

# Postgraduate Diploma Software Quality Management



## Postgraduate Diploma Software Quality Management

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

Website: [www.techtute.com/us/information-technology/postgraduate-diploma/postgraduate-diploma-software-quality-management](http://www.techtute.com/us/information-technology/postgraduate-diploma/postgraduate-diploma-software-quality-management)

# Index

01

Introduction

---

*p. 4*

02

Objectives

---

*p. 8*

03

Course Management

---

*p. 12*

04

Structure and Content

---

*p. 16*

05

Methodology

---

*p. 22*

06

Certificate

---

*p. 30*

# 01

# Introduction

Quality management in a software development process is a guarantee of its success. Taking into account the relevant measures for risk reduction and ensuring the maintenance and control of subsequent versions is fundamental to deliver sustainable projects. Ensuring the functionality and efficiency of the software in coherence with the expectations, requirements and needs of the final consumer will translate into confidence and success for the professional. This program contains the most up-to-date knowledge on the subject, available for online study from a secure platform and with the guidance of expert teachers throughout the 6-month program.



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*With this program, you will develop specialized knowledge in Software Quality Management. Enroll now”*

The importance of a good software developer's work lies mainly in delivering products with the expected quality, in order to satisfy the needs of a final consumer and preventing future risks. Although all software can have bugs, it is important to make sure that they do not exist, since their consequences can be very adverse. It should be noted that the later the defects are detected, the greater the consequences may be. The objective of Software Quality Management is to support all requirements; to be user-friendly, secure, useful, usable, stable, and to satisfy the user's needs and requirements without errors.

To provide clear solutions to users' needs, from a user-friendly and comfortable aspect, it is necessary to know each of the indicators of the software quality process and how your product is performing. As well as, to examine the technological maturity, counting with a specialized knowledge in the application of the elements, norms, standards in an efficient and effective way.

In this program, each and every one of these aspects will be determined, so that the graduate will be able, in practice, to address the reliability, metrics and assurance points correctly and strategically. In this sense, you will also be able to identify existing failure points during your assessment and implement the DevOps culture in a correct way. Taking into account the importance of process automation to avoid human errors in its development, adjusted to the quality criteria according to the ISO/IEC 9126 standard.

All this will be taught through a completely secure digital platform and the various interactive media implemented by TECH Global University, to ensure that students learn correctly. Using the most innovative methodology based on Relearning, which allows a quick grasp of the concepts thanks to their reiteration. The structure of the program consists of 3 Modules, divided into various units and subunits, which will make it possible to study in a maximum of 6 months, from any device with Internet connection.

This **Postgraduate Diploma in Software Quality Management** 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 development
- ◆ The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- ◆ Practical exercises where self-assessment can be used to improve learning
- ◆ Its special emphasis on innovative methodologies
- ◆ Theoretical lessons, questions for experts and individual reflection work
- ◆ Content that is accessible from any fixed or portable device with an Internet connection



*This Postgraduate Diploma offers you the most up-to-date knowledge in Software Quality Management. Enroll now”*

“

*Learn to distinguish the metrics according to the type of programming, evaluating the internal and external attributes in the quality of a software project”*

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

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide immersive training 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 during the academic year. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.

*Enroll now and become an expert in Software Quality Management, in only 6 months and 100% online.*

*Develop specialized knowledge in DevOps culture and its implementation in software development.*



# 02 Objectives

The objective of this Postgraduate Diploma in Software Quality Management is to provide the professional with all the knowledge required to efficiently master the software quality development process focused on TRL development levels, integration of DevOps culture and under the ISO/IEC 9126 quality criteria. Providing a broad and specialized theoretical and practical knowledge to the graduate, so that they are able to develop projects from an optimized perspective and expanding their growth possibilities in the work environment.







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*Learn about all the advantages of studying at TECH Global University. Achieve your goals and stand out in the professional environment with this exclusive qualification”*



## General Objectives

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- ◆ Develop the criteria, tasks and advanced methodologies to understand the relevance of quality-oriented work
- ◆ Analyze the key factors in the quality of a software project
- ◆ Develop the relevant regulatory aspects
- ◆ Implement DevOps and systems processes for Quality Assurance
- ◆ Reduce the technical debt of projects with a quality approach rather than an approach based on economics and short deadlines
- ◆ Provide the student with specialized knowledge to be able to measure and quantify the quality of a software project



*With TECH Global University, you can professionalize in an efficient and agile way. Thanks to its Relearning and 100% online methodology, which allows a faster memorization of the concepts"*





## Specific Objectives

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### Module 1. Software Quality TRL Development Levels

- ◆ Develop in a clear and concise way the elements that encompass software quality
- ◆ Apply the models and standards according to system, product and software process
- ◆ Delve into the ISO Quality standards applied both in general and in specific parts of the system
- ◆ Apply the standards according to the scope of the environment
- ◆ Examine the TRL maturity levels and adapt them to the different parts of the software project to be dealt with
- ◆ Acquire capacity of abstraction to apply one or several criteria of elements and levels of software quality
- ◆ Distinguish the cases of application of the standards and maturity levels in a real case simulated project

### Module 2. DevOps. Software Quality Management

- ◆ Analyze the shortcomings of a traditional process
- ◆ Assess the possible solutions and choose the most suitable one
- ◆ Understanding business needs and their impact on implementation
- ◆ Assess the costs of the improvements to implement
- ◆ Develop an evolvable software lifecycle, adapted to real need
- ◆ Anticipate possible errors and avoid them from the design process
- ◆ Justify the use of different implementation models

### Module 3. ISO/IEC 9126 Quality Criteria. Software Quality Metrics

- ◆ Develop the concept of quality criteria and relevant aspects
- ◆ Examine the ISO/IEC 9126 standard, main aspects and indicators
- ◆ Analyze the different metrics for a software project to meet the agreed assessments
- ◆ Examine the internal and external attributes to be addressed in the quality of a software project
- ◆ Distinguish the metrics according to the type of programming (structured, object oriented, layered, etc.)
- ◆ Complete real simulation cases, as a continuous learning of quality measurement
- ◆ See in the simulation cases to what extent it is feasible or unnecessary, i.e. from a constructive point of view of the authors

# 03

# Course Management

A team of professionals in the field of IT solutions and software development and research, selected by TECH, have been in charge of choosing the most up-to-date and specialized content, structuring it in a way that makes learning easier and more efficient. Using the Relearning methodology, supported by a safe and comfortable platform, in which they have different interactive means of communication with students privately and in community.



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*A team of expert teachers and active professionals have selected the most specialized and up-to-date content for this Postgraduate Diploma in Software Quality Management"*

## Management



### Mr. Molina Molina, Jerónimo

- AI Engineer & Software Architect. NASSAT - Internet Satellite in Motion
- Senior Consultant at Hexa Ingenieros. Introducer of Artificial Intelligence (ML and CV)
- Expert in artificial intelligence based solutions in the fields of Computer Vision, ML/DL and NLP. Currently investigating application possibilities of Transformers and Reinforcement Learning in a personal research project
- University Expert in Business Creation and Development. Bancaixa – FUNDEUN Alicante
- Computer Engineer. University of Alicante
- Master in Artificial Intelligence. Catholic University of Avila
- Executive MBA. European Business Campus Forum



## Professors

### Mr. Tenrero Morán, Marcos

- ◆ DevOps Engineer – Allot Communications
- ◆ Application Lifecycle Management & DevOps– Meta4 Spain. Cegid
- ◆ QA Automation Engineer – Meta4 Spain. Cegid
- ◆ Graduated in Computer Engineering from Rey Juan Carlos University
- ◆ Development of professional applications for Android - Galileo University, Guatemala
- ◆ Cloud Services Development (nodeJs, JavaScript, HTML5) - UPM
- ◆ Continuous Integration with Jenkins – Meta4. Cegid
- ◆ Web Development with Angular-CLI (4), Ionic and nodeJS. Meta4 - Rey Juan Carlos University

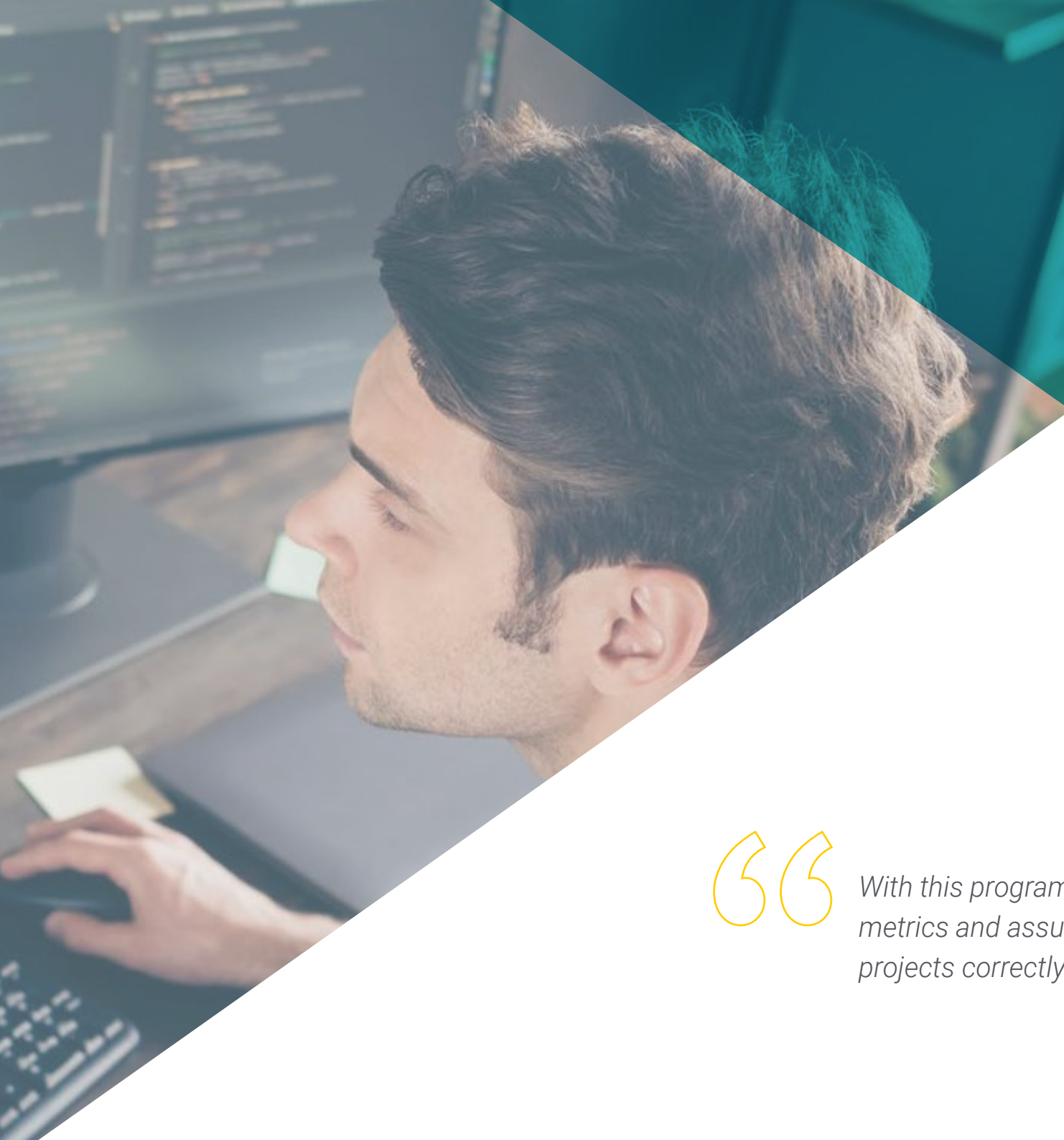
# 04

# Structure and Content

The contents of this Postgraduate Diploma have been selected by a team of expert teachers in Software Quality Management, who have structured them in 3 study modules. Each unit will be covered in depth in order to provide IT professionals with the knowledge and tools necessary to efficiently manage their future projects. Studying TRL Development Levels, DevOps approach implementation and software quality metrics. Available in different formats, both practical and theoretical, through TECH Global University's modern virtual campus.







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*With this program, you will apply reliability, metrics and assurance to software projects correctly and strategically”*

## Module 1. Software Quality TRL Development Levels

- 1.1. Elements that Influence Software Quality (I). Technical Debt
  - 1.1.1. Technical Debt. Causes and Consequences
  - 1.1.2. Software Quality General Principles
  - 1.1.3. Unprincipled and Principled Quality Software
    - 1.1.3.1. Consequences
    - 1.1.3.2. Necessity of Applying Quality Principles in Software
  - 1.1.4. Software Quality Typology
  - 1.1.5. Quality Software. Specific Features
- 1.2. Elements that Influence Software Quality (II). Associated Costs
  - 1.2.1. Software Quality Influencing Elements
  - 1.2.2. Software Quality Misconceptions
  - 1.2.3. Software Quality Associated Costs
- 1.3. Software Quality Models (I). Knowledge Management
  - 1.3.1. General Quality Models
    - 1.3.1.1. Total Quality Management
    - 1.3.1.2. European Business Excellence Model (EFQM).
    - 1.3.1.3. Six-Sigma Model
  - 1.3.2. Knowledge Management Models
    - 1.3.2.1. Dyba Model
    - 1.3.2.2. SEKS Model
  - 1.3.3. Experience Factory and QIP Paradigm
  - 1.3.4. Quality in Use Models (25010)
- 1.4. Software Quality Models (III). Quality in Data, Processes and SEI Models
  - 1.4.1. Data Quality Data Model
  - 1.4.2. Software Process Modeling
  - 1.4.3. Software & Systems Process Engineering Metamodel Specification (SPEM)
  - 1.4.4. SEI Models
    - 1.4.4.1. CMMI
    - 1.4.4.2. SCAMPI
    - 1.4.4.3. IDEAL
- 1.5. ISO Software Quality Standards (I). Analysis of the Standards
  - 1.5.1. ISO 9000 Standards
    - 1.5.1.1. ISO 9000 Standards
    - 1.5.1.2. ISO Family of Quality Standards (9000)
  - 1.5.2. Other ISO Standards Related to Quality
  - 1.5.3. Quality Modeling Standards (ISO 2501)
  - 1.5.4. Quality Measurement Standards (ISO 2502n)
- 1.6. ISO Software Quality Standards (II). Requirements and Assessment
  - 1.6.1. Standards on Quality Requirements (2503n)
  - 1.6.2. Standards on Quality Assessment (2504n)
  - 1.6.3. ISO/IEC 24744: 2007
- 1.7. TRL Development Levels (I). Levels 1 to 4
  - 1.7.1. TRL Levels
  - 1.7.2. Level 1: Basic Principles
  - 1.7.3. Level 2: Concept and/or Application
  - 1.7.4. Level 3: Critical Analytical Function
  - 1.7.5. Level 4: Component Validation in Laboratory Environment 1.8.
- 1.8. TRL Development Levels (II). Levels 5 to 9
  - 1.8.1. Level 5: Component Validation in Relevant Environment
  - 1.8.2. Level 6: System/Subsystem Model
  - 1.8.3. Level 7: Demonstration in Real Environment
  - 1.8.4. Level 8: Complete and Certified System
  - 1.8.5. Level 9: Success in Real Environment
- 1.9. TRL Development Levels. Uses
  - 1.9.1. Example of Company with Laboratory Environment
  - 1.9.2. Example of an R&D&I Company
  - 1.9.3. Example of an Industrial R&D&I Company
  - 1.9.4. Example of a Laboratory-Engineering Joint Venture Company

- 1.10. Software Quality Key Details
  - 1.10.1. Methodological Details
  - 1.10.2. Technical Details
  - 1.10.3. Software Project Management Details
    - 1.10.3.1. Quality of Computer Systems
    - 1.10.3.2. Software Product Quality
    - 1.10.3.3. Software Process Quality

## Module 2. DevOps. Software Quality Management

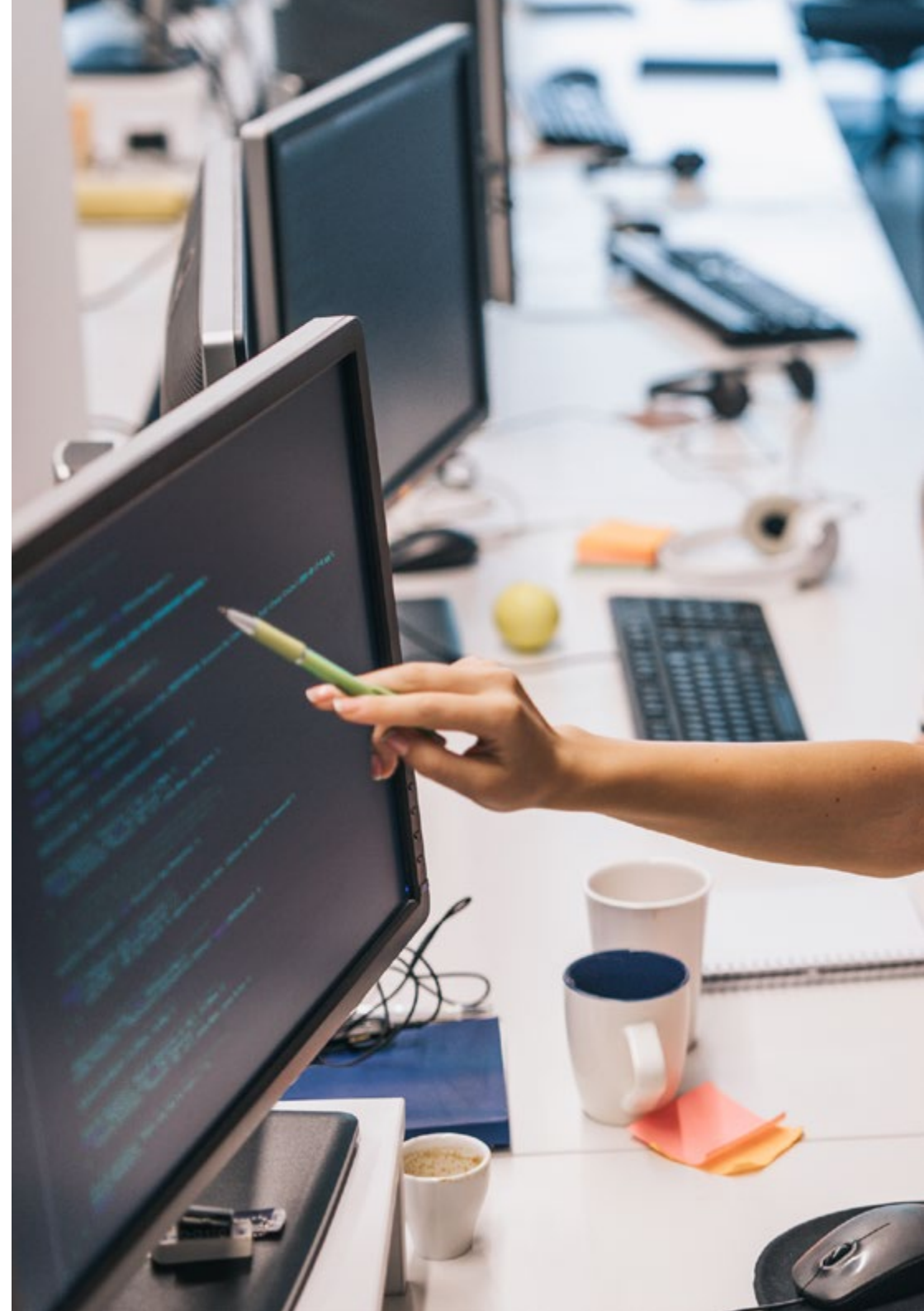
- 2.1. DevOps. Software Quality Management
  - 2.1.1. DevOps.
  - 2.1.2. DevOps and Software Quality
  - 2.1.3. DevOps. Benefits of DevOps Culture
- 2.2. DevOps. Relation to Agile
  - 2.2.1. Accelerated Delivery
  - 2.2.2. Quality
  - 2.2.3. Cost Reduction
- 2.3. DevOps Implementation
  - 2.3.1. Problem identification
  - 2.3.2. Implementation in a Company
  - 2.3.3. Implementation Metrics
- 2.4. Software Delivery Cycle
  - 2.4.1. Design Methods
  - 2.4.2. Agreements
  - 2.4.3. Roadmap
- 2.5. Error-Free Code Development
  - 2.5.1. Maintainable Code
  - 2.5.2. Development Patterns
  - 2.5.3. Code Testing
  - 2.5.4. Software Development at Code Level Good Practices
- 2.6. Automation
  - 2.6.1. Automization Types of Tests
  - 2.6.2. Cost of Automation and Maintenance
  - 2.6.3. Automization Mitigating Errors

- 2.7. Deployment
  - 2.7.1. Target Assessment
  - 2.7.2. Design of an Automatic and Adapted Process
  - 2.7.3. Feedback and Responsiveness
- 2.8. Incident Management
  - 2.8.1. Incident Management
  - 2.8.2. Incident Analysis and Resolution
  - 2.8.3. How to Avoid Future Mistakes
- 2.9. Deployment Automation
  - 2.9.1. Preparing for Automated Deployments
  - 2.9.2. Assessment of the Health of the Automated Process
  - 2.9.3. Metrics and Rollback Capability
- 2.10. Good Practices. Evolution of DevOps
  - 2.10.1. Guide of Good Practices applying DevOps
  - 2.10.2. DevOps. Methodology for the Team
  - 2.10.3. Avoiding Niches

## Module 3. ISO, IEC 9126 Quality Criteria. Software Quality Metrics

- 3.1. Quality Criteria. ISO, IEC 9126 Standard
  - 3.1.1. Quality Criteria.
  - 3.1.2. Software Quality Justification. ISO, IEC 9126 Standard
  - 3.1.3. Software Quality Measurement as a Key Indicator
- 3.2. Software Quality Criteria Features
  - 3.2.1. Reliability
  - 3.2.2. Functionality
  - 3.2.3. Efficiency
  - 3.2.4. Usability
  - 3.2.5. Maintainability
  - 3.2.6. Portability
  - 3.2.7. Security/safety

- 3.3. ISO Standard, IEC 9126 (I). Introduction
  - 3.3.1. Description of ISO, IEC 9126 Standard
  - 3.3.2. Functionality
  - 3.3.3. Reliability
  - 3.3.4. Usability
  - 3.3.5. Maintainability
  - 3.3.6. Portability
  - 3.3.7. Quality in Use
  - 3.3.8. Software Quality Metrics
  - 3.3.9. ISO 9126 Quality Metrics
- 3.4. ISO Standard, IEC 9126 (II). McCall and Boehm Models
  - 3.4.1. McCall Model: Quality Factors
  - 3.4.2. Boehm Model
  - 3.4.3. Intermediate Level. Features
- 3.5. Software Quality Metrics (I). Components
  - 3.5.1. Measurement
  - 3.5.2. Metrics
  - 3.5.3. Indicator
    - 3.5.3.1. Types of Indicators
  - 3.5.4. Measurements and Models
  - 3.5.5. Scope of Software Metrics
  - 3.5.6. Classification of Software Metrics
- 3.6. Software Quality Measurement (II). Measurement Practice
  - 3.6.1. Metric Data Collection
  - 3.6.2. Measurement of Internal Product Attributes
  - 3.6.3. Measurement of External Product Attributes
  - 3.6.4. Measurement of Resources
  - 3.6.5. Metrics for Object-Oriented Systems



- 3.7. Design of a Single Software Quality Indicator
  - 3.7.1. Single Indicator as a Global Qualifier
  - 3.7.2. Indicator Development, Justification and Application
  - 3.7.3. Example of Application. Need to Know the Detail
- 3.8. Simulation of Real Project for Quality Measurement (I)
  - 3.8.1. Project Overview (Company A)
  - 3.8.2. Application of Quality Measurement
  - 3.8.3. Proposed Exercises
  - 3.8.4. Proposed Exercises Feedback
- 3.9. Real Project Simulation for Quality Measurement (II)
  - 3.9.1. Project Overview (Company B)
  - 3.9.2. Application of Quality Measurement
  - 3.9.3. Proposed Exercises
  - 3.9.4. Proposed Exercises Feedback
- 3.10. Real Project Simulation for Quality Measurement (III)
  - 3.10.1. General Description of the Project (Company C)
  - 3.10.2. Application of Quality Measurement
  - 3.10.3. Proposed Exercises
  - 3.10.4. Proposed Exercises Feedback



*Enroll in this program now and get the most up-to-date knowledge on Software Quality Management. Graduating as an expert in just 6 months"*



# 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.





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*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.*





### 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 student will learn to solve complex situations in real business environments through collaborative activities and real cases.*

The case method has been the most widely used learning system among the world's leading Information Technology schools for as long as they have existed. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question that you are presented with in the case method, an action-oriented learning method. Throughout the course, students will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

## Relearning Methodology

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

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

*In 2019, we obtained the best learning results of all online universities in the world.*

At TECH you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only one in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.



In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

This methodology has trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, and financial markets and instruments. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

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

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

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



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



### Study Material

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

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



### Classes

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

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



### Practising Skills and Abilities

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



### Additional Reading

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





#### Case Studies

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



#### Interactive Summaries

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

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



#### Testing & Retesting

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



06

# Certificate

The Postgraduate Diploma in Software Quality Management guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma issued by TECH Global University.



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

This program will allow you to obtain your **Postgraduate Diploma in Software Quality Management** endorsed by **TECH Global University**, the world's largest online university.

**TECH Global University** is an official European University publicly recognized by the Government of Andorra (*official bulletin*). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

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

Title: **Postgraduate Diploma in Software Quality Management**

Modality: **online**

Duration: **6 months**

Accreditation: **18 ECTS**







## Postgraduate Diploma Software Quality Management

- » Modality: **online**
- » Duration: **6 months**
- » Certificate: **TECH Global University**
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- » Schedule: **at your own pace**
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