# Professional Master's Degree

## Software and Computer Systems Engineering

tech technological university

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# Professional Master's Degree
## Software and Computer Systems Engineering

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Technological University**
- Dedication: **16h/week**
- Schedule: **at your own pace**
- Exams: **online**

Website: www.techtitute.com/in/information-technology/professional-master-degree/master-software-computer-systems-engineering

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# 01 Introduction

This comprehensive program in Software and Computer Systems Engineering will allow professionals in the IT industry to deepen their understanding and learn about the processes of management, design, development and implementation of quality and secure software that meets the predefined objectives, both at the desktop and Web level.

*Specialize in computer systems with the help of professionals with extensive experience in the sector"*

This Professional Master’s Degree specializes students in software and computer systems engineering, with the aim of providing them with the knowledge and tools required for the design and development of complex systems, which provide the answer to established problems.

The main objective of this program is that the student achieves the ability to incorporate substantial qualitative improvements, providing new solutions to specific problems that arise, either with software or computer systems. It also aims to educate professionals to be capable of using a systematic and quantifiable approach to software development and maintenance, so that they also obtain in-depth knowledge of computer programming and the implementation and planning of computer systems, from a practical perspective and adapted to the current reality.

With this program the student will have access to the most advanced teaching resources and will have the opportunity to study a program that brings together the most in-depth knowledge in the field. A group of highly scientifically qualified professors with extensive international experience will provide students with the most complete and up-to-date information on the latest advances and techniques in Software and Computer Systems Engineering.

The syllabus covers the main current topics in Software and Computer Systems Engineering in such a way that whoever masters them will be prepared to work in this field. Therefore, it is not just another certificate in your backpack, but a real learning tool to approach the topics of the specialty in a modern, objective way and with the ability to make a judgment based on today's most cutting-edge information.

As it is a 100% online Professional Master's Degree, the student is not bound by fixed schedules or the need to move to another physical location, rather, they can access the content at any time of the day, balancing their professional or personal life with their academic life.

If they want to differentiate themselves from others and be capable of designing complex systems engineering projects, this is the program for them.

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

- Practical cases presented by experts in Software and Computer Systems Engineering
- 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 Software and Computer Systems Engineering
- 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

> *Completing this Professional Master's Degree will place software and computer systems engineering professionals at the forefront of the latest developments in the sector"*

*This Professional Master's Degree is the best investment you can make when selecting an up-to-date program in the field of Software and Computer Systems Engineering. We offer you quality and free access to content"*

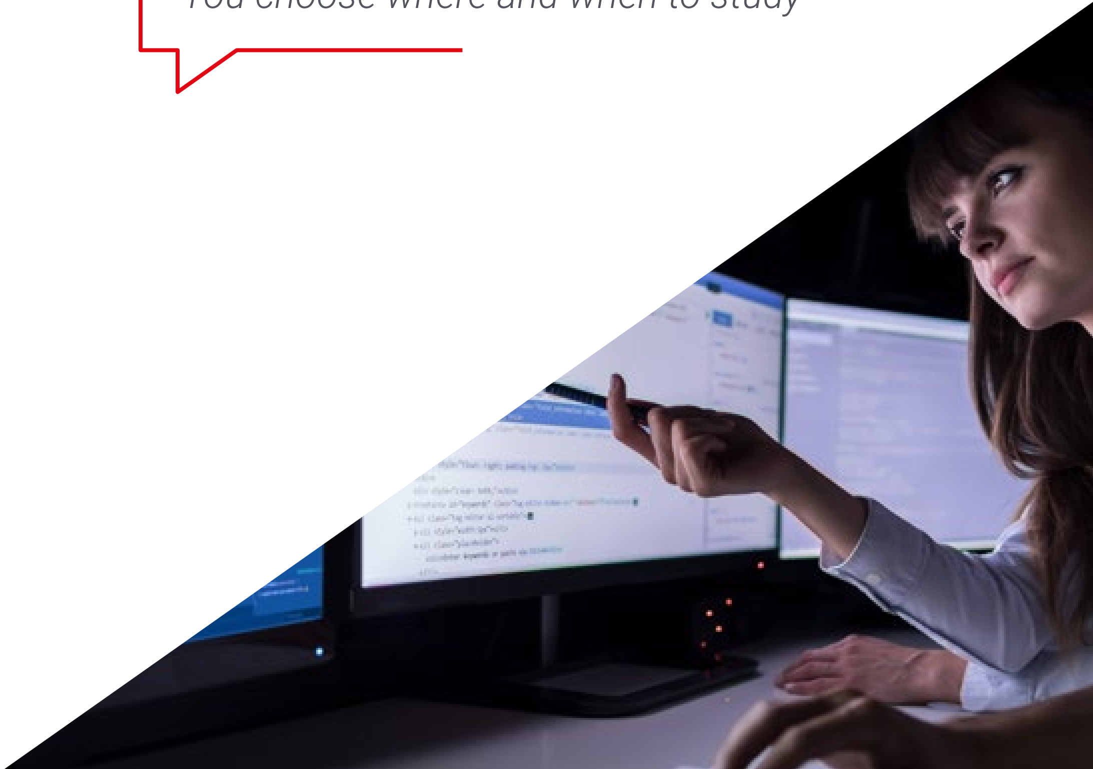
*This program comes with the best educational material, providing you with a contextual approach that will facilitate your learning"*

*This 100% online Professional Master's Degree will allow you to combine your studies with your professional work. You choose where and when to study"*

Its teaching staff includes professionals belonging to the field of Software and Computer Systems Engineering, who contribute their work experience to this training, as well as renowned specialists from reference 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 learning programmed to train 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 throughout the program. For this purpose, the professional will be assisted by an innovative interactive video system developed by renowned and experienced experts  Software and Computer Systems Engineering.



02

# Objectives

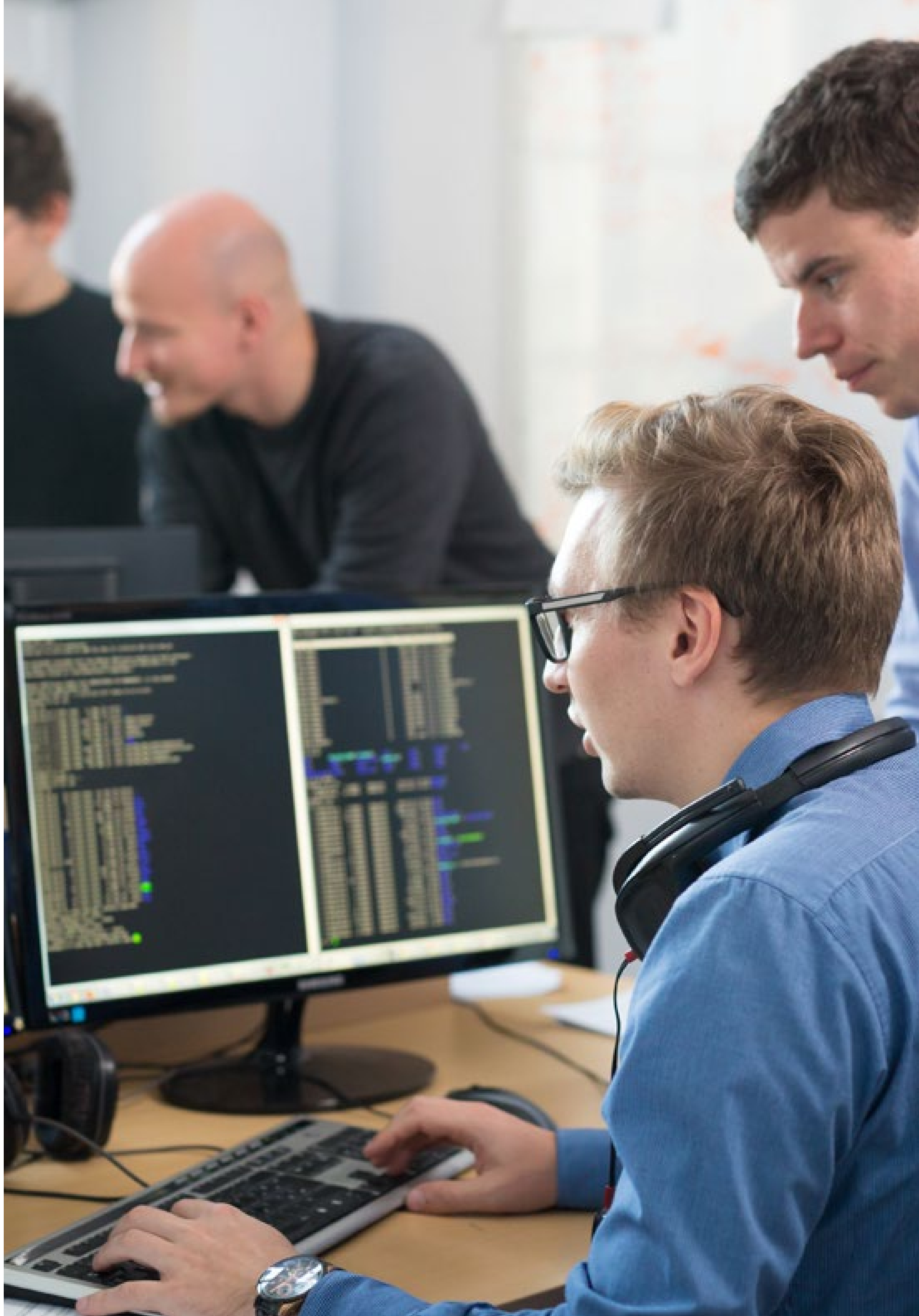
The Professional Master's Degree in Software and Computer Systems Engineering is oriented to facilitate the professional's performance in order for them to acquire and learn the main developments in this field, which will allow them to practice their profession with the highest quality and professionalism.

*Our goal is for you to become the best professional in your sector. And for this we have the best methodology and content"*

## General Objectives

- Acquire new knowledge in Software and Computer Systems Engineering
- Acquire new skills in terms of new technologies and the latest software developments
- Process the data generated in Software and Computer Systems Engineering activities

> *Join us and we will help you achieve professional excellence"*



## Specific Objectives

### Module 1. Methodologies, Development and Quality in Software Engineering

- Know the basics of Software Engineering, as well as the set of rules or ethical principles and professional responsibility during and after development
- Understand the software development process, under the different programming models and the object-oriented programming paradigm
- Understand the different types of application modeling and design patterns in the Unified Modeling Language (UML)
- Acquire the knowledge required for the correct application of agile methodologies in software development such as Scrum, among others
- Know the Lean development methodology to identify the activities that do not add value to the process, in order to obtain a higher quality software

### Module 2. Software Project Management

- Know the fundamental concepts of project management and the project management life cycle
- Understand the different stages of project management such as initiation, planning, stakeholder management and scoping
- Learn schedule development for time management, budget development and risk response
- Understand how quality management works in projects, including planning, assurance, control, statistical concepts and available tools
- Understand the functioning of the processes of procurement, execution, monitoring, control and closure of a project
- Acquire the essential knowledge related to the professional responsibility derived from project management

### Module 3. Software Development Platforms

- Understand the different software development platforms
- Acquire the necessary knowledge for the development of applications and graphical interfaces in Java and .NET languages
- Know the techniques required for the debugging and testing of the developments made
- Learn Android mobile application development environments and debugging and publishing processes
- Understand cloud-based application development and determine the correct procedures for its implementation
- Master the basic concepts, services and tools of the Google Clouds platform

### Module 4. Web-Client Computing

- Understand the process of creating web content through HTML markup language.
- Understand the procedures and techniques to improve the appearance of a document written in HTML
- Know the evolution of the Javascript language
- Acquire the necessary knowledge for the development of web client-side applications
- Develop applications with complex structures, by using the different procedures, functions and objects that integrate JavaScript
- Learn how to use the DOM programming interface for HTML and XML documents to modify their structure style and content
- Understand the use of event-based flow and listeners, as well as the use of modern toolkit and alignment systems

- Know the concept of web usability, its advantages, principles, methods and techniques to make a web site usable for the user
- Establish knowledge of web accessibility, its importance in current digital platforms, methodologies, norms, standards and determine compliance scales

### Module 5. Web Server Computing

- Understand the basic, intermediate and advanced concepts of the PHP language for the implementation of server-side applications
- Acquire the necessary knowledge for data modeling, relationships, keys and normalizations
- Understand the construction of the logical data model, the specification of tables, columns, keys and dependencies, as well as the knowledge necessary for the physical handling of data, file types, access modes and file organization
- Learn how to integrate applications developed in PHP with MariaDB and MySQL databases
- Master the process of customer interactions, using forms, Cookiesand session management
- Understand the Model View Controller View (MVC) software architecture that separates an application's data, user interface, and control logic into three distinct components
- Acquire the skills for the use of web services using XML, SOA and REST

### Module 6. Safety Management

- Learn the use of good security practices in the management of information technology services
- Acquire the knowledge for the correct certification of security processes
- Understand authentication mechanisms and methods for access control, as well as the access audit process
- Understand security management programs, risk management and security policy design
- Learn about business continuity plans, their phases and maintenance process
- Know the procedures for the correct protection of the company through DMZ networks, the use of intrusion detection systems and other methodologies

### Module 7. Software Security

- Understand software security issues, vulnerabilities and how they are classified
- Know the design principles, methodologies and standards in software security
- Understand the application of security in the different phases of the software life cycle
- Acquire the knowledge required for the safe coding of software and the evaluation techniques
- Understand the methodologies and processes to guarantee security during the development and delivery of cloud services
- Understand the basics of cryptology and the different encryption techniques currently available

### Module 8. Web Server Administration

- Know the concept, operation, architecture, resources and contents of a web server
- Understand the functioning, structure and HTTP protocol handling
- Understand the concept of distributed multi-server architectures
- Master the functioning of an application server and another proxy
- Analyze the different web servers that are trending in today's market
- Understand the process of usage statistics and load balancing on web servers
- Acquire the necessary knowledge for the installation, administration, configuration and security of the Microsoft Internet Information Services (IIS) web server as well as the free Apache web server

### Module 9. Security Audit

- Acquire the knowledge required for the correct execution of the audit process and internal computer control
- Understand the processes to carry out for the security audit in systems and networks
- Understand the different support tools, methodologies and subsequent analysis during internet and mobile device security auditing
- Learn the properties and influencing factors that condition business risks and determine the correct implementation of appropriate risk management
- Know the risk mitigation measures, as well as the methodologies for the implementation of an Information Security Management System and the norms and standards to be used
- Understand the procedures for conducting the security audit, its traceability and presentation of results

### Module 10. Online Applications Security

- Acquire the knowledge required to evaluate and detect the vulnerabilities of online applications
- Know the procedures to use during the development of web applications and their subsequent evaluation through analysis and security tests
- Learn the security measures for the deployment and production of web applications
- Understand the concepts, functions and technologies to be applied in the security of web services, as well as security tests and protective measures
- Assimilate the procedures for ethical hacking, malware analysis and forensics
- Know the mitigation and containment measures for incidents on web services
- Acquire the knowledge to implement best practice techniques for the development and implementation of online applications as well as the most common errors

# 03
# Skills

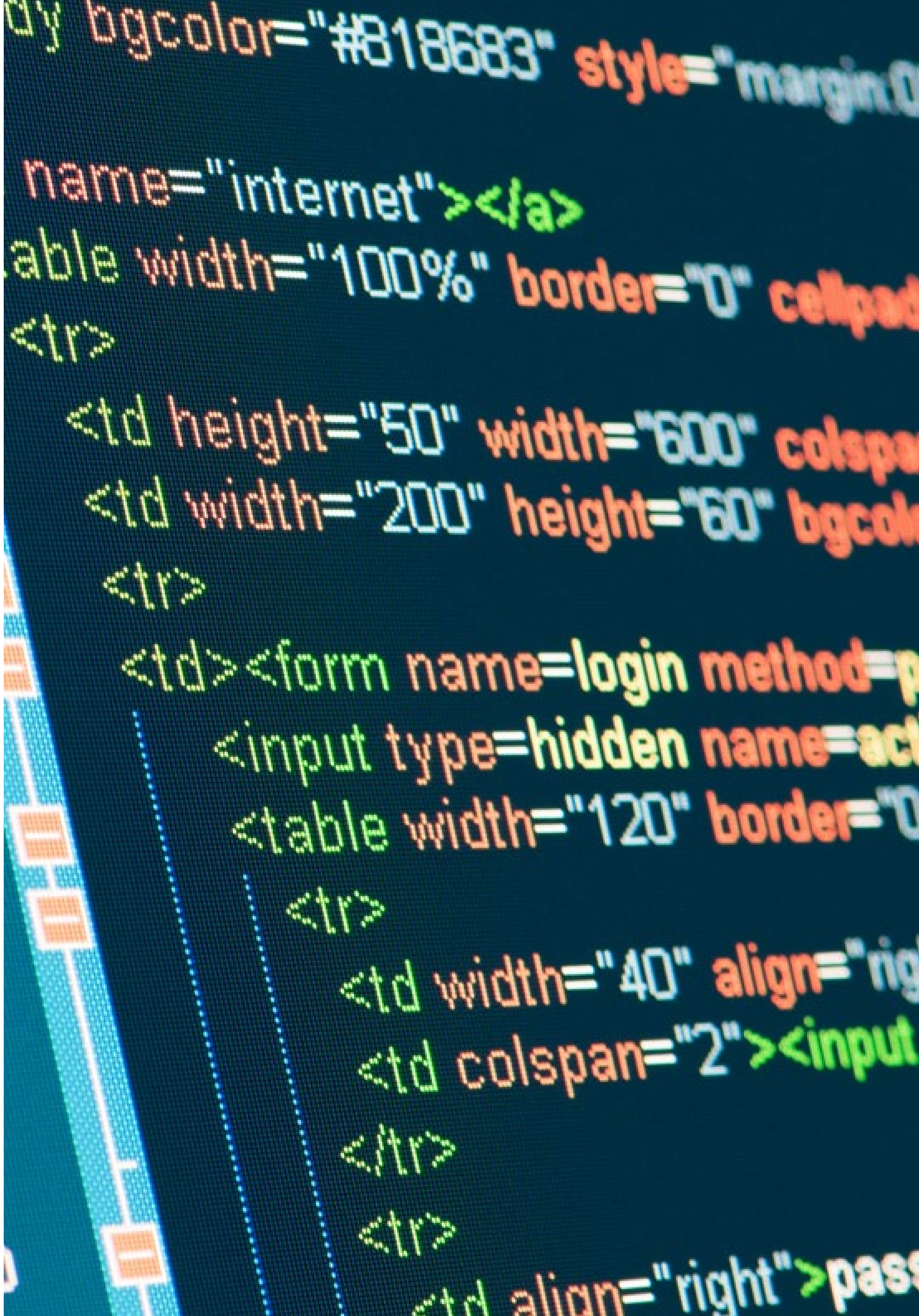
After passing the evaluations of the Professional Master's Degree in Software and Computer Systems Engineering, the professional will have acquired the skills required for quality and up-to-date practice based on the most innovative teaching methodology.

> *This program will help you acquire the skills you need to excel in your daily work"*

## General Skill

- Design, manage and implement Software and Computer Systems Engineering projects

> *Improving your skills in the field of Software and Computer Systems Engineering will allow you to be more competitive. Continue your studies and give your career a boost"*



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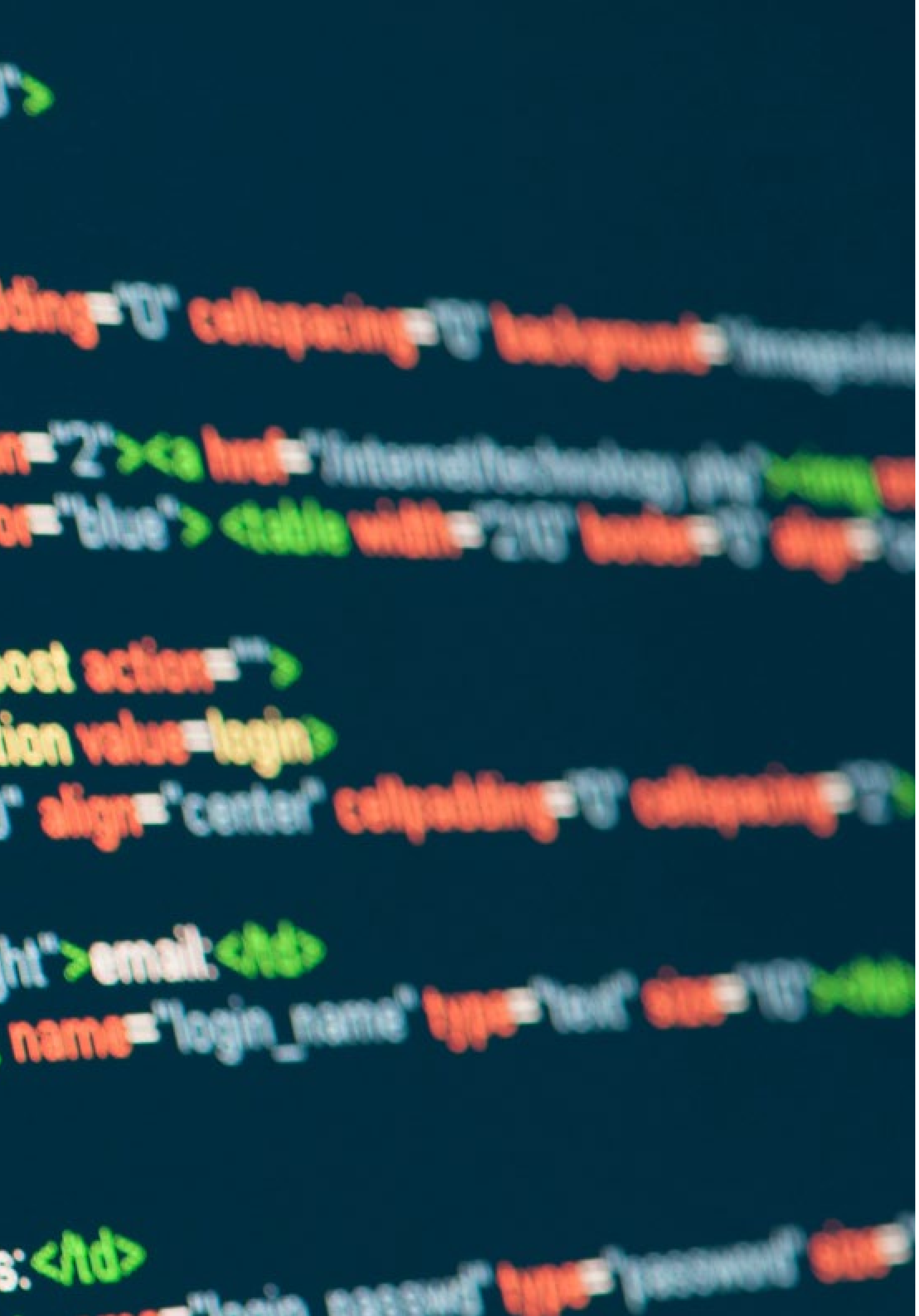


## Specific Skills

- Understand the different types of application modeling and design patterns in the Unified Modeling Language (UML)
- Understand how quality management works in projects, including planning, assurance, control, statistical concepts and available tools
- Use the necessary knowledge for the development of applications and graphical interfaces in Java and .NET languages
- Understand the procedures and techniques to improve the appearance of a document written in HTML
- Master customer interaction processes using  forms, cookies and session management
- Understand authentication mechanisms and methods for access control, as well as the access audit process
- Understand the application of security in the different phases of the software life cycle
- Know the concept, operation, architecture, resources and contents of a web server.
- Understand the different support tools, methodologies and subsequent analysis during internet and mobile device security auditing
- Understand the security policies and standards to be applied to online applications

04

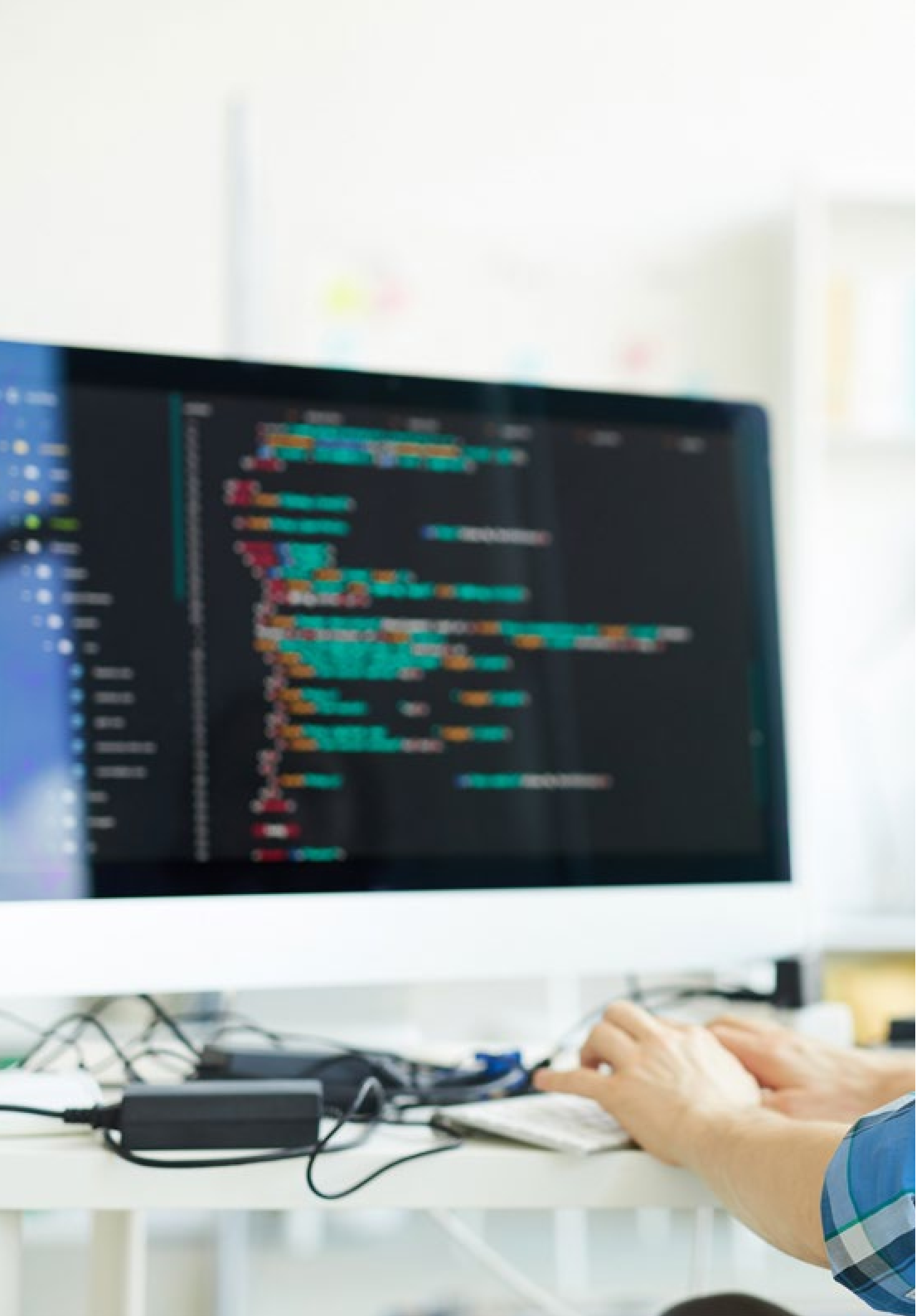
# Structure and Content

The structure of the contents has been designed by the best professionals in the Software and Computer Systems Engineering sector, with extensive experience and recognized prestige in the profession, and who aware of the benefits that the latest educational technology can bring to higher education.

> We have the most complete and up-to-date scientific program on the market. We strive for excellence and for you to achieve it too"

## **Module 1.** Methodologies, Development and Quality in Software Engineering

1.1. Introduction to Software Engineering
    1.1.1. Introduction
    1.1.2. The Software Crisis
    1.1.3. Differences between Software Engineering and Computer Science
    1.1.4. Ethics and Professional Responsibility in Software Engineering
    1.1.5. Software Factories
1.2. The Software Development Process
    1.2.1. Definition
    1.2.2. Software Process Model
    1.2.3. The Unified Software Development Process
1.3. Object-Oriented Software Development
    1.3.1. Introduction
    1.3.2. Principles of Object Orientation
    1.3.3. Object Definition
    1.3.4. Class Definition
    1.3.5. Object-Oriented Analysis vs. Object-Oriented Design
1.4. Model-Based Software Development
    1.4.1. The Need to Model
    1.4.2. Software Systems Modeling
    1.4.3. Object Modeling
    1.4.4. UML
    1.4.5. CASE Tools
1.5. Application Modeling and Design Patterns with UML
    1.5.1. Advanced Requirements Modeling
    1.5.2. Advanced Static Modeling
    1.5.3. Advanced Dynamic Modeling
    1.5.4. Component Modeling
    1.5.5. Introduction to Design Patterns with UML
    1.5.6. Adapter
    1.5.7. Factory
    1.5.8. Singleton
    1.5.9. Strategy
    1.5.10. Composite
    1.5.11. Facade
    1.5.12. Observer
1.6. Model-Driven Engineering
    1.6.1. Introduction
    1.6.2. Metamodeling of Systems
    1.6.3. MDA
    1.6.4. DSL
    1.6.5. Model Refinements with OCL
    1.6.6. Model Transformations
1.7. Ontologies in Software Engineering
    1.7.1. Introduction
    1.7.2. Ontology Engineering
    1.7.3. Application of Ontologies in Software Engineering
1.8. Agile Methodologies for Software Development, Scrum
    1.8.1. What is Software Agility?
    1.8.2. The Agile Manifesto
    1.8.3. The Roadmap of an Agile Project
    1.8.4. The Product Owner
    1.8.5. User Stories
    1.8.6. Agile Planning and Estimating
    1.8.7. Measurements in Agile Development
    1.8.8. Introduction to Scrum
    1.8.9. The Roles
    1.8.10. The Product Backlog
    1.8.11. The Sprint
    1.8.12. Meetings.
1.9. Lean Software Development Methodology
    1.9.1. Introduction
    1.9.2. Kanban
1.10. Quality and Software Process Improvement
    1.10.1. Introduction
    1.10.2. Software Measurement
    1.10.3. Software Testing
    1.10.4. Software Processes Quality Model: CMMI



## **Module 2.** Software Project Management

2.1. Fundamental Concepts of Project Management and the Project Management Lifecycle
  2.1.1. What is a Project?
  2.1.2. Common Methodology
  2.1.3. What is Project Management?
  2.1.4. What is a Project Plan?
  2.1.5. Benefits
  2.1.6. Project Life Cycle
  2.1.7. Process Groups or Project Management Life Cycle
  2.1.8. The Relationship between Process Groups and Knowledge Areas
  2.1.9. Relationships between Product and Project Life Cycle

2.2. Start-Up and Planning
  2.2.1. From the Idea to the Project
  2.2.2. Development of the Project Record
  2.2.3. Project Kick-Off Meeting
  2.2.4. Tasks, Knowledge and Skills in the Startup Process
  2.2.5. The Project Plan
  2.2.6. Development of the Basic Plan. Steps
  2.2.7. Tasks, Knowledge and Skills in the Planning Process

2.3. Stakeholders and Outreach Management
  2.3.1. Identify Stakeholders
  2.3.2. Develop Plan for Stakeholder Management
  2.3.3. Manage Stakeholder Engagement
  2.3.4. Control Stakeholder Engagement
  2.3.5. The Objective of the Project
  2.3.6. Scope Management and its Plan
  2.3.7. Gathering Requirements
  2.3.8. Define the Scope Statement
  2.3.9. Create the WBS
  2.3.10. Verify and Control the Scope

- 2.4. The Development of the Time-Schedule
  - 2.4.1. Time Management and its Plan
  - 2.4.2. Define Activities
  - 2.4.3. Establishment of the Sequence of Activities
  - 2.4.4. Estimated Resources for Activities
  - 2.4.5. Estimated Duration of Activities
  - 2.4.6. Development of the Time-Schedule and Calculation of the Critical Path
  - 2.4.7. Schedule Control
- 2.5. Budget Development and Risk Response
  - 2.5.1. Estimate Costs
  - 2.5.2. Develop Budget and S-Curve
  - 2.5.3. Cost Control and Earned Value Method
  - 2.5.4. Risk Concepts
  - 2.5.5. How to Perform a Risk Analysis
  - 2.5.6. The Development of the Response Plan
- 2.6. Quality Management
  - 2.6.1. Quality Planning
  - 2.6.2. Assuring Quality
  - 2.6.3. Quality Control
  - 2.6.4. Basic Statistical Concepts
  - 2.6.5. Quality Management Tools
- 2.7. Communication and Human Resources
  - 2.7.1. Planning Communications Management
  - 2.7.2. Communications Requirements Analysis
  - 2.7.3. Communication Technology
  - 2.7.4. Communication Models
  - 2.7.5. Communication Methods
  - 2.7.6. Communications Management Plan
  - 2.7.7. Manage Communications
  - 2.7.8. Management of Human Resources
  - 2.7.9. Main Stakeholders and their Roles in the Projects
  - 2.7.10. Types of Organization
  - 2.7.11. Project Organization
  - 2.7.12. The Work Equipment
- 2.8. Procurement
  - 2.8.1. The Procurement Process
  - 2.8.2. Planning
  - 2.8.3. Search for Suppliers and Request for Quotations
  - 2.8.4. Contract Allocation
  - 2.8.5. Contract Administration
  - 2.8.6. Contracts
  - 2.8.7. Types of Contracts
  - 2.8.8. Contract Negotiation
- 2.9. Execution, Monitoring and Control and Closure
  - 2.9.1. Process groups
  - 2.9.2. Project Execution
  - 2.9.3. Project Monitoring and Control
  - 2.9.4. Project closure
- 2.10. Professional Responsibility
  - 2.10.1. Professional Responsibility
  - 2.10.2. Characteristics of Social and Professional Responsibility
  - 2.10.3. Project Leader Code of Ethics
  - 2.10.4. Liability vs. PMP®
  - 2.10.5. Examples of Liability
  - 2.10.6. Benefits of Professionalization

## Module 3. Software Development Platforms

- 3.1. Introduction to Application Development
  - 3.1.1. Desktop Applications
  - 3.1.2. Programming Language
  - 3.1.3. Integrated Development Environments
  - 3.1.4. Web Applications
  - 3.1.5. Mobile Applications
  - 3.1.6. Cloud Applications
- 3.2. Application Development and Graphical User Interface in Java
  - 3.2.1. Integrated Development Environments for Java
  - 3.2.2. Main IDE for Java
  - 3.2.3. Introduction to the Eclipse Development Platform
  - 3.2.4. Introduction to the NetBeans Development Platform
  - 3.2.5. Controller View Model for Graphical User Interfaces
  - 3.2.6. Design a Graphical Interface in Eclipse
  - 3.2.7. Design a Graphical Interface in NetBeans
- 3.3. Debugging and Testing in Java
  - 3.3.1. Testing and Debugging of Java programs
  - 3.3.2. Debugging in Eclipse
  - 3.3.3. Debugging in NetBeans
- 3.4. Application Development and Graphical User Interface in. NET
  - 3.4.1. Net Framework
  - 3.4.2. Components of the .NET Development Platform
  - 3.4.3. Visual Studio .NET
  - 3.4.4. .NET tools for GUI
  - 3.4.5. The GUI with Windows Presentation Foundation
  - 3.4.6. Debugging and Compiling a WPF Application
- 3.5. Programming for .NET Networks
  - 3.5.1. Introduction to .NET Network Programming
  - 3.5.2. Requests and Responses in .NET
  - 3.5.3. Use of Application Protocols in .NET
  - 3.5.4. Security in .NET Network Programming
- 3.6. Mobile Application Development Environments
  - 3.6.1. Mobile Applications
  - 3.6.2. Android Mobile Applications
  - 3.6.3. Steps for Development in Android
  - 3.6.4. The IDE Android Studio
- 3.7. Development of Applications in the Environment Android Studio
  - 3.7.1. Install and Start Android Studio
  - 3.7.2. Running an Android Application
  - 3.7.3. Development of the Graphic Interface in Android Studio
  - 3.7.4. Starting Activities in Android Studio
- 3.8. Debugging and Publishing of Android Applications
  - 3.8.1. Debugging an Application in Android Studio
  - 3.8.2. Memorizing Applications in Android Studio
  - 3.8.3. Publishing an Application on Google Play
- 3.9. Cloud Application Development
  - 3.9.1. Cloud Computing
  - 3.9.2. Cloud Levels: SaaS, PaaS, IaaS
  - 3.9.3. Main Development Platforms in the Cloud
  - 3.9.4. Bibliographical References
- 3.10. Introduction to Google Cloud Platform
  - 3.10.1. Basic Concepts of Google Cloud Platform
  - 3.10.2. Google Cloud Platform Services
  - 3.10.3. Tools in Google Cloud Platform

## **Module 4.** Web-Client Computing

4.1. Introduction to HTML
- 4.1.1. Structure of the Document
- 4.1.2. Color
- 4.1.3. Text:
- 4.1.4. Hypertext Links
- 4.1.5. Images
- 4.1.6. Lists
- 4.1.7. Tables
- 4.1.8. Frames
- 4.1.9. Forms.
- 4.1.10. Specific Elements for Mobile Technologies
- 4.1.11. Obsolete Elements

4.2. Cascading Style Sheets (CSS)
- 4.2.1. Elements and Structure of a Cascading Style Sheet
  - 4.2.1.1. Creation of Style Sheets
  - 4.2.1.2. Application of Styles Selectors
  - 4.2.1.3. Style Inheritance and Cascading
  - 4.2.1.4. Page Formatting Using Styles
  - 4.2.1.5. Page Structuring Using Styles. The Box Model
- 4.2.2. Style Design for different Devices
- 4.2.3. Types of Style Sheets: Static and Dynamic Pseudoclasses
- 4.2.4. Best Practices in the Use of Style Sheets

4.3. Introduction and History of JavaScript
- 4.3.1. Introduction
- 4.3.2. History of JavaScript
- 4.3.3. Development Environment to be Used

4.4. Basic Notions of Web Programming
- 4.4.1. Basic JavaScript Syntax
- 4.4.2. Primitive Data Types and Operators
- 4.4.3. Variables and Areas
- 4.4.4. Text Strings and Template Literals
- 4.4.5. Numbers and Booleans
- 4.4.6. Comparisons

4.5. Complex JavaScript Structures
- 4.5.1. Vectors or Arrays and Objects
- 4.5.2. Sets
- 4.5.3. Maps
- 4.5.4. Disjunctive
- 4.5.5. Loops

4.6. Functions and Objects
- 4.6.1. Function Definition and Invocation
- 4.6.2. Arguments
- 4.6.3. Arrow Functions
- 4.6.4. Callback Functions
- 4.6.5. Higher Order Functions
- 4.6.6. Literal Objects
- 4.6.7. The This Object
- 4.6.8. Objects as Namespaces: theMaths and Date Objects

4.7. The Document Object Model (DOM)
- 4.7.1. What is DOM?
- 4.7.2. A Bit of History
- 4.7.3. Navigation and Element Retrieval
- 4.7.4. A Virtual DOM with JSDOM
- 4.7.5. Query Selectors
- 4.7.6. Navigation using Properties
- 4.7.7. Assigning Attributes to Elements
- 4.7.8. Creation and Modification of Nodes
- 4.7.9. Updated Styling of the DOM Elements

4.8. Modern Web Development
- 4.8.1. Event-Driven Flow and Listeners
- 4.8.2. Modern Web Toolkits and Alignment Systems
- 4.8.3. Strict JavaScript Mode
- 4.8.4. More about Functions
- 4.8.5. Asynchronous Promises and Functions
- 4.8.6. Closures
- 4.8.7. Functional Programming
- 4.8.8. POO in JavaScript

4.9. Web Usability
- 4.9.1. Introduction to Usability
- 4.9.2. Definition of Usability
- 4.9.3. Importance of User-Centered Web Design
- 4.9.4. Differences Between Accessibility and Usability
- 4.9.5. Advantages and Problems in Combining Accessibility and Usability
- 4.9.6. Advantages and Difficulties in the Implementation of Usable Websites
- 4.9.7. Usability Methods
- 4.9.8. User Requirements Analysis
- 4.9.9. Conceptual Design Principles. User-Oriented Prototyping

4.9.10. Guidelines for the Creation of Usable Web Sites
- 4.9.10.1. Usability Guidelines of Jakob Nielsen
- 4.9.10.2. Usability Guidelines of Bruce Tognazzini

4.9.11. Usability Evaluation

4.10. Web Accessibility
- 4.10.1. Introduction
- 4.10.2. Definition of Web-Accessibility
- 4.10.3. Types of Disabilities
  - 4.10.3.1. Temporary or Permanent Disabilities
  - 4.10.3.2. Visual Impairment
  - 4.10.3.3. Hearing Impairment
  - 4.10.3.4. Motor Impairment
  - 4.10.3.5. Neurological or Cognitive Disabilities
  - 4.10.3.6. Difficulties Arising from Aging
  - 4.10.3.7. Limitations Arising from the Environment
  - 4.10.3.8. Barriers Preventing Access to the Web
- 4.10.4. Technical Aids and Support Products to Overcome Barriers
  - 4.10.4.1. Aids for the Blind
  - 4.10.4.2. Aids for Persons with Low Vision
  - 4.10.4.3. Aids for People with Color Blindness
  - 4.10.4.4. Aids for the Hearing Impaired
  - 4.10.4.5. Aids for the Motor Impaired
  - 4.10.4.6. Aids for the and Neurological Impaired
- 4.10.5. Advantages and Difficulties in the Implementation of Web Accessibility
- 4.10.6. Guidelines for Compliance with Regulations and Standards
  - 4.10.6.1. Description of the Main Guidelines (Images, links, videos, etc.)
  - 4.10.6.2. Guidelines for Accessible Navigation
    - 4.10.6.2.1. Perceptibility
    - 4.10.6.2.2. Operability
    - 4.10.6.2.3. Comprehensibility
    - 4.10.6.2.4. Robustness
- 4.10.7. Description of the Web Accessibility Compliance Process
- 4.10.8. Compliance Levels
- 4.10.9. Compliance Criteria
- 4.10.10. Compliance Requirements
- 4.10.11. Web Site Accessibility Evaluation Methodology

## **Module 5.** Web Server Computing

5.1. Introduction to Server-Side Programming: PHP
- 5.1.1. Server-Side Programming Basics
- 5.1.2. Basic PHP Syntax
- 5.1.3. HTML Content Generation with PHP
- 5.1.4. Development and Testing Environments: XAMPP

5.2. Advanced PHP
- 5.2.1. Control Structures with PHP
- 5.2.2. PHP Functions
- 5.2.3. Array Handling in PHP
- 5.2.4. String Handling with PHP
- 5.2.5. Object Orientation in PHP

5.3. Data Models
- 5.3.1. Concept of Data. Life Cycle of Data
- 5.3.2. Types of Data
  - 5.3.2.1. Basic
  - 5.3.2.2. Records
  - 5.3.2.3. Dynamics

5.4. Relational Model
- 5.4.1. Description
- 5.4.2. Entities and Types of Entities
- 5.4.3. Data Elements. Attributes
- 5.4.4. Relationships: Types, Subtypes, Cardinality
- 5.4.5. Keys Types of Keys
- 5.4.6. Normalization. Normal Shapes

5.5. Construction of the Logical Data Model
- 5.5.1. Specification of Tables
- 5.5.2. Definition of Columns
- 5.5.3. Key Specification
- 5.5.4. Conversion to Normal Shapes. Dependency

5.6. The Physical Data Model. Data Files
- 5.6.1. Description of Data Files
- 5.6.2. Types of Files
- 5.6.3. Access Modes
- 5.6.4. File Organization

5.7. Database Access from PHP
- 5.7.1. Introduction to MariaDB
- 5.7.2. Working with a MariaDB Database: the SQL Language
- 5.7.3. Accessing the MariaDB Database from PHP
- 5.7.4. Introduction to MySQL
- 5.7.5. Working with a MySQL Database: The SQL Language
- 5.7.6. Accessing MySQL Database from PHP

5.8. Client Interaction from PHP
- 5.8.1. PHP Forms
- 5.8.2. Cookies
- 5.8.3. Session Management

5.9. Web Application Architecture
- 5.9.1. The Controller View Model Pattern
- 5.9.2. Controller
- 5.9.3. Models
- 5.9.4. View

5.10. Introduction to Web Services
- 5.10.1. Introduction to XML
- 5.10.2. Service-Oriented Architecture (SOA): Web Services
- 5.10.3. Creation of SOAP and REST Web Services
- 5.10.4. The SOAP Protocol
- 5.10.5. The REST Protocol

### **Module 6.** Safety Management

6.1. Information Security
- 6.1.1. Introduction
- 6.1.2. Information Security Involves Confidentiality, Integrity and Availability
- 6.1.3. Safety is an Economic Issue
- 6.1.4. Safety is a Process
- 6.1.5. Classification of Information
- 6.1.6. Information Security Involves Risk Management
- 6.1.7. Security is Articulated with Security Controls
- 6.1.8. Security is both Physical and Logical
- 6.1.9. Safety Involves People

6.2. The Information Security Professional
- 6.2.1. Introduction
- 6.2.2. Information Security as a Profession
- 6.2.3. Certifications (ISC)2
- 6.2.4. The ISO 27001 Standard
- 6.2.5. Best Security Practices in IT Service Management
- 6.2.6. Information Security Maturity Models
- 6.2.7. Other Certifications, Standards and Professional Resources

6.3. Access Control
- 6.3.1. Introduction
- 6.3.2. Access Control Requirements
- 6.3.3. Authentication Mechanisms
- 6.3.4. Authorization Methods
- 6.3.5. Access Accounting and Auditing
- 6.3.6. “Triple A" Technologies

6.4. Information Security Programs, Processes and Policies
- 6.4.1. Introduction
- 6.4.2. Security Management Programs
- 6.4.3. Risk Management

6.5. Business Continuity Plans
- 6.5.1. Introduction to BCPs
- 6.5.2. Phase I and II
- 6.5.3. Phase III and IV
- 6.5.4. Maintenance of the BCP

6.6. Procedures for the Correct Protection of the Company
- 6.6.1. DMZ Networks
- 6.6.2. Intrusion Detection Systems
- 6.6.3. Access Control Lists
- 6.6.4. Learning from the Attacker: Honeypot

6.7. Security Architecture Prevention
- 6.7.1. Overview. Activities and Layer Model
- 6.7.2. Perimeter Defence (Firewalls, WAFs, WAFs, IPS,.
- 6.7.3. Endpoint Defence (Equipment, Servers and Services)

6.8. Security Architecture Detection
- 6.8.1. Overview Detection and Monitoring
- 6.8.2. Logs, Encrypted Traffic Breaking, Recording and Siems
- 6.8.3. Alerts and Intelligence

6.9. Security Architecture Reaction
- 6.9.1. Reaction Products, Services and Resources
- 6.9.2. Incident Management
- 6.9.3. CERTS y CSIRTs

6.10. Security Architecture Recuperation
- 6.10.1. IT Resilience Solutions
- 6.10.2. Crisis Management and Governance

## Module 7. Software Security

7.1. Problems of the Software Security
- 7.1.1. Introduction to the Problem of Software Safety
- 7.1.2. Vulnerabilities and their Classification
- 7.1.3. Secure Software Properties
- 7.1.4. References

7.2. Software Safety Design Principles
- 7.2.1. Introduction
- 7.2.2. Software Safety Design Principles
- 7.2.3. Types of S-SDLC
- 7.2.4. Software Safety in S-SDLC Phases
- 7.2.5. Methodologies and Standards
- 7.2.6. References

7.3. Software Lifecycle Safety in the Requirements and Design Phases
- 7.3.1. Introduction
- 7.3.2. Attack Modeling
- 7.3.3. Cases of Abuse
- 7.3.4. Safety Requirements Engineering
- 7.3.5. Risk Analysis Architectural
- 7.3.6. Design Patterns
- 7.3.7. References

7.4. Software Lifecycle Safety in the Coding, Testing and Operation Phases
- 7.4.1. Introduction
- 7.4.2. Risk-Based Safety Testing
- 7.4.3. Code Review
- 7.4.4. Penetration Test
- 7.4.5. Security Operations
- 7.4.6. External Review
- 7.4.7. References

7.5. Secure Coding Applications I
- 7.5.1. Introduction
- 7.5.2. Secure Coding Practices
- 7.5.3. Manipulation and Validation of Inputs
- 7.5.4. Memory Overflow
- 7.5.5. References

7.6. Secure Coding Applications II
- 7.6.1. Introduction
- 7.6.2. Integers Overflows, Truncation Errors and Problems with Type Conversions between Integers
- 7.6.3. Errors and Exceptions
- 7.6.4. Privacy and Confidentiality
- 7.6.5. Privileged Programs
- 7.6.6. References

7.7. Development and Cloud Security
- 7.7.1. Safety in Development; Methodology and Practice
- 7.7.2. PaaS, IaaS, CaaS and SaaS Models
- 7.7.3. Security in the Cloud and for Cloud Services

7.8. Encryption
- 7.8.1. Fundamentals of Cryptology
- 7.8.2. Symmetric and Asymmetric Encryption
- 7.8.3. Encryption at Rest and in Transit

7.9. Security Automation and Orchestration (SOAR)
- 7.9.1. Complexity of Manual Processing; Need to Automate Tasks
- 7.9.2. Products and Services
- 7.9.3. SOAR Architecture

7.10. Telework Safety
- 7.10.1. Need and Scenarios
- 7.10.2. Products and Services
- 7.10.3. Telework Safety

## **Module 8.** Web Server Administration

8.1. Introduction to Web Servers
- 8.1.1. What is a Web Server?
- 8.1.2. Architecture and Operation of a Web Server
- 8.1.3. Resources and Contents on a Web Server
- 8.1.4. Application Servers
- 8.1.5. Proxy Servers
- 8.1.6. Main Web Servers on the Market
- 8.1.7. Web Server Usage Statistics
- 8.1.8. Web Server Security
- 8.1.9. Load Balancing on Web Servers
- 8.1.10. References

8.2. HTTP Protocol Handling
- 8.2.1. Operation and Structure
- 8.2.2. Request Methods
- 8.2.3. Status Codes
- 8.2.4. Headers
- 8.2.5. Content Coding Code Pages
- 8.2.6. Performing HTTP Requests on the Internet using a Proxy, Livehttpheadersor Similar Method, Analyzing the Protocol Used.

8.3. Description of Distributed Multi-Server Architectures
- 8.3.1. 3-Layer Model
- 8.3.2. Fault Tolerance
- 8.3.3. Load Sharing
- 8.3.4. Session State Stores
- 8.3.5. Cache Stores

8.4. Internet Information Services (IIS)
- 8.4.1. What is IIS?
- 8.4.2. History and Evolution of IIS
- 8.4.3. Main Advantages and Features of IIS7 and Later Versions
- 8.4.4. IIS7 Architecture and Later Versions

8.5. IIS Installation, Administration and Configuration
- 8.5.1. Preamble
- 8.5.2. Internet Information Services (IIS) Installation
- 8.5.3. IIS Administration Tools
- 8.5.4. Web Site Creation, Configuration and Administration
- 8.5.5. Installation and Management of IIS Extensions

8.6. Advanced Security in IIS
- 8.6.1. Preamble
- 8.6.2. Authentication, Authorization, and Access Control in IIS
- 8.6.3. Configuring a Secure Website on IIS with SSL
- 8.6.4. Security Policies Implemented in IIS 8.x

8.7. Introduction to Apache
- 8.7.1. What is Apache?
- 8.7.2. Main Advantages of Apache
- 8.7.3. Main Features of Apache
- 8.7.4. Architecture

8.8. Apache Installation and Configuration
- 8.8.1. Initial Installation of Apache
- 8.8.2. Apache Configuration

8.9. Installation and Configuration of the Different Apache Modules
- 8.9.1. Apache Module Installation
- 8.9.2. Types of Modules
- 8.9.3. Secure Apache Configuration

8.10. Advanced Security
- 8.10.1. Authentication, Authorization and Access Control
- 8.10.2. Authentication Methods
- 8.10.3. Secure Apache Configuration with SSL

## **Module 9.** Security Audit

9.1. Introduction to Information Systems in the Company
- 9.1.1. Introduction to Information Systems in the Company and the Role of IT Auditing
- 9.1.2. Definitions of "IT Audit" and "IT Internal Control"
- 9.1.3. Functions and Objectives of IT Auditing
- 9.1.4. Differences between Internal Control and IT Auditing

9.2. Internal Controls of Information Systems
- 9.2.1. Functional Flowchart of a Data Processing Center
- 9.2.2. Classification of Information Systems Controls
- 9.2.3. The Golden Rule

9.3. The Process and Phases of the Information Systems Audit
- 9.3.1. Risk Assessment and Other IT Auditing Methodologies
- 9.3.2. Execution of an Information Systems Audit. Phases of the Audit
- 9.3.3. Fundamental Skills of the Auditor of an IT System

9.4. Technical Audit of Security in Systems and Networks
- 9.4.1. Technical Security Audits. Intrusion Test. Previous Concepts
- 9.4.2. Security Audits in Systems. Support Tools
- 9.4.3. Security Audits in Networks. Support Tools

9.5. Technical Audit of Security on the Internet and in Mobile Devices
- 9.5.1. Internet Security Audit. Support Tools
- 9.5.2. Mobile Devices Security Audit. Support Tools
- 9.5.3. Annex 1. Structure of an Executive Report and Technical Report
- 9.5.4. Annex 2. Tools Inventory
- 9.5.5. Annex 3. Methods

9.6. Information Security Management System
- 9.6.1. Security of IS: Properties and Influential Factors
- 9.6.2. Business Risks and Risk Management: Implementing Controls
- 9.6.3. Information Security Management System (ISMS): Concept and Critical Success Factors
- 9.6.4. ISMS-PDCA Model
- 9.6.5. ISMS ISO-IEC 27001: Organizational Context
- 9.6.6. Annex 4. Context of the Organization
- 9.6.7. Annex 5. Leadership.
- 9.6.8. Annex 6. Planning
- 9.6.9. Annex 7. Support
- 9.6.10. Annex 8. Operation
- 9.6.11. Annex 9. Performance Evaluation
- 9.6.12. Annex 10. Improvement
- 9.6.13. Annex to ISO 27001/ISO-IEC 27002: Objectives and Controls
- 9.6.14. ISMS Audit

9.7. Carrying Out the Audit
- 9.7.1. Procedures
- 9.7.2. Techniques

9.8. Traceability
- 9.8.1. Methods
- 9.8.2. Analysis

9.9. Copyright
- 9.9.1. Techniques
- 9.9.2. Results

9.10. Reports and Presenting Proof
- 9.10.1. Types of Reports
- 9.10.2. Data Analysis
- 9.10.3. Presenting Proof

## **Module 10.** Online Application Security

10.1. Vulnerabilities and Security Issues in Online Applications
- 10.1.1. Introduction to Online Application Security
- 10.1.2. Security Vulnerabilities in the Design of Web Applications
- 10.1.3. Security Vulnerabilities in the Implementation of Web Applications
- 10.1.4. Security Vulnerabilities in the Deployment of Web Applications
- 10.1.5. Official Lists of Security Vulnerabilities

10.2. Policies and Standards for Online Application Security
- 10.2.1. Pillars for the Security of Online Applications
- 10.2.2. Information Security Management System
- 10.2.3. Secure Software Development Life Cycle
- 10.2.4. Standards for Application Security

10.3. Security in the Design of Web Applications
- 10.3.1. Introduction to Web Application Security
- 10.3.2. Security in the Design of Web Applications

10.4. Testing the Online Safety and Security of Web Applications
- 10.4.1. Web Application Security Testing and Analysis
- 10.4.2. Web Application Deployment and Production Security

10.5. Web Services Security
- 10.5.1. Introduction to Web Services Security
- 10.5.2. Web Services Security Functions and Technologies

10.6. Testing the Online Safety and Security of Web Services
- 10.6.1. Evaluation of Web Services Security
- 10.6.2. Online Protection. Firewalls and XML Gateways

10.7. Ethical Hacking, Malware and Forensics
- 10.7.1. Ethical Hacking
- 10.7.2. Malware Analysis
- 10.7.3. Forensic Analysis

10.8. Incident Resolution on Web Services
- 10.8.1. Monitoring
- 10.8.2. Performance Measurement Tools
- 10.8.3. Containment Measures
- 10.8.4. Root Cause Analysis
- 10.8.5. Proactive Problem Management

10.9. Best Practices to ensure Application Security
- 10.9.1. Handbook of Best Practices in the Development of Online Applications
- 10.9.2. Handbook of Good Practices in the Implementation of Online Applications

10.10. Common Errors that Undermine Application Security
- 10.10.1. Common Errors in Development
- 10.10.2. Common Errors in Hosting
- 10.10.3. Common Production Errors

> *A unique, key, and decisive educational experience to boost your professional development"*

05

# Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning.**
This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.

> *Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*

## Case Study to contextualize all content

Our program offers a revolutionary approach to developing skills and knowledge. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.

> *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

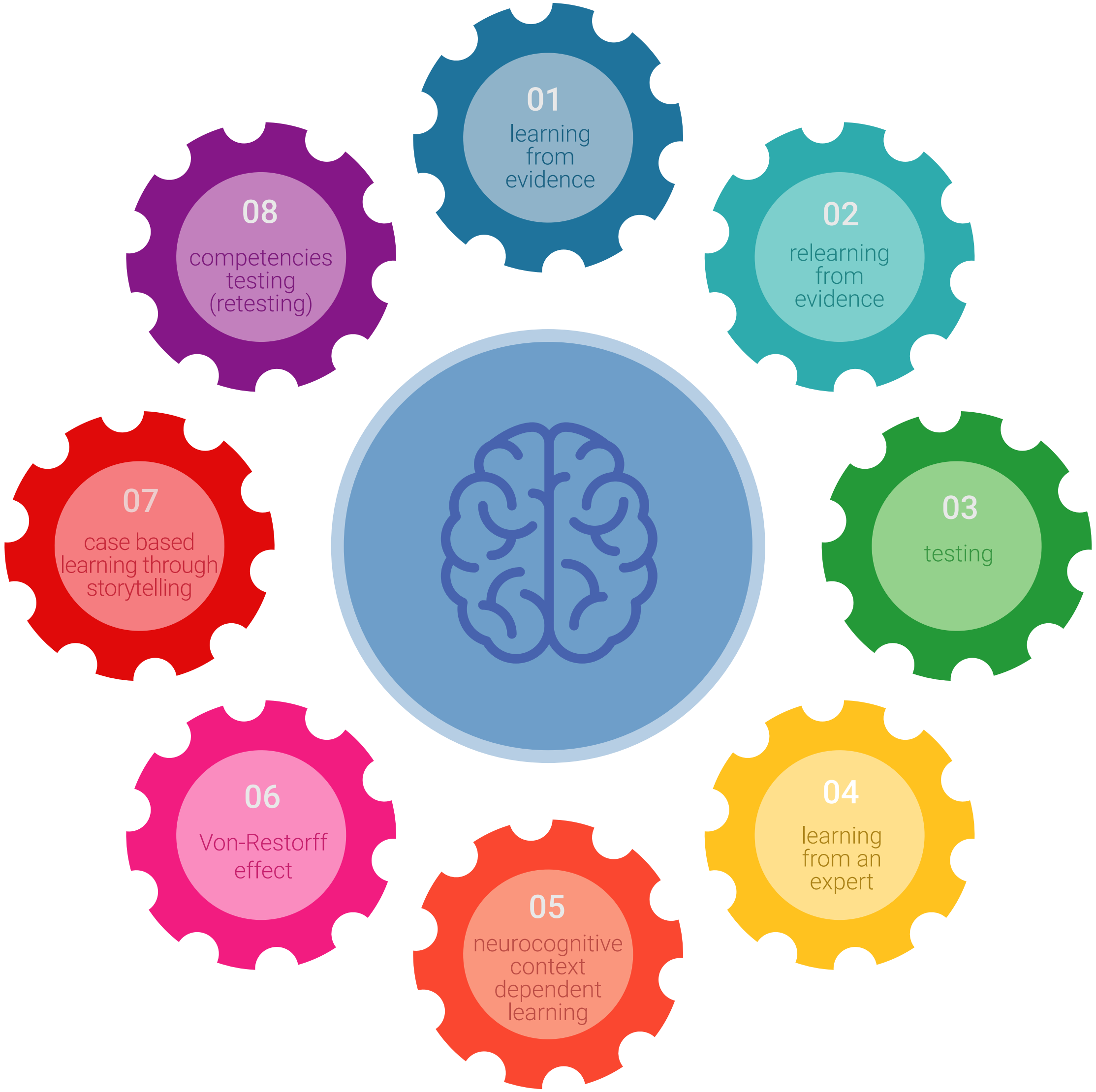
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

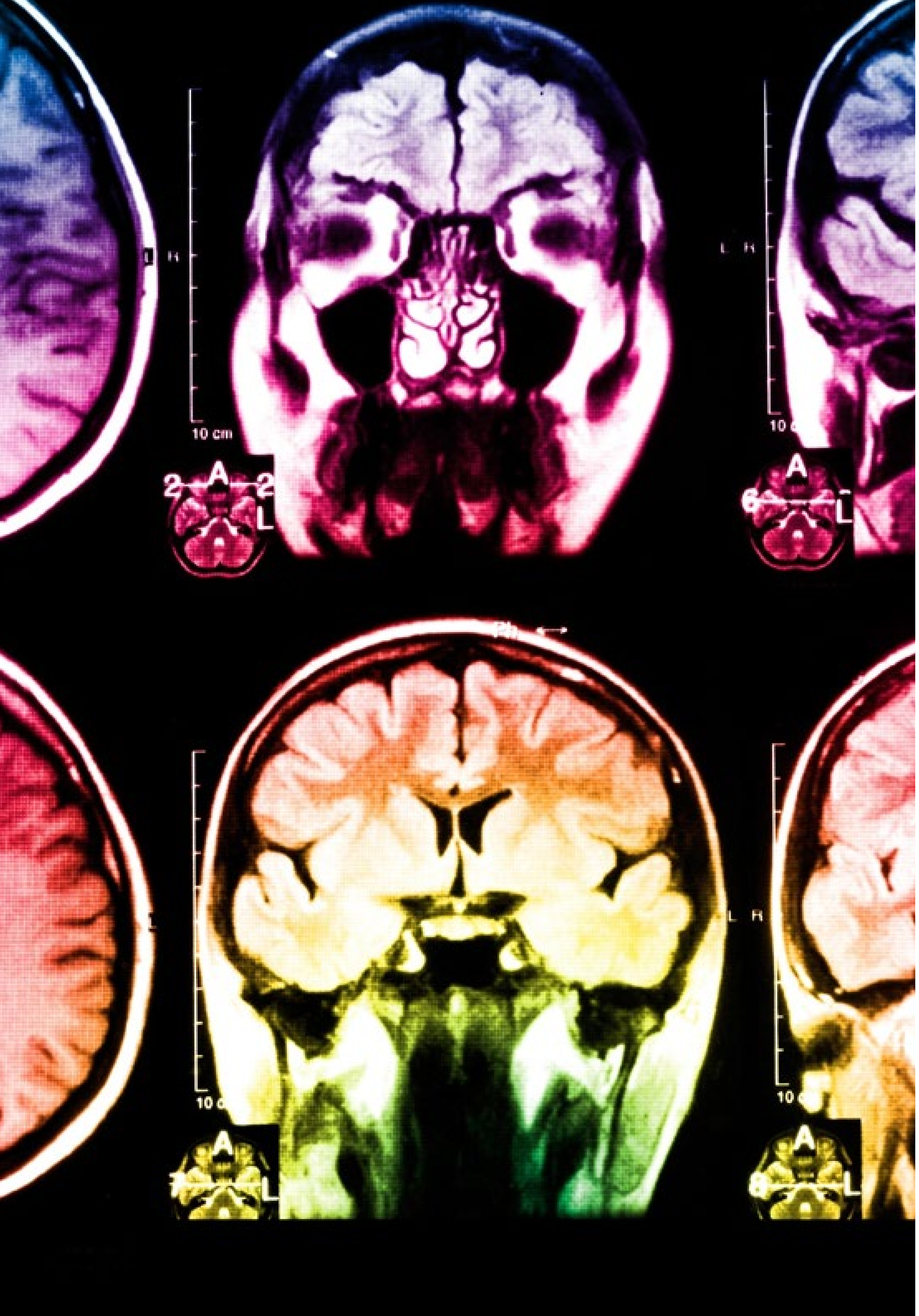
We enhance the Case Study with the best 100% online teaching method: Relearning.

> *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.


01 learning from evidence
02 relearning from evidence
03 testing
04 learning from an expert
05 neurocognitive context dependent learning
06 Von-Restorff effect
07 case based learning through storytelling
08 competencies testing (retesting)



In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically. This methodology has trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, and financial markets and instruments. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

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

From the latest scientific evidence in the field of neuroscience, not only do we know how to organize information, ideas, images and memories, but we know that the place and context where we have learned something is fundamental for us to be able to remember it and store it in the hippocampus, to retain it in our long-term memory.

In this way, and in what is called neurocognitive context-dependent e-learning, the different elements in our program are connected to the context where the individual carries out their professional activity.

## This program offers the best educational material, prepared with professionals in mind:

### Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.

### Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

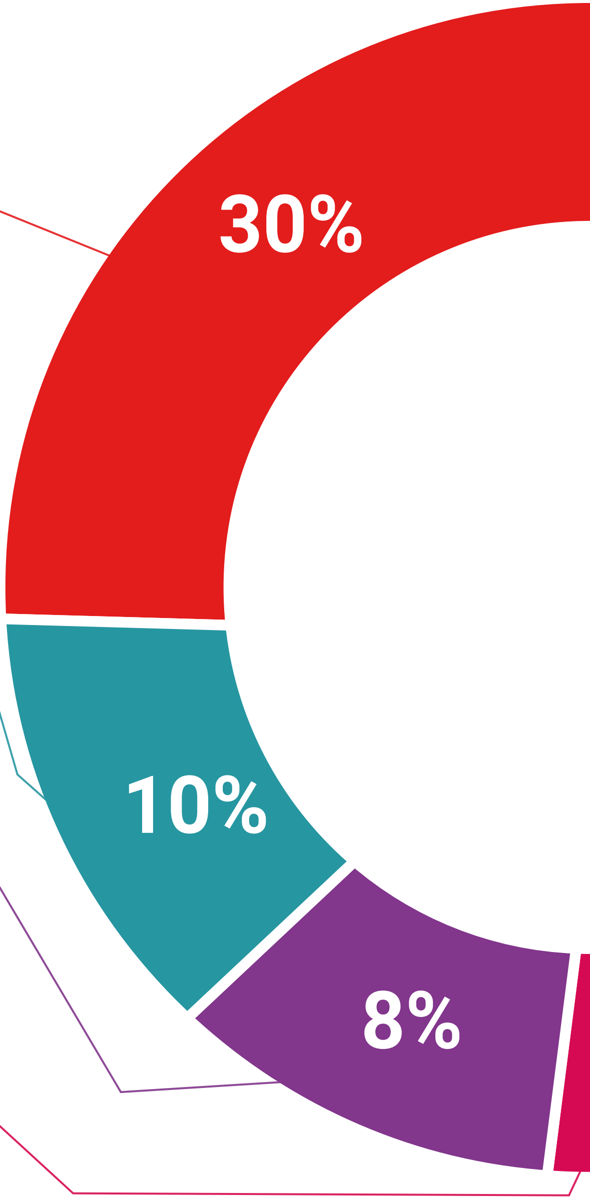
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

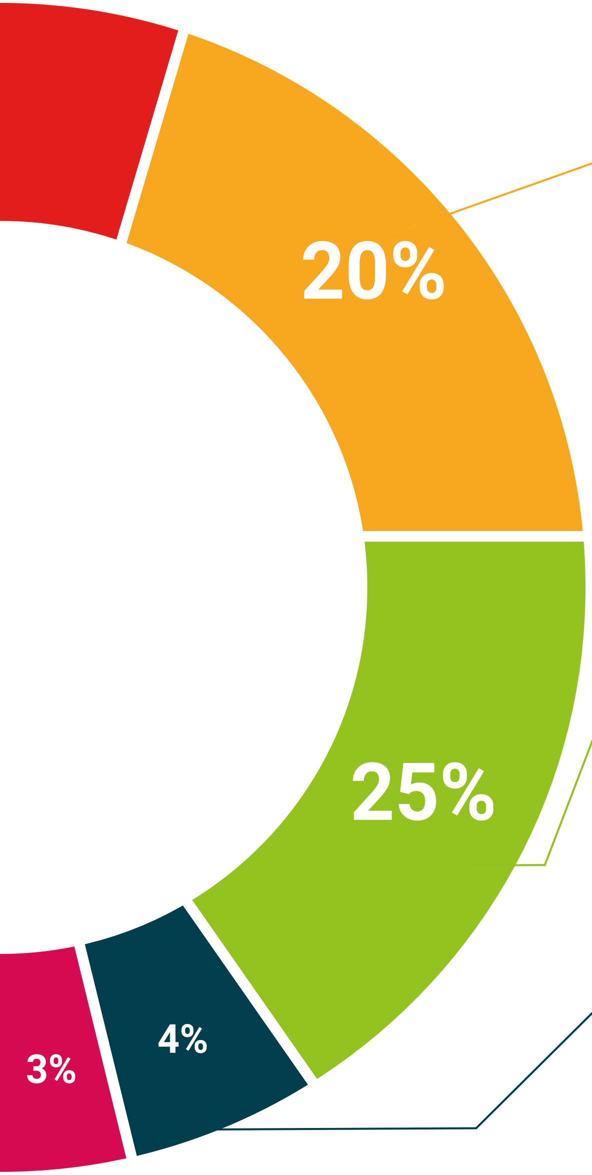
### Practising Skills and Abilities

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

### Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





### Case Studies

Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best specialists in the world.

### Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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

### Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.

06

# Certificate

The Professional Master's Degree in *Software* and Computer Systems Engineering guarantees students, in addition to the most rigorous and up-to-date education, access to a Professional Master's Degree issued by TECH Technological University.

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

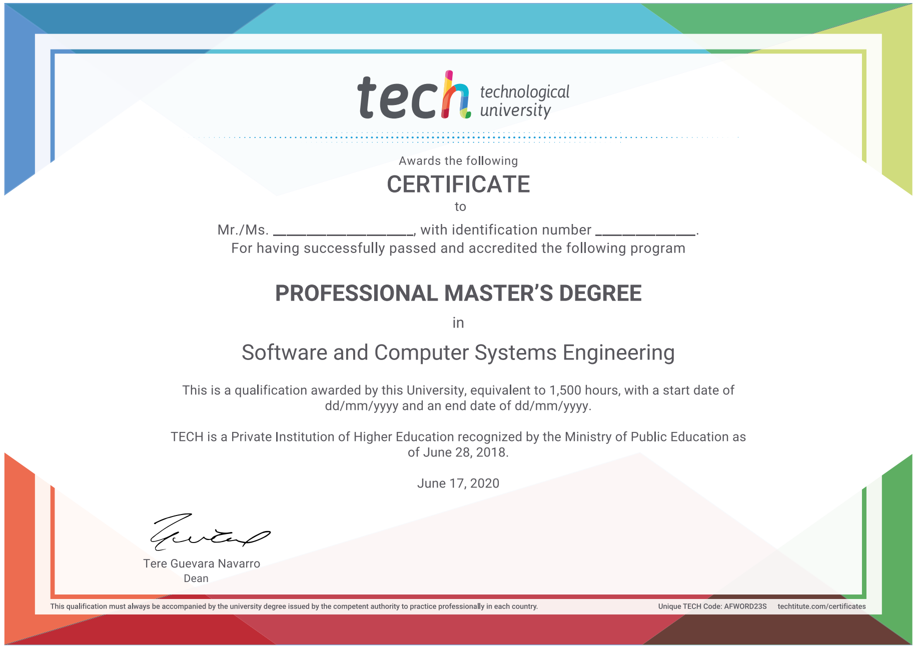
This **Professional Master's Degree in Software and Computer Systems Engineering** contains the most complete and up-to-date program on the market.

After the student has passed the assessments, they will receive their corresponding **Professional Master's Degree** issued by **TECH Technological University** via tracked delivery*.

The certificate issued by **TECH Technological University** will reflect the qualification obtained in the Professional Master's Degree, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Professional Master's Degree in Software and Computer Systems Engineering**

Official Nº of hours: **1,500 h.**



tech technological university

Awards the following

CERTIFICATE

to

Mr./Ms. _________________, with identification number ____________.
For having successfully passed and accredited the following program

PROFESSIONAL MASTER'S DEGREE

in

Software and Computer Systems Engineering

This is a qualification awarded by this University, equivalent to 1,500 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

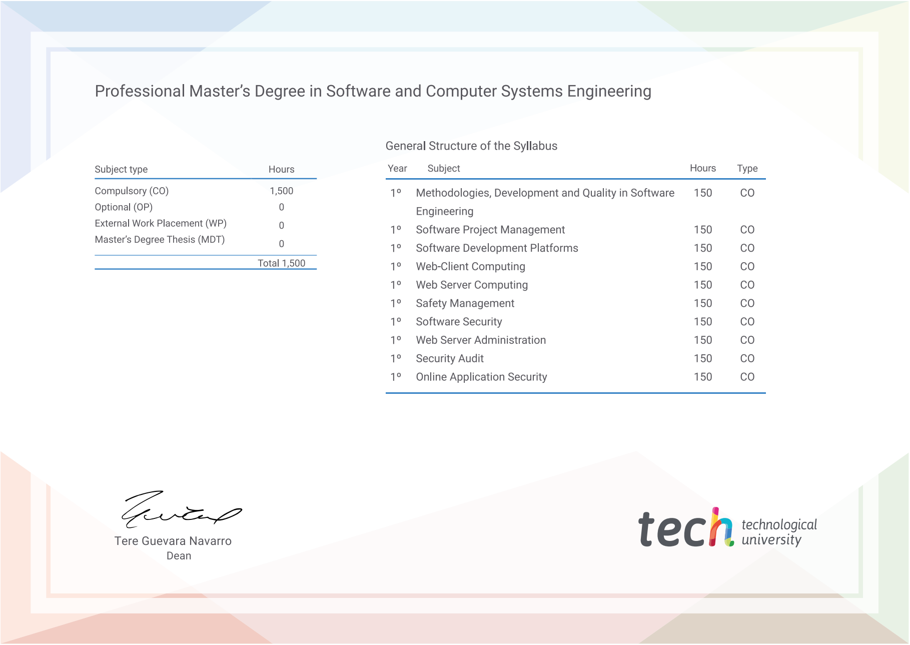
TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro
Dean

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country.

Unique TECH Code: AFWORD23S techtitute.com/certificates



Professional Master's Degree in Software and Computer Systems Engineering

| Subject type | Hours |
|---|---|
| Compulsory (CO) | 1,500 |
| Optional (OP) | 0 |
| External Work Placement (WP) | 0 |
| Master's Degree Thesis (MDT) | 0 |
| | Total 1,500 |

General Structure of the Syllabus

| Year | Subject | Hours | Type |
|---|---|---|---|
| 1º | Methodologies, Development and Quality in Software Engineering | 150 | CO |
| 1º | Software Project Management | 150 | CO |
| 1º | Software Development Platforms | 150 | CO |
| 1º | Web-Client Computing | 150 | CO |
| 1º | Web Server Computing | 150 | CO |
| 1º | Safety Management | 150 | CO |
| 1º | Software Security | 150 | CO |
| 1º | Web Server Administration | 150 | CO |
| 1º | Security Audit | 150 | CO |
| 1º | Online Application Security | 150 | CO |

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

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# Professional Master's Degree
## Software and Computer Systems Engineering

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Technological University**
- Dedication: **16h/week**
- Schedule: **at your own pace**
- Exams: **online**

# Professional Master's Degree

Software and Computer Systems Engineering

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