Professional Master's Degree
Advanced Software Development

tech global university

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Professional Master's Degree
Advanced Software Development

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

Website: www.techtitute.com/us/information-technology/professional-master-degree/master-advanced-software-development

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01

Introduction to the Program

Advanced Software Development has become a fundamental pillar for economic competitiveness and technological innovation at a global level. According to data from Statista, spending on business software amounted to approximately US$913 billion, representing a growth of 12.4% over the previous year. Given that technology is evolving at breakneck speed, TECH has designed this postgraduate degree to provide the most up-to-date knowledge needed to master the creation of scalable, secure, and efficient applications. Through a 100% online and innovative methodology, specialists will learn how to optimize processes using agile methodologies, apply cybersecurity principles, and design robust systems that respond to the needs of today's market.

With a 100% online methodology, you will delve into the latest technologies and frameworks to create innovative and scalable solutions. Enroll and get ready to lead high-impact projects from anywhere!"

Investing in Advanced Software Development not only improves application performance and security, but also allows companies to remain competitive in an ever-evolving technological environment. Given the growing need for efficient, secure, and scalable applications, there is a growing demand for specialists capable of designing, optimizing, and maintaining advanced systems. In this context, mastering architectures such as microservices, the use of AI in programming, and the integration of cloud environments has become an essential competitive advantage for any professional in the industry.

To meet this demand, TECH has designed the Professional Master's Degree in Advanced Software Development, a university program that will address the fundamentals and most innovative applications in this field. Throughout the syllabus, designed with a comprehensive approach, professionals will address key concepts such as agile development, process automation through DevOps, security in business applications, and performance optimization in distributed systems. All of this will be complemented by practical cases that reinforce the theoretical content and encourage application in real environments.

As a result, graduates will be prepared to take on strategic roles within the technology sector, gaining access to job opportunities in software companies, innovative startups, and large corporations. In this way, each student will excel in areas such as software architecture, cybersecurity, and the development of solutions based on Artificial Intelligence, thereby enhancing their professional profile and facilitating their international projection.

In addition, this degree will be taught 100% online, allowing students to manage their learning independently and flexibly. Thanks to TECH's innovative Relearning methodology, based on the repetition of key concepts, they will consolidate their knowledge efficiently, without having to invest long hours in traditional study. In this way, they will be able to balance their professional growth with their daily responsibilities, ensuring a dynamic and highly effective experience.

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

- The development of case studies presented by experts in Software
- 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
- Special emphasis on innovative methodologies in Advanced Software Development
- 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 be taught by experts in a flexible online format and gain access to advanced knowledge in architecture, AI, and IT security. Take the first step toward new opportunities in the tech industry!"

Master AI, cybersecurity, and software architecture with an innovative syllabus. This will prepare you to lead high-level tech projects. Enroll and advance your career!"

This Professional Master's Degree will connect you with expert teachers and up-to-date content on agile methodologies, advanced programming, and digital infrastructure management.

From anywhere and with total flexibility, you will be able to access this cutting-edge postgraduate degree with practical cases and cutting-edge tools. Take the step towards the future of software. Enroll now!

The teaching staff includes professionals from the field of software, who bring their work experience to this program, as well as renowned specialists from leading companies 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 an immersive learning experience designed to prepare for real-life situations.

This program is designed around Problem-Based Learning, whereby the student must try to solve the different professional practice situations that arise throughout the program. For this purpose, the professional will be assisted by an innovative interactive video system created by renowned and experienced experts.

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 relies on an enormous faculty of more than 6,000 professors of the highest international renown.

Study at the world's largest online university and guarantee your professional success. The future starts 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

Syllabus

Through a structured, practice-oriented syllabus, professionals will delve into key areas such as distributed software architecture, web and mobile application development, advanced use of languages (Python, Java, JavaScript), and the implementation of microservices and containers with Docker and Kubernetes. In addition, they will address essential topics such as Artificial Intelligence applied to development, Machine Learning, databases (SQL, NoSQL), IT security and data protection, agile methodologies such as Scrum and DevOps, and cloud computing with AWS and Azure.

You will learn at your own pace and expand your job opportunities! With this Professional Master's Degree, you will boost your career. It's your time to take it to the next level"

Module 1. Advanced Software Architecture for Seniors

1.1. Advanced Software Architecture
  1.1.1. Software Architecture
  1.1.2. Scalability and Modularity
  1.1.3. Modern Architecture Examples
1.2. Scalable and Advanced Software Design
  1.2.1. Horizontal and Vertical Scalability
  1.2.2. Load Balancing Strategies
  1.2.3. Design Patterns for Distributed Systems
1.3. Advanced Architectural Models
  1.3.1. Monolithic Architecture: Advantages and Disadvantages
  1.3.2. Microservice-Based Architecture
  1.3.3. Serverless: Case Studies and Limitations
1.4. Advanced Design Patterns
  1.4.1. Structural Patterns: Adapter, Facade
  1.4.2. Behavior Patterns: Observer, Strategy
  1.4.3. Creational Patterns: Singleton, Factory
1.5. UML Diagrams and Advanced Modeling
  1.5.1. UML Diagrams
  1.5.2. Class and Sequence Diagrams
  1.5.3. Distributed System Modeling
1.6. Advanced Dependency Management
  1.6.1. Principles of Dependency Injection
  1.6.2. Use of Inversion of Control (IoC) Containers
  1.6.3. Examples with Modern Frameworks
1.7. Middleware and Messaging
  1.7.1. Middleware
  1.7.2. Integration Using Message Queues
  1.7.3. Tools: RabbitMQ, Kafka
1.8. Advanced Event-Driven Architectures
  1.8.1. Event-Driven
  1.8.2. Reactive System Design
  1.8.3. Advantages and Challenges
1.9. Security in Software Architecture
  1.9.1. Authentication and Authorization Strategies
  1.9.2. Protection Against Common Attacks: SQL injection, XSS
  1.9.3. Role and Permission Management
1.10. Case Studies of Real Architectures
  1.10.1. Analysis of Real Architectures
  1.10.2. Evaluation of Architectural Decisions
  1.10.3. Lessons Learned from Successful Projects

Module 2. Advanced Back-End Development for Seniors

2.1. Advanced Back-End Development
  2.1.1. Back-End Roles and Responsibilities
  2.1.2. Key Technologies in Back-End Environments
  2.1.3. Examples of Successful Back-End Applications
2.2. REST and GraphQL APIs
  2.2.1. RESTful API Design and Consumption
  2.2.2. GraphQL: Advantages
  2.2.3. Integration Case Studies
2.3. Advanced Databases
  2.3.1. SQL Query Optimization
  2.3.2. Indexing and Partitioning
  2.3.3. NoSQL Databases
2.4. Back-End Authentication and Authorization
  2.4.1. Use of JWT and OAuth2
  2.4.2. Secure Session Management
  2.4.3. Access Control Strategies
2.5. Back-End Scalability and Performance
  2.5.1. Caching with Redis
  2.5.2. Load Balancing in Back-End Applications
  2.5.3. Monitoring and Key Metrics
2.6. Back-End Testing and Code Quality
  2.6.1. Types of Tests: Unit, Integration, E2E
  2.6.2. Automation Tools
  2.6.3. Code Coverage and Analysis

2.7. Back-End Service Integration
- 2.7.1. Connecting to External Services
- 2.7.2. Error Handling in Integrations
- 2.7.3. Retry and Timeout Strategies

2.8. Asynchronous Task Management in Backend
- 2.8.1. Background Tasks
- 2.8.2. Tools such as Celery and RabbitMQ
- 2.8.3. Common Use Cases

2.9. Microservices in Backend
- 2.9.1. Design and Communication between Microservices
- 2.9.2. Orchestration and Monitoring
- 2.9.3. Practical Implementation with Frameworks

2.10. Deployment and Maintenance in Backend
- 2.10.1. Deployment Automation
- 2.10.2. Version Management and Rollback
- 2.10.3. Production Monitoring

Module 3. Advanced Front-End for Seniors

3.1. Modern Frameworks
- 3.1.1. Vue.js: State, Components, and Lifecycle
- 3.1.2. Svelte, Comparison with React
- 3.1.3. Modern Development Tools (Vite, Webpack)

3.2. Front-End Performance Optimization
- 3.2.1. Lazy Loading and Code Splitting
- 3.2.2. Efficient Global State Management
- 3.2.3. Progressive Rendering Techniques

3.3. Automated Front-End Testing
- 3.3.1. Tools such as Jest and Cypress
- 3.3.2. Component and Functionality Testing
- 3.3.3. Automated Integration Testing

3.4. Advanced Development with React
- 3.4.1. Advanced and Customized Hooks
- 3.4.2. Context API and Redux for State Management
- 3.4.3. Design Patterns in Components

3.5. Advanced Animations in Frontend
- 3.5.1. Use of Libraries such as GSAP and Framer Motion
- 3.5.2. Complex Transitions in SPAs
- 3.5.3. Animation Optimization for Performance

3.6. Progressive Web App (PWA) Development
- 3.6.1. Progressive Web Apps (PWA)
- 3.6.2. Service Workers and Offline Storage
- 3.6.3. Optimization Strategies for Mobile Devices

3.7. Advanced Form Management in Frontend
- 3.7.1. Complex Form Validations
- 3.7.2. Nested Data Handling
- 3.7.3. Synchronization with APIs

3.8. API Consumption in Frontend
- 3.8.1. Integration with REST and GraphQL
- 3.8.2. Error Handling and Loading States
- 3.8.3. Request Optimization Strategies

3.9. Visual Testing and Accessibility in Frontend
- 3.9.1. Responsive Design Testing
- 3.9.2. Web Accessibility Validation
- 3.9.3. Tools such as Lighthouse

3.10. Front-End Deployment and Monitoring
- 3.10.1. Deployment on Platforms such as Netlify or Vercel
- 3.10.2. Configuration for Production Environments
- 3.10.3. Performance Monitoring with Advanced Tools

Module 4. Data Science and Machine Learning for Seniors

4.1. Data Science
- 4.1.1. Practical Applications in Data Management and IT Process Optimization
- 4.1.2. Main Tools for Data Analysis and Processing: Pandas, NumPy
- 4.1.3. Initial Data Processing

4.2. Data Visualization for Analysis and Effective Information Presentation
- 4.2.1. Creating Basic Graphs with Matplotlib
- 4.2.2. Advanced Visualizations with Seaborn
- 4.2.3. Customization and Design of Interactive Graphs

4.3. Descriptive Statistics in Data Science
- 4.3.1. Measures of Central Tendency
- 4.3.2. Measures of Dispersion and Distribution
- 4.3.3. Correlation Analysis

4.4. Data Cleaning and Transformation
- 4.4.1. Handling Null and Duplicate Values
- 4.4.2. Mathematical Transformations and Categorization
- 4.4.3. Use of Pipelines for Automated Cleaning

4.5. Supervised Machine Learning
- 4.5.1. Linear and Logistic Regression Models
- 4.5.2. Classification Models: KNN, Decision Trees
- 4.5.3. Model Assessments with Performance Metrics

4.6. Unsupervised Machine Learning
- 4.6.1. Clustering with K-means and DBSCAN
- 4.6.2. Dimension Reduction with PCA
- 4.6.3. Group and Pattern Analysis in Data

4.7. Neural Networks
- 4.7.1. Types of Neural Networks and Their Architecture
- 4.7.2. Implementation with Keras and TensorFlow
- 4.7.3. Practical Examples of Prediction

4.8. Data Processing in Real Time
- 4.8.1. Integration with Apache Kafka
- 4.8.2. Data Streaming with Spark
- 4.8.3. Practical Examples of Real-Time Processing

4.9. Implementation of Data Science Projects
- 4.9.1. End-to-end Project Design
- 4.9.2. Integrating Models into Applications
- 4.9.3. Testing and Deployment in Production

4.10. Ethics and Responsibility in Data Use
- 4.10.1. Ethical Considerations in Machine Learning
- 4.10.2. Biases in Data and Models
- 4.10.3. Regulations and Legal Compliance

Module 5. Applied Cybersecurity for Seniors

5.1. Cybersecurity
- 5.1.1. Cybersecurity. Common Threats
- 5.1.2. Importance of Cybersecurity in Software Development
- 5.1.3. Key International Legislation and Regulations

5.2. Web Application Security
- 5.2.1. Vulnerabilities According to OWASP
- 5.2.2. Application Penetration Testing
- 5.2.3. Strategies to Mitigate Common Attacks

5.3. Password Management and Authentication in Web Environments
- 5.3.1. Best Practices in Password Management
- 5.3.2. Implementation of Multi-Factor Authentication
- 5.3.3. Secure Key Management

5.4. Encryption and Data Protection
- 5.4.1. Symmetric and Asymmetric Encryption
- 5.4.2. Implementation of SSL/TLS
- 5.4.3. Cryptography in Databases

5.5. Secure Network and Firewalls in Web Environments
- 5.5.1. Firewall Configuration
- 5.5.2. Network Traffic Monitoring
- 5.5.3. Use of VPNs for Secure Connections

5.6. API Security
- 5.6.1. Token-Based Authentication
- 5.6.2. Access Restriction via IPs
- 5.6.3. Protection Against Brute Force Attacks

5.7. Auditing and Monitoring Systems in Web Environments
- 5.7.1. Tools for Security Monitoring
- 5.7.2. Log Analysis for Intrusion Detection
- 5.7.3. Generating Security Reports

5.8. Response to Cyberattack Incidents
- 5.8.1. Cyberattack Response Planning
- 5.8.2. Damage Containment Procedures
- 5.8.3. Recovery and Prevention of Future Incidents

5.9. Security in DevOps Environments
- 5.9.1. DevSecOps
- 5.9.2. Integration of Security Testing in CI/CD
- 5.9.3. Automation of Security Audits

5.10. Cybersecurity Case Studies
- 5.10.1. Simulation of Real Attacks
- 5.10.2. Implementation of Defense Strategies
- 5.10.3. Vulnerability Assessment in Real Projects

Module 6. Advanced Full-Stack Development for Seniors

6.1. MEAN and MERN Stacks
- 6.1.1. Key Components of Both Stacks
- 6.1.2. Differences between MEAN and MERN
- 6.1.3. Use Cases for Each Stack

6.2. Full-Stack Project Configuration
- 6.2.1. Initializing Projects with Node.js
- 6.2.2. Configuring MongoDB and Express
- 6.2.3. Initial Integration with Angular or React

6.3. Backend with Node.js and Express
- 6.3.1. Creating RESTful Servers
- 6.3.2. Middleware Management
- 6.3.3. Implementing Dynamic Routes

6.4. Frontend with Angular or React
- 6.4.1. Structuring Front-End Projects
- 6.4.2. Creating Reusable Components
- 6.4.3. Communicating with the Backend via APIs

6.5. State Management in Frontend
- 6.5.1. Redux and NgRx
- 6.5.2. Shared State Management Between Components
- 6.5.3. Data Persistence in the Frontend

6.6. Authentication and Authorization in Full-Stack Projects
- 6.6.1. Implementation of User Login and Registration
- 6.6.2. Front-End Route Protection
- 6.6.3. Role and Permission Validation

6.7. Testing in Full Stack Projects
- 6.7.1. Back-End and Front-End Unit Testing
- 6.7.2. End-to-end Test Integration
- 6.7.3. Test Automation with Modern Tools

6.8. Full-Stack Application Deployment
- 6.8.1. Server Configuration for Deployment
- 6.8.2. Use of Docker for Containers
- 6.8.3. Deployment on Cloud Services such as AWS or Heroku

6.9. Performance Optimization
- 6.9.1. Back-End and Front-End Caching
- 6.9.2. Load Time Reduction
- 6.9.3. Production Monitoring and Profiling

6.10. Full-Stack Theoretical Final Project
- 6.10.1. Project Planning and Theoretical Design
- 6.10.2. Theoretical Component Implementation
- 6.10.3. Project Presentation and Documentation

Module 7. DevOps and Advanced Automation for Seniors

7.1. DevOps
- 7.1.1. DevOps. Principles and Benefits
- 7.1.2. DevOps Lifecycle: Development, Integration, Deployment
- 7.1.3. Comparison with Traditional Models

7.2. Containers and Virtualization
- 7.2.1. Differences Between Virtual Machines and Containers
- 7.2.2. Docker: Installation and Commands
- 7.2.3. Docker Container Creation and Management

7.3. Container Orchestration
- 7.3.1. Kubernetes: Architecture and Components
- 7.3.2. Cluster Creation and Administration
- 7.3.3. Deployments and Services in Kubernetes

7.4. Continuous Integration (CI)
- 7.4.1. Continuous Integration. Principles
- 7.4.2. CI Pipeline Configuration with GitHub Actions
- 7.4.3. Test and Build Automation

7.5. Continuous Delivery (CD)
- 7.5.1. Continuous Delivery (CD)
- 7.5.2. CD Pipeline Configuration
- 7.5.3. Automated Deployment Tools

7.6. Infrastructure as Code (IaC)
- 7.6.1. Terraform and Its Usefulness
- 7.6.2. Cloud Infrastructure Management with IaC
- 7.6.3. Practical Examples with Terraform and AWS

7.7. Monitoring and Logging in DevOps
- 7.7.1. Monitoring in DevOps
- 7.7.2. Tools such as Prometheus and Grafana
- 7.7.3. Log Management with ELK Stack (Elasticsearch, Logstash, Kibana)

7.8. Security in DevOps (DevSecOps)
- 7.8.1. Integrating Security Testing into Pipelines
- 7.8.2. Vulnerability Scanning in Docker Images
- 7.8.3. Configuration Auditing in Kubernetes Clusters

7.9. Performance and Scalability Testing
- 7.9.1. Load Testing Tools (JMeter, Locust)
- 7.9.2. Strategies for Assessing System Scalability
- 7.9.3. Optimization Based on Test Results

7.10. Practical Application of a DevOps Case Study
- 7.10.1. Implementing Full CI/CD for a Project
- 7.10.2. Using Kubernetes for Deployment
- 7.10.3. Automated Monitoring and Security Configuration

Module 8. Advanced Agile Methodologies for Seniors

8.1. Agile Methodologies
- 8.1.1. Principles of the Agile Manifesto
- 8.1.2. Comparison between Scrum, Kanban, and SAFe
- 8.1.3. Success Stories in the Application of Agile Methodologies

8.2. Advanced Scrum as an Agile Methodology
- 8.2.1. Detailed Roles and Responsibilities
- 8.2.2. Advanced Product Backlog Management
- 8.2.3. Metrics and Project Tracking in Scrum

8.3. Kanban for Development Teams
- 8.3.1. Principles of Continuous Flow
- 8.3.2. WIP (Work in Progress) Limits Management
- 8.3.3. Workflow Optimization with Kanban

8.4. Scaling Agile
- 8.4.1. SAFe (Scaled Agile Framework)
- 8.4.2. Implementation of LESS (Large-scale Scrum)
- 8.4.3. Coordination betweenMultiple Agile Teams

8.5. Agile Coaching and Leadership
- 8.5.1. Key Skills of an Agile Coach
- 8.5.2. Facilitating Effective Retrospectives
- 8.5.3. Conflict Resolution in Agile Teams

8.6. Risk Management in Agile Projects
- 8.6.1. Risk Identification and Analysis
- 8.6.2. Risk Mitigation Strategies
- 8.6.3. Rapid Adaptation to Unexpected Changes

8.7. Agile Tools for Remote Teams
- 8.7.1. Using Jira and Trello for Agile Management
- 8.7.2. Effective Communication with Slack and Microsoft Teams
- 8.7.3. Techniques for Collaboration in Distributed Environments

8.8. Metrics in Agile Projects
- 8.8.1. Burnup and Burndown Charts
- 8.8.2. Measuring Team Velocity
- 8.8.3. Key Indicators for Continuous Improvement

8.9. Case Studies in Agile Methodologies
- 8.9.1. Analysis of Implementation in Real Companies
- 8.9.2. Lessons Learned from Successful Projects
- 8.9.3. Common Failures and How to Avoid Them

8.10. Practical Project in Agile Teams
- 8.10.1. Planning a Project with Scrum and Kanban
- 8.10.2. Project Execution and Monitoring
- 8.10.3. Presentation of Results and Retrospective

Module 9. Cross-Platform Mobile Development for Seniors

9.1. Cross-Platform Mobile Development
- 9.1.1. Differences between Native and Cross-Platform Development
- 9.1.2. Benefits of the Cross-Platform Approach
- 9.1.3. Popular Tools and Frameworks

9.2. Flutter
- 9.2.1. Configuration of the Development Environment
- 9.2.2. Creating Your First Flutter App
- 9.2.3. Basic Widgets and Navigation

9.3. Advanced Development with Flutter
- 9.3.1. State Management with Provider and Riverpod
- 9.3.2. Custom Animations in Flutter
- 9.3.3. Integration with RESTful and GraphQL Services

9.4. React Native Framework for Cross-Platform Mobile Development
- 9.4.1. Installing and Setting Up the Environment
- 9.4.2. Components and Navigation in React Native
- 9.4.3. Styles and Responsive Design

9.5. Advanced Development with React Native for Cross-Platform Mobile Development
- 9.5.1. State Management with Redux and Context API
- 9.5.2. Handling Native and External Libraries
- 9.5.3. Publishing to Stores (App Store and Google Play)

9.6. Testing Mobile Applications
- 9.6.1. Unit and Functional Testing
- 9.6.2. Using Tools such as Detox and Appium
- 9.6.3. Test Automation in Mobile Environments

9.7. Mobile Performance Optimization
- 9.7.1. Strategies for Reducing Memory Usage
- 9.7.2. Graphics and Animation Optimization
- 9.7.3. Improving Load and Response Times

9.8. Progressive Web Apps (PWA)
- 9.8.1. Advantages of PWAs
- 9.8.2. Implementation of Service Workers
- 9.8.3. Creating Offline-First Apps

9.9. Integration of Advanced Features for Cross-Platform Mobile Development
- 9.9.1. Use of Hardware APIs: GPS, Camera
- 9.9.2. Push Notifications in Mobile Applications
- 9.9.3. Payments and Biometric Authentication

9.10. Practical Mobile Development Project
- 9.10.1. Design and Implementation of a Complete Application
- 9.10.2. Integration of Multiple Technologies Learned
- 9.10.3. Testing and Final Deployment in Stores

Module 10. Cloud Computing for Seniors

10.1. Cloud Computing
- 10.1.1. Cloud Computing
- 10.1.2. Services Models: IaaS, PaaS, SaaS
- 10.1.3. Benefits and Challenges of Adopting the Cloud

10.2. Cloud Service Providers
- 10.2.1. Main Platforms: AWS, Azure, Google Cloud
- 10.2.2. Comparison of Features and Prices
- 10.2.3. Specific Use Cases for Each Provider

10.3. Setting Up Cloud Services
- 10.3.1. Creating Virtual Machines
- 10.3.2. Cloud Storage: Types and Configuration
- 10.3.3. Virtual Networks and Access Management

10.4. Deploying Applications in the Cloud
- 10.4.1. Deployment Methods: Manual and Automated
- 10.4.2. Using Tools Such as Elastic Beanstalk and App Engine
- 10.4.3. Practical Example of Deployment

10.5. Cloud Containers
- 10.5.1. Using Services Such as ECS, GKE, and AKS
- 10.5.2. Integration with Docker and Kubernetes
- 10.5.3. Scalability of Containerized Applications

10.6. Cloud Database Management
- 10.6.1. Managed Services: RDS, Firestore, Cosmos DB
- 10.6.2. Database Configuration and Optimization
- 10.6.3. Backup and Disaster Recovery

10.7. Cloud Security
- 10.7.1. Security Policies and Access Control
- 10.7.2. Encryption of Data in Transit and at Rest
- 10.7.3. Audits and Regulatory Compliance

10.8. Cloud Automation
- 10.8.1. Infrastructure as Code (IaC)
- 10.8.2. Use of Terraform and CloudFormation
- 10.8.3. Creation of Automation Pipelines

10.9. Monitoring and Optimization
- 10.9.1. Use of Tools such as CloudWatch, Stackdriver, and Azure Monitor
- 10.9.2. Cloud Cost Optimization
- 10.9.3. Alerts and Key Metrics for Applications

10.10. Trends in Cloud Computing
- 10.10.1. Hybrid Cloud and Multi-Cloud: Features and Benefits
- 10.10.2. Serverless Computing: Concepts and Use Cases
- 10.10.3. The Future of Cloud Computing: Artificial Intelligence and Automation

If you want to know why TECH is the largest online university in the world according to Forbes, enroll now and find out. You will update your knowledge and skills using the best tools available"

04

Teaching Objectives

The main objective of this Professional Master's Degree is to prepare highly skilled professionals to lead innovative technology projects and develop high-performance digital solutions. To this end, the syllabus will focus on providing a comprehensive overview of the software life cycle, from design and architecture to implementation and maintenance. In this way, students will acquire advanced mastery of the most widely used tools and methodologies. Thanks to this practical, market-oriented approach, graduates will be prepared to face technological challenges and become leaders in Advanced Software Development.

Thanks to this postgraduate degree, you will acquire skills in IT security and data protection, enabling you to ensure the creation of reliable digital environments that are resistant to threats"

General Objectives

- Provide in-depth knowledge of advanced software architectures and their applicability in professional environments
- Provide a comprehensive overview of modern back-end development, covering architectures, tools, and best practices
- Develop efficient and scalable front-end applications with modern technologies
- Apply advanced data science and machine learning techniques
- Understand the fundamentals of cybersecurity and its importance in software development
- Manage the structure and differences between MEAN and MERN stacks
- Master the fundamental principles of DevOps and its impact on software development
- Implement the principles of the agile manifesto in development environments
- Manage the differences and benefits of native and cross-platform mobile development
- Analyze the fundamental concepts of Cloud computing and its impact on application development and operation

With high-quality lessons enhanced by advanced multimedia technology, practical case studies, and self-paced learning, you will gain a more immersive and efficient learning experience"

Specific Objectives

Module 1. Advanced Software Architecture for Seniors

- Identify the main design patterns used in modern distributed systems
- Determine the importance of scalability and modularity in advanced software development
- Apply dependency injection principles and the use of inversion of control (IoC) containers
- Explore messaging tools such as RabbitMQ and Kafka for system integration

Module 2. Advanced Back-End Development for Seniors

- Design efficient and scalable RESTful and GraphQL APIs
- Optimize SQL queries and manage high-performance NoSQL databases
- Implement secure authentication using JWT and Oauth2
- Configure cache strategies with Redis and load balancing on back-end servers

Module 3. Advanced Front-End for Seniors

- Implement front-end applications with Vue.js, Svelte, and React
- Optimize performance using lazy loading, code splitting, and progressive rendering
- Automate unit, integration, and visual testing with tools such as Jest and Cypress
- Manage global state efficiently with Redux and Context API

Module 4. Data Science and Machine Learning for Seniors

- Apply data cleaning, transformation, and preparation methods for Machine Learning
- Develop advanced visualizations with Matplotlib and Seaborn to interpret data
- Train supervised Machine Learning models and evaluate their performance with key metrics
- Implement clustering and dimensionality reduction techniques in unsupervised Machine Learning

Module 5. Applied Cybersecurity for Seniors

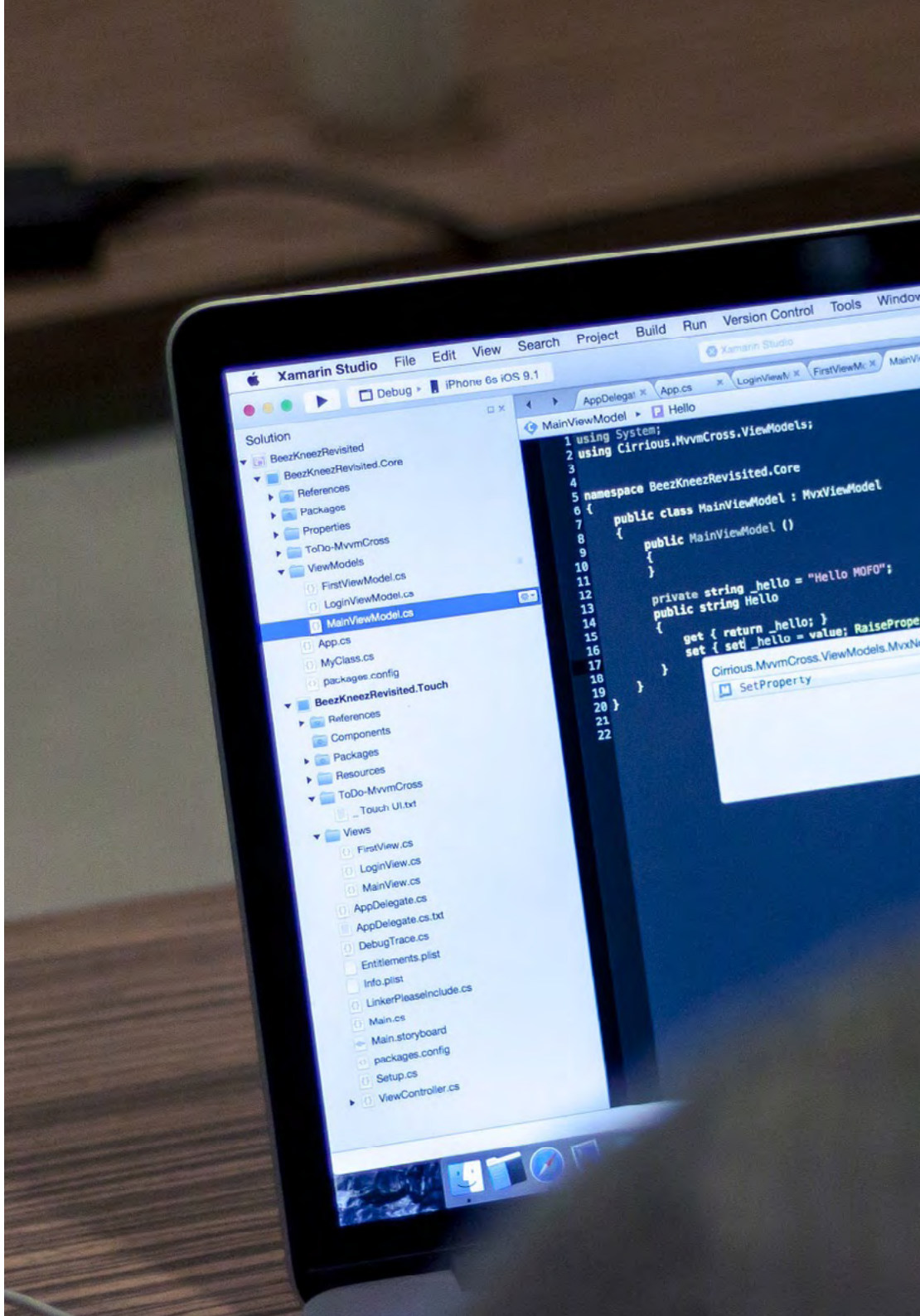
- Identify common cybersecurity threats and assess their impact on software development
- Implement mitigation strategies based on OWASP vulnerabilities
- Configure firewalls, VPNs, and traffic monitoring tools on networks
- Apply encryption and data protection techniques with SSL/TLS and cryptography in databases

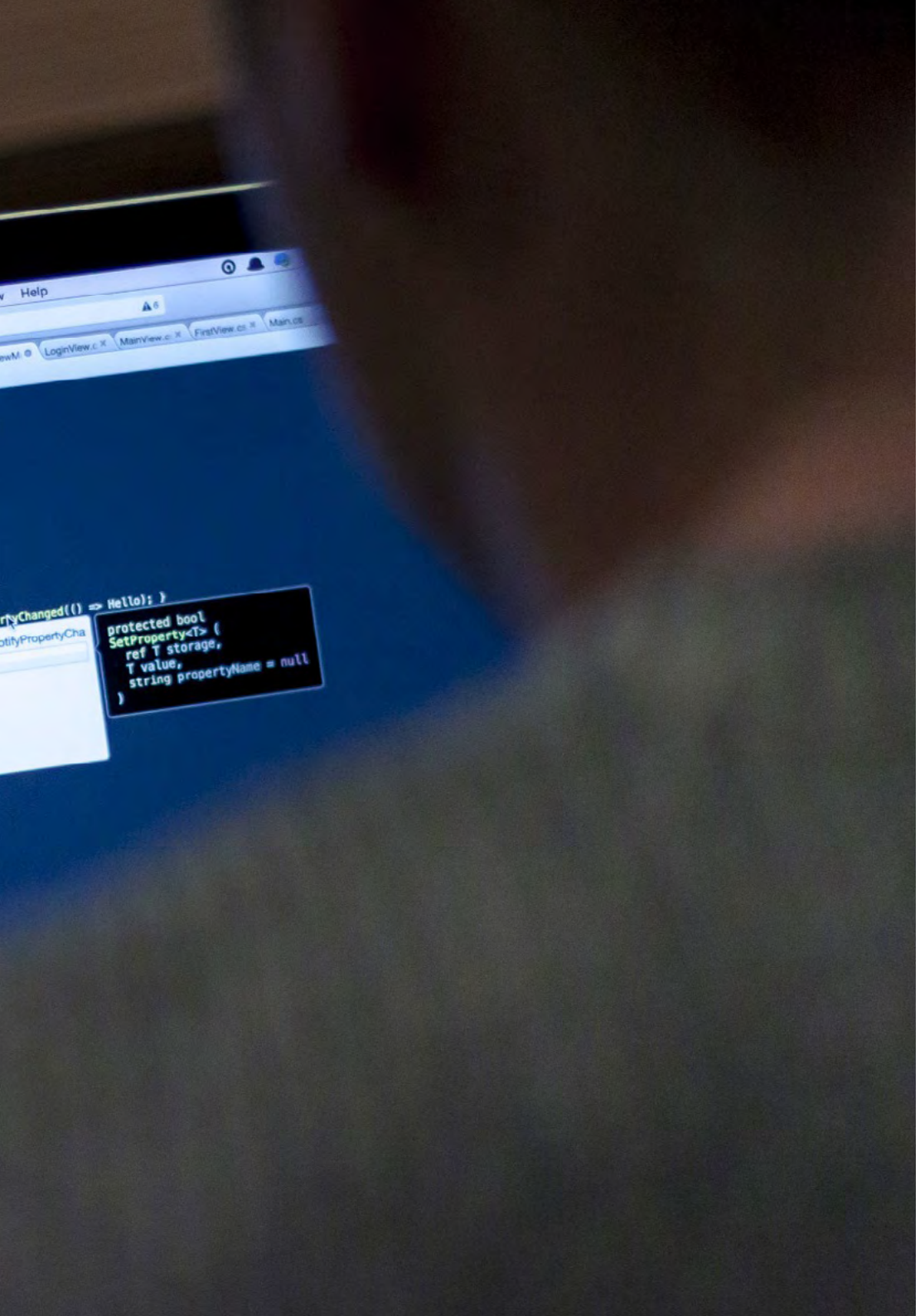
Module 6. Advanced Full-Stack Development for Seniors

- Set up Full-Stack development environments with Node.js, MongoDB, and Express
- Develop RESTful servers and manage middleware in backend applications
- Implement frontend with Angular or React and establish communication with APIs
- Manage application status using Redux or NgRx

Module 7. DevOps and Advanced Automation for Seniors

- Configure and manage containerized development environments using Docker and Kubernetes
- Implement CI/CD pipelines with GitHub Actions and continuous delivery tools
- Automate infrastructure management with Terraform and IaC on AWS
- Monitor applications with Prometheus, Grafana, and ELK Stack





Module 8. Advanced Agile Methodologies for Seniors

- Differentiate and select the most appropriate Agile Methodology according to the project context
- Effectively manage a product backlog and define key metrics in Scrum
- Optimize workflow in Kanban by managing WIP limits
- Coordinate multiple teams using agile scaling frameworks such as SAFe and LESS

Module 9. Cross-Platform Mobile Development for Seniors

- Set up development environments with Flutter and React Native
- Develop dynamic mobile interfaces with widgets in Flutter and components in React Native
- Implement state management with Provider, Riverpod, Redux, and Context API
- Optimize graphics, animations, and loading times in mobile applications

Module 10. Cloud Computing for Seniors

- Differentiate between cloud service models (IaaS, PaaS, SaaS) and their practical applications
- Compare cloud providers such as AWS, Azure, and Google Cloud based on features and costs
- Set up virtual machines, cloud storage, and virtual networks
- Deploy applications using tools such as Elastic Beanstalk and App Engine

05

Career Opportunities

This university degree will open the door to a wide range of job opportunities in various industries, from banking and healthcare to e-commerce and Artificial Intelligence. Graduates will be prepared to take on strategic roles such as software architects, Full-Stack development engineers, cybersecurity specialists, Cloud Computing experts, and data analysts, among others. In addition, thanks to their training in agile methodologies, Artificial Intelligence, DevOps, and microservices, they will be able to lead digital transformation and technology infrastructure optimization projects in companies of any size.

With an innovative methodology tailored to market needs, this postgraduate degree will ensure you advance in your career while benefiting from cutting-edge education with excellent job prospects"

Graduate Profile

Graduates will have the skills and knowledge necessary to create technological solutions that transform industries and communities. In this way, they will not only master the latest techniques and tools in software engineering, but will also be equipped with a comprehensive vision that will enable them to integrate technology and society. In turn, they will be able to design, develop, and maintain complex systems, ensuring quality, security, and innovation in every project. In addition, these experts will have the communication and leadership skills necessary to lead teams and consult organizations on their path to technological excellence.

If you are ready to be part of this technological revolution and become a pioneer in advanced software development, this university program is your path to success.

- **Problem-Solving:** analyze and solve complex problems in software development, applying advanced methods and tools to find innovative and effective solutions
- **Teamwork and Collaboration:** work effectively in multidisciplinary teams, collaborating with other professionals to design, develop, and maintain complex software systems
- **Time Management and Planning:** plan and manage software development projects efficiently, setting priorities and realistic deadlines to ensure the delivery of high-quality results
- **Effective Communication:** communicate technical ideas and solutions clearly and concisely, both orally and in writing, to ensure effective collaboration with colleagues and clients

After completing the program, you will be able to use your knowledge and skills in the following positions:

1. **Software Architect:** responsible for designing the structure and components of complex software systems, ensuring their scalability, efficiency, and maintainability.
2. **IT Project Manager:** coordinator and leader of software development projects, managing resources, timelines, and costs to meet established objectives.
3. **DevOps Engineer:** responsible for automating development and operations processes to improve efficiency and quality in the software lifecycle.
4. **Cybersecurity Specialist:** developer of programs and systems that protect information and systems from cyber threats.
5. **Cross-Platform Application Developer:** creator of applications for different platforms, such as mobile, web, and smart TVs.
6. **Systems Analyst:** responsible for evaluating and improving existing computer systems, identifying needs, and proposing appropriate technological solutions.
7. **IT Consultant:** advisor to companies on the implementation and optimization of technological solutions aligned with their business objectives.
8. **Software Test Engineer:** designer and executor of test plans to ensure the quality and functionality of software applications.
9. **Data Science Specialist:** analyst of large volumes of data to extract valuable information and support data-driven decision making.
10. **Systems and Network Administrator:** responsible for managing an organization's IT infrastructure, ensuring the availability, security, and efficiency of systems and networks.

06

Study Methodology

TECH is the world's first university to combine the **case study** methodology with **Relearning**, a 100% online learning system based on guided repetition.

This disruptive pedagogical strategy has been conceived to offer professionals the opportunity to update their knowledge and develop their skills in an intensive and rigorous way. A learning model that places students at the center of the educational process giving them the leading role, adapting to their needs and leaving aside more conventional methodologies.

TECH will prepare you to face new challenges in uncertain environments and achieve success in your career"

The student: the priority of all TECH programs

In TECH's study methodology, the student is the main protagonist.
The teaching tools of each program have been selected taking into account the demands of time, availability and academic rigor that, today, not only students demand but also the most competitive positions in the market.

With TECH's asynchronous educational model, it is students who choose the time they dedicate to study, how they decide to establish their routines, and all this from the comfort of the electronic device of their choice. The student will not have to participate in live classes, which in many cases they will not be able to attend. The learning activities will be done when it is convenient for them. They can always decide when and from where they want to study.

"At TECH you will NOT have live classes (which you might not be able to attend)"

The most comprehensive study plans at the international level

TECH is distinguished by offering the most complete academic itineraries on the university scene. This comprehensiveness is achieved through the creation of syllabi that not only cover the essential knowledge, but also the most recent innovations in each area.

By being constantly up to date, these programs allow students to keep up with market changes and acquire the skills most valued by employers. In this way, those who complete their studies at TECH receive a comprehensive education that provides them with a notable competitive advantage to further their careers.

And what's more, they will be able to do so from any device, pc, tablet or smartphone.

> *TECH's model is asynchronous, so it allows you to study with your pc, tablet or your smartphone wherever you want, whenever you want and for as long as you want"*

Case Studies and Case Method

The case method has been the learning system most used by the world's best business schools. Developed in 1912 so that law students would not only learn the law based on theoretical content, its function was also to present them with real complex situations. In this way, they could make informed decisions and value judgments about how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

With this teaching model, it is students themselves who build their professional competence through strategies such as Learning by Doing or Design Thinking, used by other renowned institutions such as Yale or Stanford.

This action-oriented method will be applied throughout the entire academic itinerary that the student undertakes with TECH. Students will be confronted with multiple real-life situations and will have to integrate knowledge, research, discuss and defend their ideas and decisions. All this with the premise of answering the question of how they would act when facing specific events of complexity in their daily work.

Relearning Methodology

At TECH, case studies are enhanced with the best 100% online teaching method: Relearning.

This method breaks with traditional teaching techniques to put the student at the center of the equation, providing the best content in different formats. In this way, it manages to review and reiterate the key concepts of each subject and learn to apply them in a real context.

In the same line, and according to multiple scientific researches, reiteration is the best way to learn. For this reason, TECH offers between 8 and 16 repetitions of each key concept within the same lesson, presented in a different way, with the objective of ensuring that the knowledge is completely consolidated during the study process.

Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.

A 100% online Virtual Campus with the best teaching resources

In order to apply its methodology effectively, TECH focuses on providing graduates with teaching materials in different formats: texts, interactive videos, illustrations and knowledge maps, among others. All of them are designed by qualified teachers who focus their work on combining real cases with the resolution of complex situations through simulation, the study of contexts applied to each professional career and learning based on repetition, through audios, presentations, animations, images, etc.

The latest scientific evidence in the field of Neuroscience points to the importance of taking into account the place and context where the content is accessed before starting a new learning process. Being able to adjust these variables in a personalized way helps people to remember and store knowledge in the hippocampus to retain it in the long term. This is a model called Neurocognitive context-dependent e-learning that is consciously applied in this university qualification.

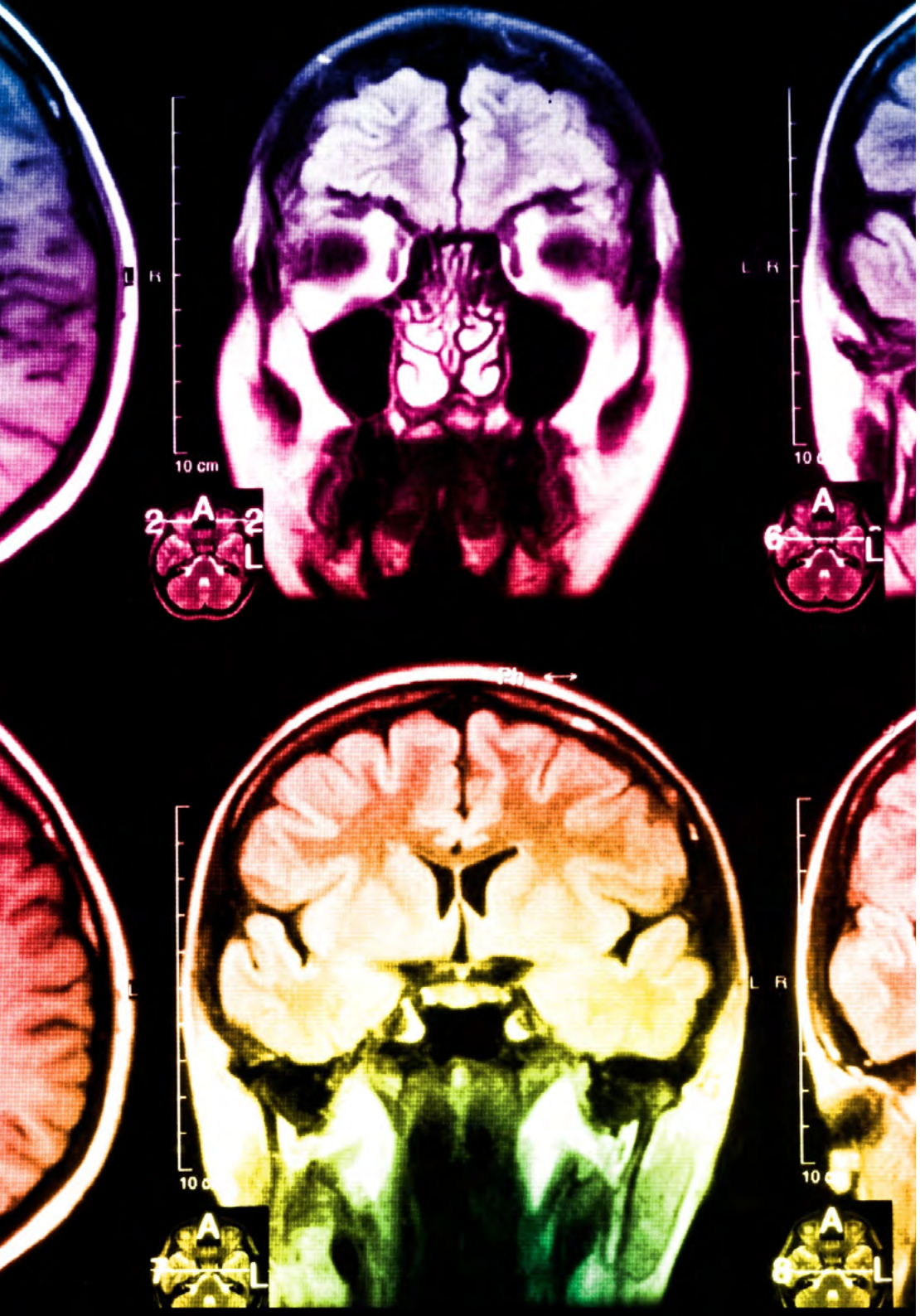
In order to facilitate tutor-student contact as much as possible, you will have a wide range of communication possibilities, both in real time and delayed (internal messaging, telephone answering service, email contact with the technical secretary, chat and videoconferences).

Likewise, this very complete Virtual Campus will allow TECH students to organize their study schedules according to their personal availability or work obligations. In this way, they will have global control of the academic content and teaching tools, based on their fast-paced professional update.

The online study mode of this program will allow you to organize your time and learning pace, adapting it to your schedule"

The effectiveness of the method is justified by four fundamental achievements:

1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that assess real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.



The university methodology top-rated by its students

The results of this innovative teaching model can be seen in the overall satisfaction levels of TECH graduates.

The students' assessment of the teaching quality, the quality of the materials, the structure of the program and its objectives is excellent. Not surprisingly, the institution became the top-rated university by its students according to the global score index, obtaining a 4.9 out of 5.

Access the study contents from any device with an Internet connection (computer, tablet, smartphone) thanks to the fact that TECH is at the forefront of technology and teaching.

You will be able to learn with the advantages that come with having access to simulated learning environments and the learning by observation approach, that is, Learning from an expert.

As such, the best educational materials, thoroughly prepared, will be available in this program:

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.

This content is then adapted in an audiovisual format that will create our way of working online, with the latest techniques that allow us to offer you high quality in all of the material that we provide you with.

Practicing Skills and Abilities

You will carry out activities to develop specific competencies and skills in each thematic field. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop within the framework of the globalization we live in.

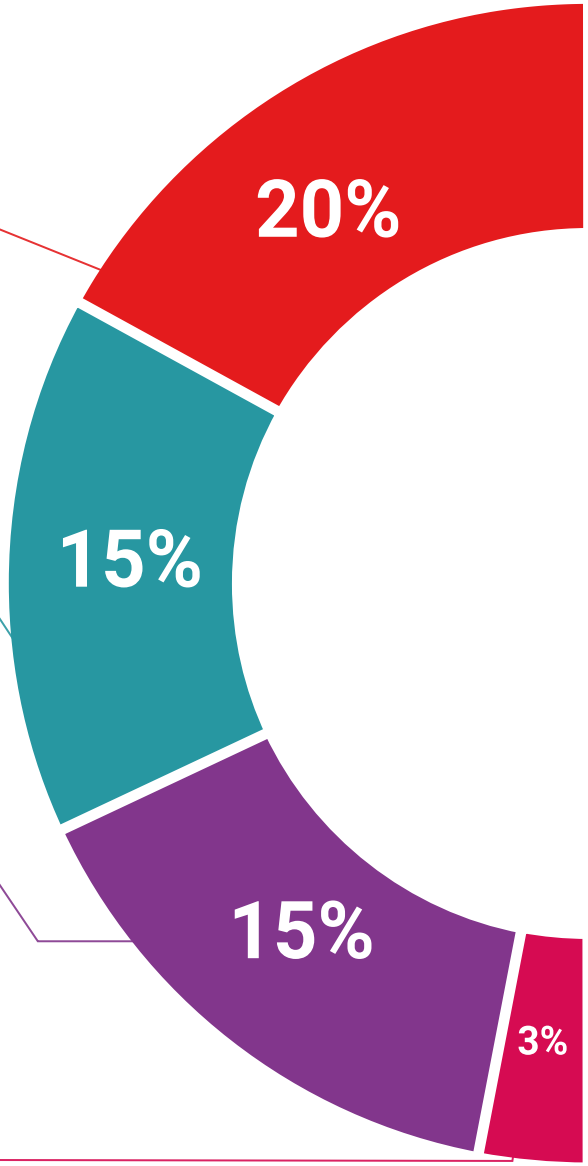
Interactive Summaries

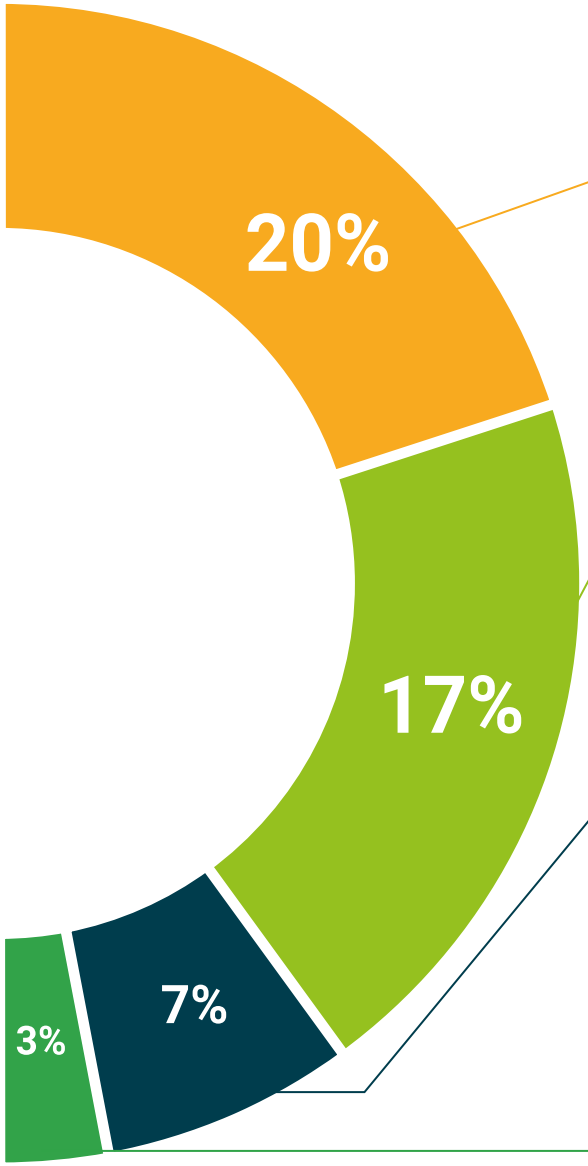
We present the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".

Additional Reading

Recent articles, consensus documents, international guides... In our virtual library you will have access to everything you need to complete your education.





Case Studies

Students will complete a selection of the best case studies in the field. Cases that are presented, analyzed, and supervised by the best specialists in the world.

Testing & Retesting

We periodically assess and re-assess your knowledge throughout the program. We do this on 3 of the 4 levels of Miller's Pyramid.

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 for future difficult decisions.

Quick Action Guides

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical and effective way to help students progress in their learning.

07

Teaching Staff

This Professional Master's Degree has an exceptional teaching staff, made up of experts in the field of software engineering and technology. In this regard, the professionals are not only recognized for their academic experience, but also for their participation in research and development projects in the technology sector. Therefore, students will benefit from training that combines theory and practice, allowing them to develop skills that are applicable in the real world.

The teaching staff will ensure that the syllabus is always up to date and aligned with the latest trends and emerging technologies, providing the necessary tools to excel in the sector"

Management

Mr. Utrilla Utrilla, Rubén

- Technology Project Manager at Serquo
- Fullstack Developer at ESSP
- Junior Fullstack Developer at Sinis Technology S.L
- Junior Fullstack Developer at Cantoblanco Polytechnic School Campus
- Master's Degree in AI and Innovation by Founderz
- Degree in Computer Engineering from the Autonomous University of Madrid
- Google Cloud Developer course in Google Academic Program

Professors

Mr. Pradilla Pórtoles, Adrián

- Head of IT at Open Sistemas
- Ruby on Rails Developer at Populate Tools
- Product Development at Global ideas4all
- Senior Systems Technician at FREMAP's Prevention Society
- Bootcamp in Tokenization by Tutellus
- Executive Master's Degree in Artificial Intelligence by the Artificial Intelligence Institute
- Postgraduate degree in Marketing and Advertising from the Antonio de Nebrija University.
- Degree in Computer Engineering from the Antonio de Nebrija University.
- Postgraduate Certificate in Technical Engineering in Computer Systems by Antonio de Nebrija University.

Mr. Amate Ortega, Antonio

- Technical Product Manager at Serquo Software
- Expert in Computer Engineering
- Expert in Mathematics
- Product-Oriented Full-Stack Development Specialist
- Software Engineering Specialist
- Digital Product Creation Specialist
- Graduate in Computer Engineering from the Autonomous University of Madrid

Mr. González Ávila, José Luis

- Head of Digital Transformation Project for Public Services in the Canary Islands Government
- Forensic Expert in Information Technology at Juan Antonio Rodríguez
- Project Manager at Aguas y Estructuras S.A.
- Senior Technology Consultant at Plexus Tecnologías
- Analyst at Novasoft Soluciones Canarias S.A
- Bachelor's Degree in Computer Engineering from the University of La Laguna
- Technical Degree in Management Computer Engineering from the University of La Laguna
- Expert in Big Data in Public Administration (R.FD.14.IN.24) from the Canary Islands Institute of Public Administration
- Expert in European Project Management (R.FD.62.AB.24) from the Canary Islands Institute of Public Administration
- Specialist in Power BI Data Visualization Tool for Decision Making by Structuralia
- Expert in Scrum Manager – eLearning by Scrum Master
- Expert in Management and Marketing of Innovative Products by Human Development Human Resources and Training Consulting
- Expert in the Use of the AVIP Tool for Teachers-Tutors by INTECCA

Ms. Jiménez Monar, Angélica Liceth

- Software Developer at Serquo
- Technical Support Specialist at Tecnocom
- Degree in Computer Engineering from the Autonomous University of Madrid
- Higher Degree in Network Computer Systems Administration

Mr. Gallegos Quishpe, Darío Fernando

- Senior iOS Developer at Tecdata
- iOS Developer at Sandav Consulting
- iOS Developer at BBVA
- Hybrid Developer at IMBox
- Bachelor's Degree in Computer Engineering from the Complutense University of Madrid
- Certification in Mobile Development with Android from the Community of Madrid
- Certificate in Big Data & Machine Learning from the Complutense University of Madrid

A unique, crucial and decisive learning experience to boost your professional development"

08

Certificate

This Professional Master's Degree in Advanced Software Development guarantees students, in addition to the most rigorous and up-to-date education, access to a diploma for the Professional Master's Degree issued by TECH Global University.

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

This private qualification will allow you to obtain a diploma for the **Professional Master's Degree in Advanced Software 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** 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: **Professional Master's Degree in Advanced Software Development**

Modality: **online**

Duration: **12 months**

Accreditation: **60 ECTS**

tech global university

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

Professional Master's Degree in Advanced Software Development

This is a private qualification of 1,800 hours of duration equivalent to 60 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

Professional Master's Degree in Advanced Software Development

General Structure of the Syllabus

Subject type	ECTS
Compulsory (CO)	60
Optional (OP)	0
External Work Placement (WP)	0
Master's Degree Thesis (MDT)	0
	Total 60

General Structure of the Syllabus

Year	Subject	ECTS	Type
1º	Advanced Software Architecture for Seniors	6	CO
1º	Advanced Back-End Development for Seniors	6	CO
1º	Advanced Front-End for Seniors	6	CO
1º	Data Science and Machine Learning for Seniors	6	CO
1º	Applied Cybersecurity for Seniors	6	CO
1º	Advanced Full-Stack Development for Seniors	6	CO
1º	DevOps and Advanced Automation for Seniors	6	CO
1º	Advanced Agile Methodologies for Seniors	6	CO
1º	Cross-Platform Mobile Development for Seniors	6	CO
1º	Cloud Computing for Seniors	6	CO

Dr. Pedro Navarro Illana
Dean

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*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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Professional Master's Degree
Advanced Software Development

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

Professional Master's Degree
Advanced Software Development

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