate front-end AI integrations



You will master advanced front-end architecture strategies, including state management, performance optimization and security, all through didactic materials at the cutting edge of technology and education"

03

Skills

This university program will provide computer scientists with skills that will include mastering advanced strategies in front-end architecture, such as state management, performance optimization and security, as well as the ability to build scalable, maintainable and secure web applications. In addition, professionals will delve into CSS architecture and apply advanced methodologies to structure code efficiently. They will also equip themselves with skills to design aesthetically pleasing and functionally rich user interfaces, applying user-centered UX design principles.





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You will apply best practices in accessibility, internationalization and testing, ensuring that the applications you develop are accessible to all users and comply with legal and ethical standards"



General Skills

- ♦ Build scalable and secure applications
- ♦ Create aesthetically pleasing user interfaces
- ♦ Apply accessibility best practices and standards in projects
- ♦ Develop advanced TypeScript knowledge
- ♦ Integrate TypeScript in different environments
- ♦ Develop advanced knowledge of React
- ♦ Train in security, testing and internationalization best practices in React
- ♦ Implement sophisticated solutions in Vue
- ♦ Develop specialized knowledge in web security and optimization in Vue
- ♦ Provide a solid and advanced foundation in Angular
- ♦ Master mobile application optimization skills
- ♦ Develop specialized knowledge in WCAG and ARIA
- ♦ Acquire a solid understanding of WebXR
- ♦ Use specific frameworks and libraries to create AR experiences on the web
- ♦ Provide a solid foundation in Artificial Intelligence (AI) and Machine Learning (ML) concepts
- ♦ Master tools such as TensorFlow.js





Specific Skills

- ♦ Analyze advanced state management in front-end applications
- ♦ Compile testing techniques and tools
- ♦ Implement modern CSS and layouts
- ♦ Master advanced types and utilities in TypeScript
- ♦ Implement advanced error handling and debugging
- ♦ Implement custom hooks
- ♦ Optimize React applications for superior performance
- ♦ Apply Server-Side Rendering (SSR) and static generation with Next.js.
- ♦ Implement the Composition API in Vue applications
- ♦ Adopt Vue 3 and explore its capabilities
- ♦ Apply Angular application architecture principles
- ♦ Implement RxJS for reactive state management
- ♦ Implement advanced media queries techniques
- ♦ Use frameworks and tools for responsive design
- ♦ Develop Progressive Web Apps (PWA)
- ♦ Ensure accessibility in mobile applications
- ♦ Use tools and frameworks to facilitate i18n
- ♦ Ensure accessibility in SPAs and PWAs
- ♦ Master the basics of WebXR and its API
- ♦ Develop AR experiences on the web
- ♦ Create interactive VR environments
- ♦ Design UI/UX for WebXR applications
- ♦ Develop specialized knowledge on Artificial Intelligence (AI) and Machine Learning (ML)
- ♦ Implement image recognition and NLP in front-end applications



You will gain advanced knowledge in frameworks such as React, Vue and Angular, preparing you to face the challenges of Front-End Web Development in a constantly evolving digital world"

04

Course Management

The teachers behind this Master's Degree are highly qualified and experienced experts in the field of web development. In fact, these professionals are committed to educational excellence and have a solid background in the use of front-end technologies and development methodologies. In addition, their experience and expertise will enable graduates to receive quality knowledge, preparing them adequately for the challenges of Front-End Web Development in today's working world.



“

These faculty members have a solid understanding of the fundamental concepts of web development, such as HTML, CSS and JavaScript, and are up to date with the latest developments in frameworks and libraries such as React, Vue and Angular"

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

**Ms. Jiménez Monar, Angélica Liceth**

- ♦ Software Developer at Serquo
- ♦ Technical Support Specialist at Tecnocom
- ♦ Degree in Computer Engineering from Universidad Autónoma de Madrid
- ♦ Superior Degree in Networked Computer Systems Administration

Ms. Zayat Mata, Ana

- ♦ Software Development Team Leader at Taric SAU
- ♦ Software Developer at Taric SAU
- ♦ Master's Degree in Computer Engineering from Universidad Autónoma de Madrid
- ♦ Degree in Computer Engineering from Universidad Autónoma de Madrid

05

Structure and Content

The content of this Master's Degree will cover a wide range of topics, designed to provide IT professionals with in-depth, practical knowledge in the field of web development. From fundamental concepts such as HTML, CSS and JavaScript, to advanced technologies such as JavaScript frameworks (React, Vue, Angular) and TypeScript, professionals will acquire skills in building modern, responsive web applications. In addition, the focus will be on state management, performance optimization, web security, and accessibility, ensuring that graduates will be prepared to meet the challenges of front-end development in a constantly evolving environment.



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The contents of this high quality university program will include specialized modules on UX design, SEO, testing, internationalization and new technologies, such as WebXR and Machine Learning"

Module 1. Advanced Front-End Web Architecture and Development

- 1.1. Advanced Front-End Architecture
 - 1.1.1. Separation of Concerns
 - 1.1.2. Design and Architectural Patterns
 - 1.1.3. MVC, MVP, MVVM
 - 1.1.4. Singleton, Factory, Observer
 - 1.1.5. Functional Patterns
 - 1.1.6. Modularity and Componentization
- 1.2. State Management in Front End
 - 1.2.1. State Management Strategies
 - 1.2.2. Libraries and Frameworks
 - 1.2.3. Patterns and Best Practices
- 1.3. Performance Optimization in Front-End Web Development
 - 1.3.1. Deferred Loading and Resource Optimization
 - 1.3.2. Performance Analysis Tools (Profiling)
 - 1.3.3. Caching and Service Worker Strategies
 - 1.3.4. Caching
- 1.4. Security in Front-End Web Development
 - 1.4.1. Preventing XSS and CSRF Attacks
 - 1.4.2. Secure Authentication and Session Handling
 - 1.4.3. CSP Implementation
- 1.5. Testing and Code Quality in Front-End Web Development
 - 1.5.1. Automated Testing (Unit, Integration, E2E)
 - 1.5.2. Code Analysis Tools
 - 1.5.3. Refactoring Strategies
 - 1.5.4. Continuous Integration and Continuous Delivery (CI/CD)
- 1.6. Micro Front Ends
 - 1.6.1. Architecture
 - 1.6.2. Communication between Micro Front Ends
 - 1.6.3. Deployment and Versioning
- 1.7. Event-Driven Architectures in Front-End Web Development
 - 1.7.1. Asynchronous Communication Patterns
 - 1.7.2. EventBus and Event Handling
 - 1.7.3. Front-End Applications

- 1.8. Server-Side Rendering (SSR) and Static Site Generation (SSG)
 - 1.8.1. Differences and Applications
 - 1.8.2. Tools and Frameworks (Next.js, Nuxt.js)
 - 1.8.3. SEO and Load Optimization
- 1.9. Progressive Application Development (PWA) in Front End
 - 1.9.1. Service Workers
 - 1.9.2. Offline Caching Strategies
 - 1.9.3. Installability and Hardware Access
- 1.10. Single Page Application Architecture (SPA) in Front-End Web Development
 - 1.10.1. Routing and State Management
 - 1.10.2. Lazy Loading and Code Splitting
 - 1.10.3. Form Handling and Validation

Module 2. CSS Architecture, Preprocessors and Front-End Interface Design and User Experience

- 2.1. CSS Methodologies in Front-End Web Development
 - 2.1.1. BEM, SMACSS, Atomic Design
 - 2.1.2. Organization and Structure of CSS Code
 - 2.1.3. Scalability and Maintainability
- 2.2. CSS Preprocessors in Front-End Web Development
 - 2.2.1. SASS, LESS, and Stylus
 - 2.2.2. Mixins, Functions, and Variables
 - 2.2.3. Managing Themes and Dynamic Styles
- 2.3. Modern Cascading Style Sheets (CSS) and Layouts in Front-End Web Development
 - 2.3.1. Flexbox and CSS Grid
 - 2.3.2. Responsive Layouts and Modern Techniques
 - 2.3.3. Best Practices and Design Patterns
- 2.4. Animations and Microinteractions in Front-End Web Development
 - 2.4.1. CSS Animations and Transitions
 - 2.4.2. JavaScript Libraries for Complex Animations
 - 2.4.3. Impact on User Experience
- 2.5. Cascading Style Sheets (CSS) Frameworks in Front-End Web Development
 - 2.5.1. Bootstrap, Tailwind, Materialize
 - 2.5.2. Customization and Optimization
 - 2.5.3. Appropriate Choice according to the Project

- 2.6. Accessibility in Front-End Web Development
 - 2.6.1. Accessible Design
 - 2.6.2. Evaluation Tools and Techniques
 - 2.6.3. Implementation of ARIA Roles and Attributes
 - 2.7. System Design in Front-End Web Development
 - 2.7.1. System Design
 - 2.7.2. Creation and Maintenance of Style Guides
 - 2.7.3. Use of Tools such as Storybook
 - 2.8. UI Design and UX Principles in Front-End Web Development
 - 2.8.1. Colors and Fonts
 - 2.8.2. User-Centered Design and Empathy Maps
 - 2.8.3. Prototyping and Iterative Feedback
 - 2.9. Advanced Responsive Design in Front-End Web Development
 - 2.9.1. Advanced Techniques and Modern Approaches
 - 2.9.2. Mobile - First and Adaptability Design
 - 2.9.3. Testing and Tools for Responsive Design
 - 2.10. Design Trends in Front-End Web Development
 - 2.10.1. UI Voice Design and Virtual Assistants
 - 2.10.2. Augmented and Virtual Reality in UI
 - 2.10.3. Future of Web Design and Emerging Technologies
- Module 3. Using Advanced TypeScript in Front-End Web Development**
- 3.1. Advanced Types and TypeScript Utilities in Front-End Web Development
 - 3.1.1. Conditional, Mapped, and Utility Types
 - 3.1.2. Advanced Constructs
 - 3.1.3. Design Patterns with Advanced Types
 - 3.2. Integrating TypeScript with Frameworks in Front-End Web Development
 - 3.2.1. Using TypeScript in React, Vue, and Angular
 - 3.2.2. Component Typing and Creation
 - 3.2.3. Strategies for Migrating from JavaScript to TypeScript
 - 3.3. Error Handling and Debugging with TypeScript in Front-End Web Development
 - 3.3.1. Advanced Error Handling Techniques
 - 3.3.2. Environment Configuration for Efficient Debugging
 - 3.3.3. Use of Source Maps and Inspection Tools
 - 3.4. Decorators and Metaprogramming with TypeScript in Front-End Web Development
 - 3.4.1. Decorator Applications and Limitations
 - 3.4.2. Metaprogramming Patterns and Reflection
 - 3.4.3. Practical Application of Front-End Development
 - 3.5. Code Optimization with TypeScript in Front-End Web Development
 - 3.5.1. Tools for Analysis and Optimization
 - 3.5.2. Techniques to Reduce Bundle Size
 - 3.5.3. Strategies to Improve Execution Time
 - 3.6. Testing and Code Quality with TypeScript in Front-End Web Development
 - 3.6.1. Testing Frameworks Compatible with TypeScript
 - 3.6.2. Strategies for Component and Service Testing
 - 3.6.3. Maintaining a Healthy Code Base
 - 3.7. Typescript in Server-side Applications with Node.js in Front-End Web Development
 - 3.7.1. Node.js Project Configurations with Typescript
 - 3.7.2. Typescript in RESTful and GraphQL APIs
 - 3.7.3. Security and Error Handling
 - 3.8. Scalable Application Architectures with Typescript in Front-End Web Development
 - 3.8.1. Designing Clean and Scalable Architectures
 - 3.8.2. Microservices and TypeScript
 - 3.8.3. Design Patterns and SOLID
 - 3.9. Deployment and Monitoring of TypeScript Applications in Front-End Web Development
 - 3.9.1. Tools and Services for Efficient Deployment
 - 3.9.2. Performance Monitoring and Error Detection
 - 3.9.3. Specific Optimizations for TypeScript Applications
 - 3.10. Future of TypeScript in Front-End Web Development
 - 3.10.1. Language Evolution and Upcoming Features
 - 3.10.2. Community, Resources and Continuous Learning
 - 3.10.3. Impact on the Front-End Development Ecosystem

Module 4. Advanced React Front-End Development

- 4.1. Custom Hooks with React Advanced in Front-End Web Development
 - 4.1.1. Creating Custom Hooks
 - 4.1.2. Composing and Reusing Logic
 - 4.1.3. Best Practices and Advanced Usage Examples
- 4.2. Context API with React in Web Front-End Development
 - 4.2.1. Implementing Context API for Global State Management
 - 4.2.2. Design Patterns and Optimization Strategies
 - 4.2.3. Data Accessibility and Localization
- 4.3. Performance Optimization in Front-End Web Development
 - 4.3.1. Memoization Techniques and Pure Components
 - 4.3.2. Application Profiling and Bottleneck Diagnostics
 - 4.3.3. Deferred Loading and Code-Splitting Strategies
- 4.4. Advanced Architectures and Patterns with React in Front-End Web Development
 - 4.4.1. Micro Front Ends with React
 - 4.4.2. Advanced Architectural Patterns
 - 4.4.3. Large System Design Strategies
- 4.5. SSR (Server Side Rendering) and Static Generation with Next.js
 - 4.5.1. Advanced Configuration of Next.js for Optimization and SEO
 - 4.5.2. Dynamic Routing and Static Page Generation
 - 4.5.3. Internationalization and Localization in Complex SSR Applications
- 4.6. Testing React Applications in Front-End Web Development
 - 4.6.1. Strategies and Tools for Effective Testing
 - 4.6.2. Mocking and Simulation of APIs and Contexts
 - 4.6.3. Testing Hooks and High Order Components
- 4.7. Complex State Handling in Front-End Web Development
 - 4.7.1. Strategies for Handling Complex and Global States
 - 4.7.2. Use of Libraries such as Redux, MobX, or Zustand
 - 4.7.3. Patterns for State Synchronization and Side Effects

- 4.8. Security in React Applications in Front-End Web Development
 - 4.8.1. Security Strategies in React
 - 4.8.1.1. XSS Vulnerabilities and Data Escapes
 - 4.8.1.2. Use of PropTypes and Typescript
 - 4.8.2. Security in State Handling and Context APIs
 - 4.8.2.1. Sensitive States
 - 4.8.2.2. Data Encryption
 - 4.8.3. Authentication and Access Control Implementation
 - 4.8.3.1. Auth0 or Firebase Auth
 - 4.8.3.2. Custom HOCs and Hooks
- 4.9. Integration with APIs and Microservices in Front-End Web Development
 - 4.9.1. Design Patterns for Efficient Integration with Back Ends
 - 4.9.2. Handling Authentication, Caching and Load States
 - 4.9.3. Strategies for Error and Fallback Handling
- 4.10. State of the Art and Trends of the React Ecosystem in Front-End Web Development
 - 4.10.1. New Features of the React Ecosystem
 - 4.10.2. React and the Future of Web Development
 - 4.10.3. Community, Resources and Emerging Tools

Module 5. Advanced Vue Front-End Development

- 5.1. Composition API in Front-End Web Development
 - 5.1.1. Composition API Compared to Options API
 - 5.1.2. Design Patterns and Logic Reuse
 - 5.1.3. Practical Examples and Advanced Applications
- 5.2. Vue Router in Front-End Web Development
 - 5.2.1. Advanced Routing Strategies
 - 5.2.2. Lazy Loading and Code Splitting with Vue
 - 5.2.3. Integrating Vue Router with Transitions and Animations
- 5.3. State Management with Vue in Front-End Web Development
 - 5.3.1. Architecture and Modularity in Vuex
 - 5.3.2. Advanced Patterns and Complex State Management
 - 5.3.3. Performance Optimizations in Vuex



- 5.4. Testing with Vue in Front-End Web Development
 - 5.4.1. Configuration of Test Environments with Vue Test Utils
 - 5.4.2. Unit and Integration Tests
 - 5.4.3. Mocking and Dependency Simulation
- 5.5. Security in Vue Applications
 - 5.5.1. Security in Vue
 - 5.5.1.1. Risk Identification and Mitigation
 - 5.5.1.2. Content Escape and Injection Prevention
 - 5.5.2. Safe State Handling and Local Storage
 - 5.5.2.1. Safe Practices
 - 5.5.2.2. Encryption of Sensitive Data
 - 5.5.2.3. Session Token Management
 - 5.5.3. Authentication and Route Protection
 - 5.5.3.1. Vue Router Configuration
 - 5.5.3.2. Creating Secure Browsing and Redirection
- 5.6. Development of Advanced Components with Vue in Front-End Web Development
 - 5.6.1. Design and Architecture of Reusable Components
 - 5.6.2. Advanced Slots and Composition Patterns
 - 5.6.3. Component Libraries and System Design
- 5.7. Performance Optimization with Vue in Front-End Web Development
 - 5.7.1. Analyzing and Improving the Performance of Vue Applications
 - 5.7.2. Deferred Loading and Code-Splitting Strategies
 - 5.7.3. Efficient Use of Watchers and Computers
- 5.8. Vue 3 and Application Composition in Front-End Web Development
 - 5.8.1. New Features of Vue 3
 - 5.8.2. Migration from Vue 2 to Vue 3
 - 5.8.3. Using Vue 3 for Large-Scale Applications
- 5.9. Server Side Rendering and SSR with Nuxt.js
 - 5.9.1. Configuring and Optimizing Nuxt.js for SSR
 - 5.9.2. SEO and Static Site Generation
 - 5.9.3. Transition from SPA to Universal Applications
- 5.10. State of the Art and Trends with Vue in Front-End Web Development
 - 5.10.1. Vue Ecosystem and Emerging Tools
 - 5.10.2. Vue and PWA Development
 - 5.10.3. Community, Continuous Learning and Resources

Module 6. Advanced Angular Front-End Development

- 6.1. Angular Architecture and Modules in Front-End Web Development
 - 6.1.1. Angular Application Architecture
 - 6.1.2. Lazy Loading and Module Organization
 - 6.1.3. Dependency Injection and Providers
- 6.2. Advanced Path Management with Angular Applications in Front-End Web Development
 - 6.2.1. Dynamic Configuration of Routes
 - 6.2.2. Lazy Loading Tactics
 - 6.2.3. Advanced Navigation Strategies
- 6.3. RxJS and Reactive State Management with Angular Applications in Front-End Web Development
 - 6.3.1. Reactive Patterns with RxJS
 - 6.3.2. Advanced Strategies for Event and Data Handling
 - 6.3.3. RxJS Integration with Angular and HTTP Forms
- 6.4. Optimization of Angular Applications in Front-End Web Development
 - 6.4.1. Optimization Techniques and Performance Analysis
 - 6.4.2. AOT Compilation and Tree Shaking
 - 6.4.3. Caching and Service Worker Strategies
- 6.5. Testing in Angular in Front-End Web Development
 - 6.5.1. Test Environment Configuration with Jasmine and Karma
 - 6.5.2. Testing Components, Services and Pipes
 - 6.5.3. Mocking and Dependency Management in Test
- 6.6. Dynamic Forms and Validation with Angular Applications in Front-End Web Development
 - 6.6.1. Reactive Forms vs. Template-Driven
 - 6.6.2. Custom Validators and Form State Handling
 - 6.6.3. Integration with External Libraries and Error Handling
- 6.7. Angular Application Security in Front-End Web Development
 - 6.7.1. Security in Angular
 - 6.7.1.1. Common Vulnerabilities
 - 6.7.1.2. XSS and CSRF Sanitization and Prevention
 - 6.7.2. Authentication and Authorization Strategies
 - 6.7.2.1. JWT and OAuth2
 - 6.7.2.2. Route Guards
 - 6.7.3. Security Enhancements with HTTP Client

- 6.8. Development of Angular Libraries in Front-End Web Development
 - 6.8.1. Creating and Publishing Reusable Libraries
 - 6.8.2. Best Practices and Versioning
 - 6.8.3. Library Integration and Documentation
- 6.9. Angular Universal for SSR in Front-End Web Development
 - 6.9.1. Configuration and Optimization of Angular Universal
 - 6.9.2. SEO and Load Time Improvements
 - 6.9.3. Prerendering Strategies and Static Content Generation
- 6.10. State of the Art and Trends in Front-End Web Development
 - 6.10.1. Recent Updates and Angular Roadmap
 - 6.10.2. Angular Tools and Ecosystem
 - 6.10.3. Integration with Emerging Technologies

Module 7. Mobile Development and Advanced Responsive Design in Front-End

- 7.1. Responsive Design in Front-End Web Development
 - 7.1.1. Advanced Media Query Techniques
 - 7.1.2. Relative Units and Fluid Design
 - 7.1.3. Responsive Image Strategies and Vectors
- 7.2. Frameworks and Tools for Responsive Design in Front-End Web Development
 - 7.2.1. Bootstrap, Foundation and Tailwind CSS for Responsive Design
 - 7.2.2. Adaptive Design and Prototyping Tools
 - 7.2.3. Automation and Testing of Responsive Design
- 7.3. Performance on Mobile Devices
 - 7.3.1. Optimization of Load and Performance on Mobile Devices
 - 7.3.2. Efficient Content Delivery Strategies
 - 7.3.3. Performance Analysis and Monitoring on Real Devices
- 7.4. PWA and Mobile Experience
 - 7.4.1. Development of Progressive Web Apps for an Optimal Mobile Experience
 - 7.4.2. Integration with Native Device Functions
 - 7.4.3. Engagement and Re-Engagement Strategies
- 7.5. Mobile Accessibility
 - 7.5.1. Mobile Accessibility Best Practices and Standards
 - 7.5.2. Testing and Validation of Accessibility on Mobile Devices
 - 7.5.3. Inclusive Design for Mobile Applications

- 7.6. Mobile Navigation and Design Patterns
 - 7.6.1. Adaptive Navigation Patterns for Mobile
 - 7.6.2. Design of Intuitive User Interfaces
 - 7.6.3. Usability and User Experiences in Mobile Contexts
- 7.7. Mobile Development Frameworks
 - 7.7.1. React Native and Vue Native for Native Applications with JavaScript
 - 7.7.2. Comparison with Native Solutions and Webviews
 - 7.7.3. Applications and Best Practices
- 7.8. Emerging Mobile Technologies
 - 7.8.1. 5G and Its Impact on Mobile Web Development
 - 7.8.2. Augmented Reality (AR) and Virtual Reality (VR) in Mobile Contexts
 - 7.8.3. Integration of Sensors and Specific Hardware
- 7.9. Mobile Testing and Debugging
 - 7.9.1. Tools and Environments for Mobile Testing
 - 7.9.2. Simulators, Emulators and Testing on Real Devices
 - 7.9.3. Debugging Strategies for Mobile Applications
- 7.10. Future of Mobile Development
 - 7.10.1. Emerging Trends and the Future of Mobile Development
 - 7.10.2. Cross-Platform Development and the Future of Native Technologies
 - 7.10.3. Adapting and Responding to Changes in User Behavior

Module 8. Internationalization and Front-End Web Accessibility

- 8.1. Internationalization (i18n) in Front-End Web Development
 - 8.1.1. Localization and Globalization Strategies
 - 8.1.2. Tools and Frameworks for i18n
 - 8.1.3. Handling Dates, Currencies and Pluralizations
- 8.2. Implementing Accessibility in Front-End Web Development
 - 8.2.1. WCAG and ARIA
 - 8.2.2. Accessibility Testing and Validation Tools
 - 8.2.3. Practical Examples and Correction of Common Accessibility Problems
- 8.3. International SEO in Front-End Web Development
 - 8.3.1. SEO Strategies for Multilingual Sites
 - 8.3.2. URL Structure and hreflang Tags
 - 8.3.3. Content Optimization for Specific Markets

- 8.4. Frameworks and Libraries for i18n in Front-End Web Development
 - 8.4.1. Integration of i18next, React Intl, and Other Libraries
 - 8.4.2. Translation Management and Localization Workflows
 - 8.4.3. Internationalization Automation
- 8.5. Multilingual Usability Testing in Front-End Web Development
 - 8.5.1. Testing with Users in Different Languages
 - 8.5.2. Cultural Adaptation and Usability
 - 8.5.3. Strategies for Collecting and Applying International Feedback
- 8.6. Accessibility in SPA and PWA Applications in Front-End Web Development
 - 8.6.1. Accessibility in SPA and PWA
 - 8.6.2. Techniques to Improve Accessibility in Dynamic Applications
 - 8.6.3. Application Examples and Practical Solutions
- 8.7. International Front-End Web Development Standards
 - 8.7.1. International Data Protection Policies
 - 8.7.2. Impact of International Legislation on Web Design and Development
 - 8.7.3. Strategies for Keeping Up to Date and Complying with Standards
- 8.8. Multimedia and Accessible Content in Front-End Web Development
 - 8.8.1. Creating Accessible Multimedia Content
 - 8.8.2. Closed Captioning, Audio Descriptions and Transcripts
 - 8.8.3. Best Practices for Interactive Content
- 8.9. Inclusive Design and UX Principles in Front-End Web Development
 - 8.9.1. Inclusive Design Approaches for a Global Audience
 - 8.9.2. Cultural Considerations in UX Design
 - 8.9.3. Strategies for Creating Universal User Experiences
- 8.10. Future of Internationalization and Accessibility in Front-End Web Development
 - 8.10.1. Technological Innovations and Their Impact on i18n and Accessibility
 - 8.10.2. Emerging Trends and Adaptation to New Standards
 - 8.10.3. Preparing for Future Challenges in a Globalized Digital World

Module 9. Augmented and Virtual Reality in Front-End Web Development

- 9.1. WebXR from the Front-End Web Development Approach
 - 9.1.1. WebXR and Its API
 - 9.1.2. Augmented Reality (AR) and Virtual Reality (VR). Differences
 - 9.1.3. Compatibility and Hardware Requirements
- 9.2. Development of AR Experiences on the Front-End Web
 - 9.2.1. Use of Frameworks and Libraries for AR (A-Frame, AR.js)
 - 9.2.2. Integration of AR into Existing Web Applications
 - 9.2.3. Application and Design Best Practices
- 9.3. Creation of Interactive VR Environments in Front-End Web Development
 - 9.3.1. Design and Development of VR Environments
 - 9.3.2. Tools and Techniques for the Creation of 3D Content
 - 9.3.3. Immersive VR Applications in the Browser
- 9.4. User Interface and User Experience in WebXR from a Front-End Approach
 - 9.4.1. UI/UX Design for AR and VR Applications
 - 9.4.2. Usability and Accessibility
 - 9.4.3. Strategies for Navigation and Interaction in Immersive Environments
- 9.5. Performance Optimization for WebXR from the Front-End Approach
 - 9.5.1. Specific Optimization Techniques for AR/VR Experiences
 - 9.5.2. Efficient Handling of Graphics and Computational Resources
 - 9.5.3. Testing and Performance Monitoring on Different Devices
- 9.6. Integration of Sensors and Real-Time Data Using Front-End Technologies
 - 9.6.1. Use of Device Sensors for Immersive Experiences
 - 9.6.2. Incorporation of Real-Time Data in AR/VR Applications
 - 9.6.3. Practical Applications in Specific Industries
- 9.7. Mixed Reality and Hybrid Applications from a Front-End Approach
 - 9.7.1. Mixed Reality (MR) and Its Application in Front-End Web Development
 - 9.7.2. Development of Experiences that Combine Physical and Virtual Elements
 - 9.7.3. Practical Applications for Emerging Uses in Education, Training and Commerce
- 9.8. Accessibility in WebXR Applications from a Front-End Approach
 - 9.8.1. Challenges and Solutions for AR/VR Accessibility
 - 9.8.2. Strategies for Making AR/VR Content Accessible to All Users
 - 9.8.3. Standards and Guidelines for Inclusion in Immersive Experiences

- 9.9. WebXR and the Future of e-Commerce from a Front-End Approach
 - 9.9.1. AR/VR Applications in e-Commerce
 - 9.9.2. Improvements in the Shopping Experience and Product Visualization
 - 9.9.3. Future Trends and Consumer Expectations
- 9.10. Emerging Trends and Future of WebXR from a Front-End Approach
 - 9.10.1. Technological Advances and Their Impact on AR/VR Development
 - 9.10.2. WebXR on Mobile and Wearable Devices
 - 9.10.3. Future Visions for AR/VR Integration on the Web

Module 10. Artificial Intelligence and Machine Learning in Front-End Web Development

- 10.1. Artificial Intelligence (AI) and Machine Learning (ML) from a Front-End Approach
 - 10.1.1. Artificial Intelligence (AI) and Machine Learning (ML) for Front-End Web Developers
 - 10.1.2. JavaScript Tools and Libraries for AI/ML
 - 10.1.3. Basic Integration of ML Models in Front-End Applications
- 10.2. Frameworks and JavaScript Libraries for ML from a Front-End Approach
 - 10.2.1. TensorFlow.js and Its Ecosystem
 - 10.2.2. Creating and Training Models Directly in the Browser
 - 10.2.3. Examples and Practical Applications
- 10.3. Personalization and User Experience Enhanced by AI from a Front-End Approach
 - 10.3.1. Use of AI for Content Personalization and Recommendations
 - 10.3.2. Improving the UX with Chatbots and Virtual Assistants
 - 10.3.3. User Behavior Analysis and Interface Optimization
- 10.4. Image Recognition and Natural Language Processing (NLP) from a Front-End Approach
 - 10.4.1. Implementation of Image Recognition on the Front-End
 - 10.4.2. Integration of NLP Capabilities to Improve User Interaction
 - 10.4.3. Tools and APIs Available for Developers
- 10.5. Accessibility and Artificial Intelligence (AI) from a Front-End Approach
 - 10.5.1. AI Applications to Improve Web Accessibility
 - 10.5.2. Automatic Generation of Image Descriptions
 - 10.5.3. Adaptive Interfaces Based on User Needs



- 10.6. Performance Optimization with Artificial Intelligence (AI) from a Front-End Approach
 - 10.6.1. Use of Predictive Modeling for Anticipated Resource Loading
 - 10.6.2. Predictive Analytics for Application Performance Improvement
 - 10.6.3. Intelligent Caching Strategies
- 10.7. Security and Ethics in the Integration of Artificial Intelligence (AI) from a Front-End Approach
 - 10.7.1. Ethical Considerations in the Use of AI on the Front End
 - 10.7.2. Bias Prevention and Privacy Assurance
 - 10.7.3. AI-Based Security Enhancements
- 10.8. Testing and Debugging of Artificial Intelligence (AI) Functionalities from a Front-End Approach
 - 10.8.1. Tools and Techniques for Testing AI Integrations
 - 10.8.2. Debugging of ML Models in Web Applications
 - 10.8.3. Validation and Quality Assurance of AI Predictions
- 10.9. UI/UX of the Future with Artificial Intelligence (AI) from a Front-End Approach
 - 10.9.1. Adaptive and Predictive Interface Design
 - 10.9.2. Examples of Innovative AI- Enhanced UI
 - 10.9.3. Trends in Interaction Design Based on AI Capabilities
- 10.10. Emerging Trends and Future of Artificial Intelligence (AI) from a Front-End Approach
 - 10.10.1. Advances in Artificial Intelligence (AI) Technologies and their Potential in Web Development
 - 10.10.2. Generative Artificial Intelligence (AI) and Its Impact on Web Content
 - 10.10.3. Future Visions for the Integration of Artificial Intelligence (AI) in User Experiences

“ Upon completion of this Master’s Degree, you will be equipped with the necessary skills to develop innovative and high quality front-end web applications. With all TECH's quality guarantees!”

06

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 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.



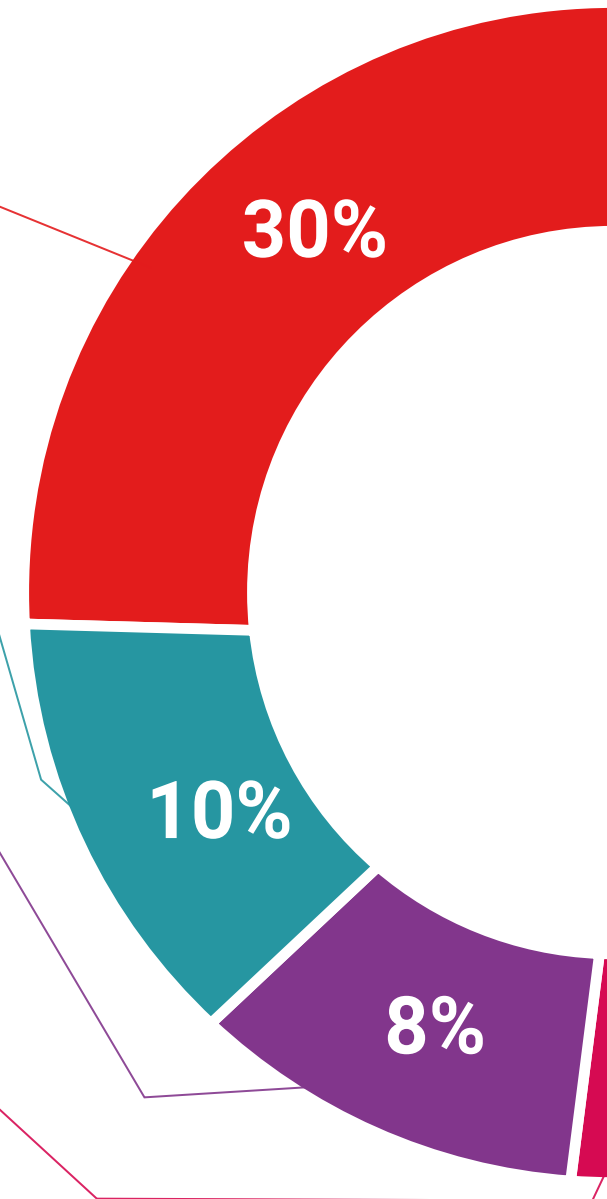
Practising Skills and Abilities

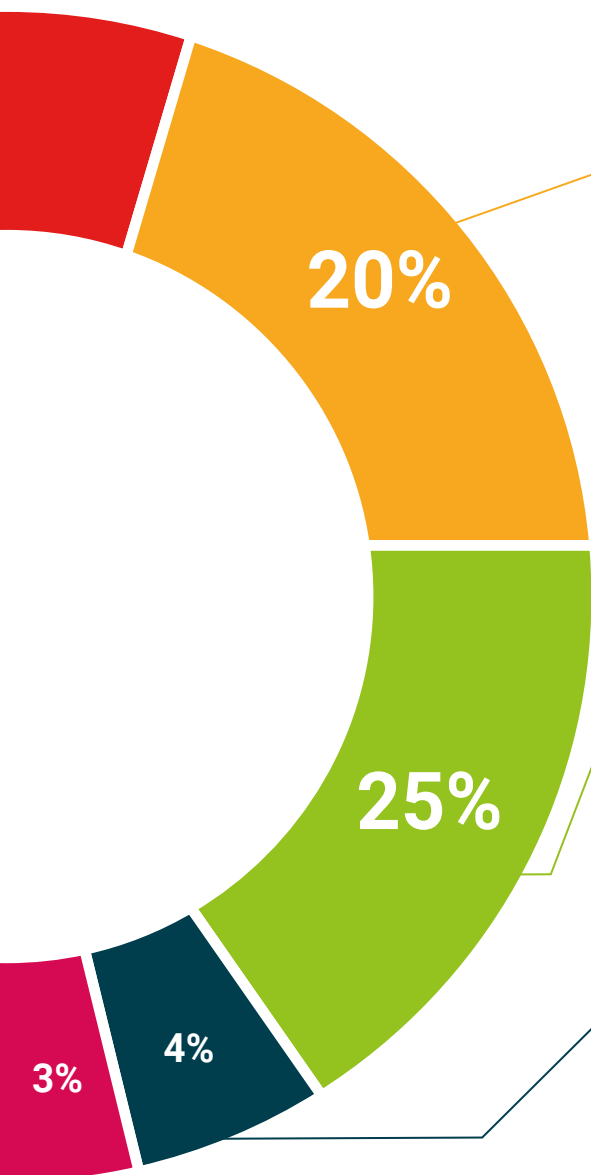
They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



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.



07 Certificate

The Master's Degree in Front-End Web Development guarantees students, in addition to the most rigorous and up-to-date education, access to a Master's Degree diploma issued by TECH Global University.



“

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

This program will allow you to obtain your **Master's Degree diploma in Front-End Web Development** 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: **Master's Degree in Front-End Web Development**

Modality: **online**

Duration: **12 months**

Accreditation: **60 ECTS**





Master's Degree Front-End Web Development

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Global University
- » Credits: 60 ECTS
- » Schedule: at your own pace
- » Exams: online

Master's Degree

Front-End Web Development