Postgraduate Certificate

Object-Oriented Programming and Design Patterns from Scratch

tech global university

tech global university

Postgraduate Certificate

Object-Oriented Programming and Design Patterns from Scratch

- Modality: **online**
- Duration: **6 weeks**
- Certificate: **TECH Global University**
- Accreditation: **6 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Website: www.techtitute.com/us/information-technology/postgraduate-certificate/object-oriented-programming-design-patterns-scratch

Index

01

Introduction to the Program

Object-Oriented Programming (OOP) and Design Patterns are fundamental pillars in the development of modern software. According to a study by the IEEE Computer Society, the adoption of OOP has allowed leading technology companies, such as Microsoft and Google, to develop robust solutions that meet the demands of their vast user bases. Taking into account the importance of modern programming, TECH has developed this Postgraduate Certificate that will provide a complete understanding of these concepts. Using a 100% online methodology and a completely up-to-date syllabus, specialists will become highly trained experts in developing robust, high-quality software solutions. In this way, they will stand out in highly competitive and dynamic work environments.

You will master Object-Oriented Programming and Design Patterns. With the flexible methodology and 24/7 access to the content, you can progress at your own pace and from anywhere. Take the next step in your career!"

Object-Oriented Programming (OOP) and Design Patterns allow for the creation of more organized, efficient and maintainable applications. On the one hand, OOP structures the code into "objects", promoting reuse and simplifying maintenance. On the other hand, Design Patterns provide proven solutions to common programming problems, which facilitates teamwork and improves the quality of the code in the long term.

Given this scenario, TECH's Postgraduate Certificate in Object-Oriented Programming and Design Patterns from Scratch is the best opportunity to acquire a deep understanding of these concepts, from their fundamental principles to their advanced application. Through a comprehensive syllabus, classes, objects, inheritance, polymorphism and patterns such as Singleton, Factory, Observer and Strategy will be explored in depth. In this way, professionals will be prepared to solve problems and create efficient and well-structured software.

By acquiring this knowledge, graduates will find numerous opportunities on the job market. In fact, they will be prepared to take on leadership roles in software development projects, which will enable them to improve their employability and move towards more outstanding and better paid professional opportunities. In addition, they will be able to face related challenges in different contexts.

Furthermore, the 100% online modality in which the program is taught will provide the necessary flexibility to adapt learning to the personal and work schedules of the students. With access to the materials 24 hours a day and from any device with an Internet connection, they will be able to learn at their own pace, regardless of their location. Likewise, the Relearning methodology will allow for the consolidation of knowledge through active repetition, ensuring that concepts are deeply assimilated. Without a doubt, this program will provide the necessary tools to take your professional career to the next level, combining quality and a practical approach.

This **Postgraduate Certificate in Object-Oriented Programming and Design Patterns from Scratch** contains the most complete and up-to-date educational program on the market. Its most notable features are:

- The development of case studies presented by experts in programming
- 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 the self-assessment process can be carried out to improve learning
- Special emphasis on innovative methodologies in Object-Oriented Programming and Design Patterns from Scratch
- 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

Ready to transform your future as a programmer? In this Postgraduate Certificate you will acquire the essential skills to build robust and scalable applications. Enroll now!"

With TECH'ssupport, you will have access to an up-to-date syllabus and expert professors to guide you in each step. Enroll now and take your professional development to new heights!"

Do you want to master best practices in software development? You've come to the right place. With innovative lessons and a 100% online approach, you will be able to manage your own learning efficiently.

Increase your employability with the skills most in demand on the market. TECH offers you an online Postgraduate Certificate that will provide you with the fundamental concepts of OOP and Design Patterns.

Its teaching staff includes professionals from the field of medicine, who bring to this program the experience of their work, 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 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

Throughout a comprehensive syllabus, professionals will immerse themselves in key concepts such as class and object creation, inheritance, polymorphism and the most commonly used design patterns. In addition, they will delve into the implementation of SOLID principles, which are fundamental to developing clean and maintainable code. As a result, they will know how to apply these practices in the creation of modular and reusable software. Finally, graduates will delve into refactoring techniques, allowing them to improve and optimize code without altering its functionality, which is crucial for long-term projects.

You will acquire the ability to design and develop object-oriented applications, using design patterns effectively to solve complex problems in software development”

Module 1. Object-Oriented Programming and Design Patterns from Scratch

1.1. Object-Oriented Programming (OOP) from Scratch
- 1.1.1. Object Oriented Programming
- 1.1.2. Differences between OOP and Structured Programming
- 1.1.3. OOP Elements: Classes, Objects, Methods and Attributes

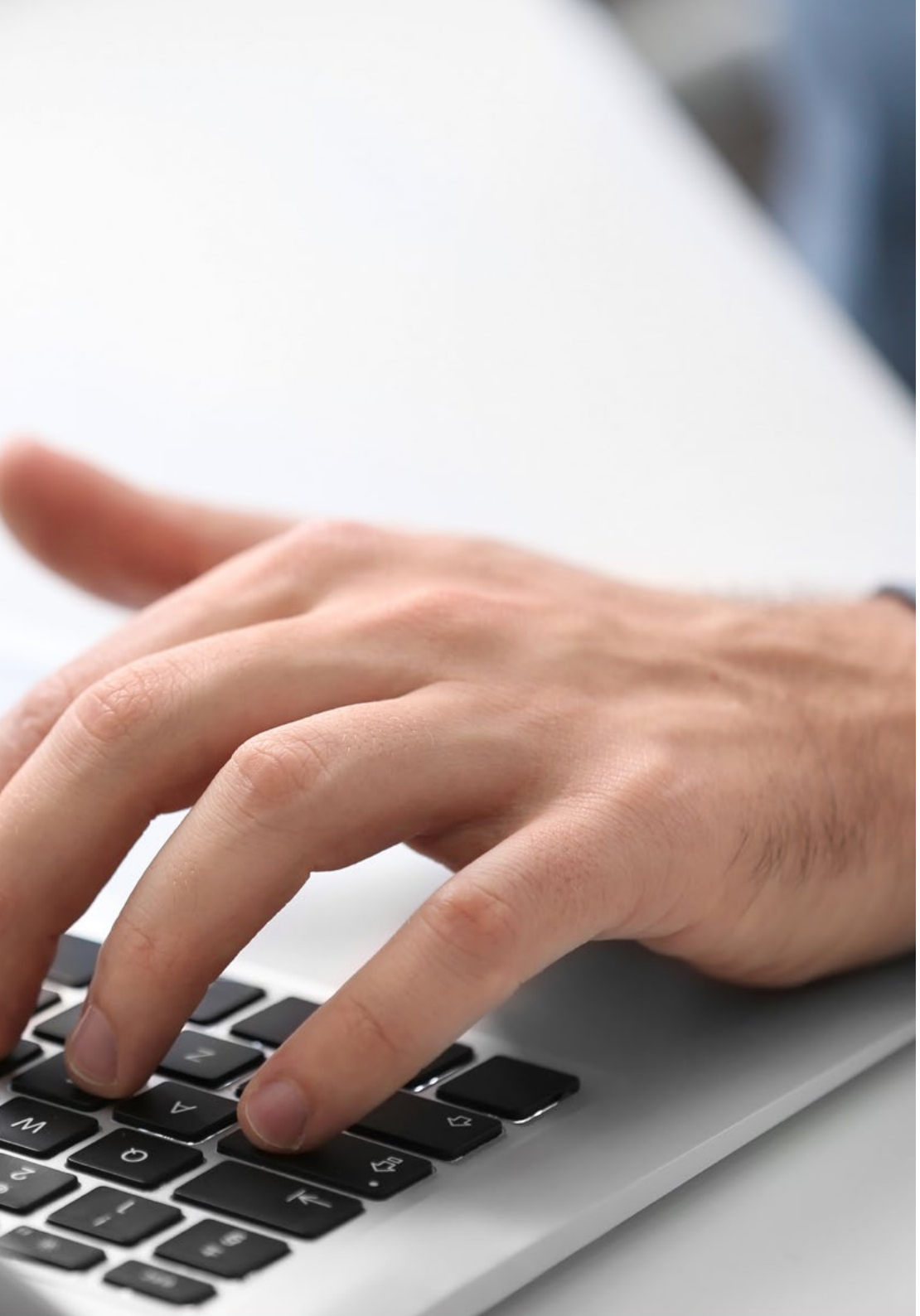
1.2. Classes and Objects in Python
- 1.2.1. Creation of Classes and Objects in Python
- 1.2.2. Instance and Class Attributes
- 1.2.3. Special Methods (init, str, repr, etc.)
- 1.2.4. Static and Class Methods: Uses

1.3. Encapsulation and Abstraction in Classes
- 1.3.1. Encapsulation: Uses
- 1.3.2. Access Modifiers in Python
  - 1.3.2.1. Public, Protected and Private
- 1.3.3. Abstraction: Hiding Details and Improving Simplicity
- 1.3.4. Use of Properties (@property) for Access Control

1.4. Inheritance in Python. Usefulness in OOP
- 1.4.1. Inheritance: Usefulness in OOP
- 1.4.2. Creating Derived Classes and Multiple Inheritance in Python
- 1.4.3. Inherited Methods and Attributes and Overloading in Inheritance
- 1.4.4. Class Hierarchies and Base Class Management

1.5. Polymorphism and Overloading in Python
- 1.5.1. Polymorphism: Duck Typing
- 1.5.2. Polymorphism with Classes and Methods in Python
- 1.5.3. Overloading and Overwriting Methods in Python
- 1.5.4. Polymorphism in Software Design. Applications and Advantages

1.6. Class Relations and Complex Structure Design
- 1.6.1. Types of Relations: Association, Aggregation and Composition
- 1.6.2. Differences between Aggregation and Composition: Examples
- 1.6.3. Design of Complex Structures Using Class Relations



1.7. Design Patterns and SOLID Principles
- 1.7.1. Relevance of Design Patterns
- 1.7.2. Application of Design Patterns in OOP Projects. Advantages
- 1.7.3. Classification of Design Patterns
- 1.7.4. SOLID Principles and their Importance in Object-Oriented Design

1.8. Creative Design Patterns
- 1.8.1. Purpose of the Creational Design Patterns
- 1.8.2. Singleton Pattern
- 1.8.3. Factory and Factory Method Pattern
- 1.8.4. Builder Pattern

1.9. Structural Design Patterns
- 1.9.1. Purpose of the Structural Design Patterns
- 1.9.2. Adapter Pattern
- 1.9.3. Decorator Pattern
- 1.9.4. Facade Pattern

1.10. Behavioral Design Patterns
- 1.10.1. Behavioral Patterns. Applications
- 1.10.2. Observer Pattern
- 1.10.3. Strategy Pattern

You will master the fundamental concepts of programming from scratch and how to apply them in real projects. Enroll at TECH today and take your professional development to the next level!"

04

Teaching Objectives

The main goal of this Postgraduate Certificate is to provide professionals with the knowledge and skills necessary to develop applications using the fundamental principles of Object-Oriented Programming and the most relevant Design Patterns in the software industry. Throughout the program, they will learn how to structure and organize their code efficiently, applying techniques that facilitate the reuse and maintenance of the software over time. In addition, they will understand and correctly apply the essential concepts of OOP: encapsulation, inheritance and polymorphism. In this way, they will be able to develop complex projects that integrate these principles and patterns.

With the 100% online modality and the Relearning methodology, you will learn effectively, repeating and applying what you have learned at each step. Make the most of this opportunity to improve your professional profile!"

General Objectives

- Understand the fundamental principles of object-oriented programming
- Identify and apply the pillars of OOP: encapsulation, inheritance, polymorphism and abstraction
- Design classes and objects that represent practical solutions to real problems
- Implement design patterns such as Singleton, Factory, Observer and Strategy
- Analyze complex problems and propose solutions based on design patterns
- Optimize code reuse and maintainability through sound design principles
- Create scalable and flexible software architectures with OOP and design patterns
- Integrate design patterns into projects to improve development quality
- Resolve design conflicts by applying OOP best practices
- Develop skills to design modular, robust and efficient software

Specific Objectives

- Define the key concepts of Object-Oriented Programming such as classes, objects, attributes, methods, encapsulation, abstraction, inheritance and polymorphism
- Understand the use of encapsulation and abstraction in classes using the Python programming language
- Examine the concept of polymorphism and overloading within the Python language, understanding its applications and advantages
- Determine the types of relationships between classes such as association, aggregation and composition

Become an expert in Object-Oriented Programming! In this Postgraduate Certificate you will learn how to create robust and scalable applications, mastering different tools"

05

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.

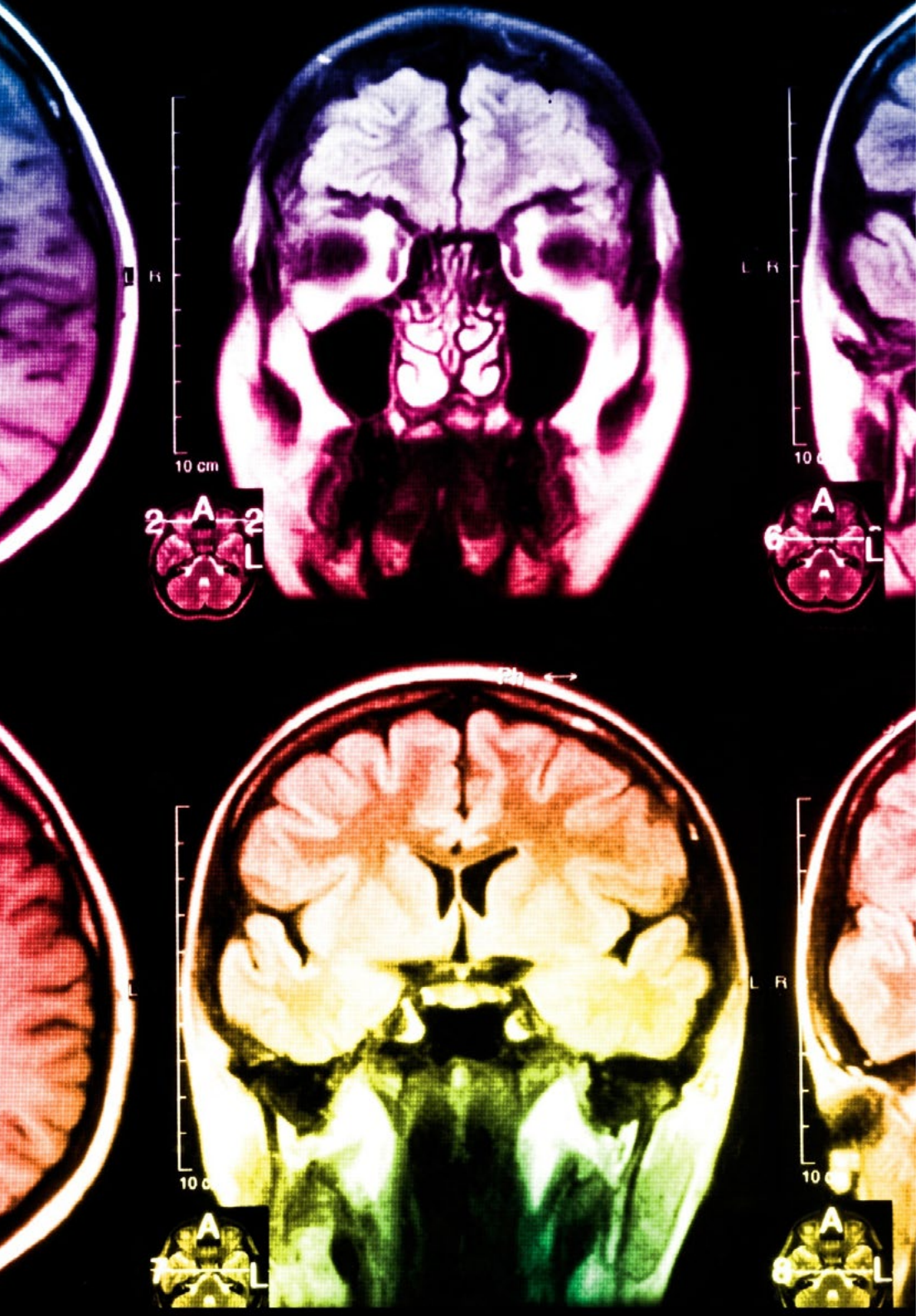
In order to facilitate tutor-student contact as much as possible, you will have a wide range of communication possibilities, both in real time and delayed (internal messaging, telephone answering service, email contact with the technical secretary, chat and videoconferences).

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.

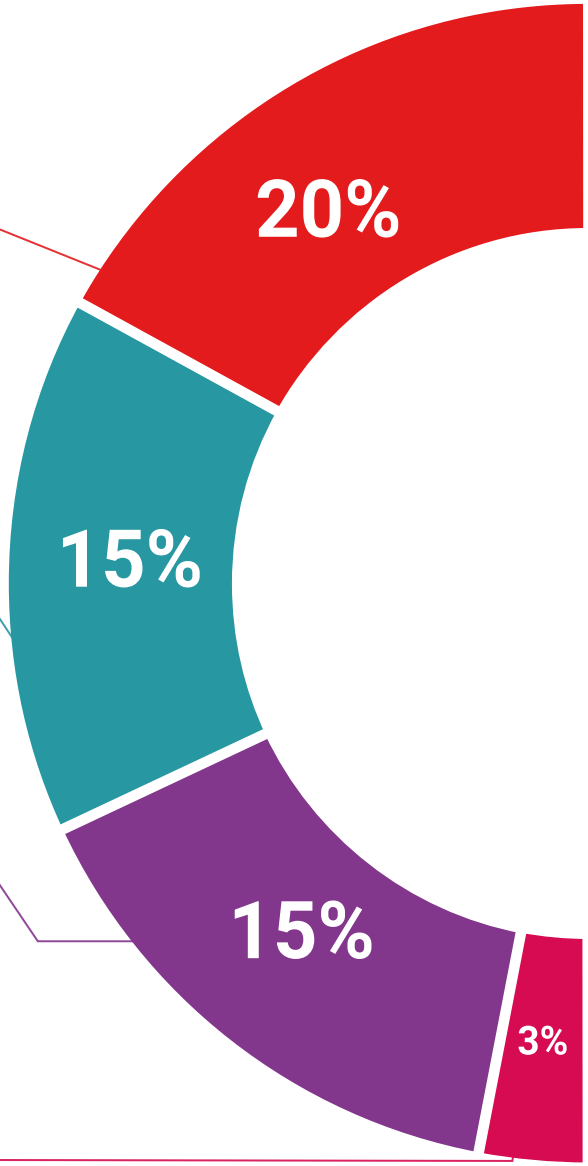
Interactive Summaries

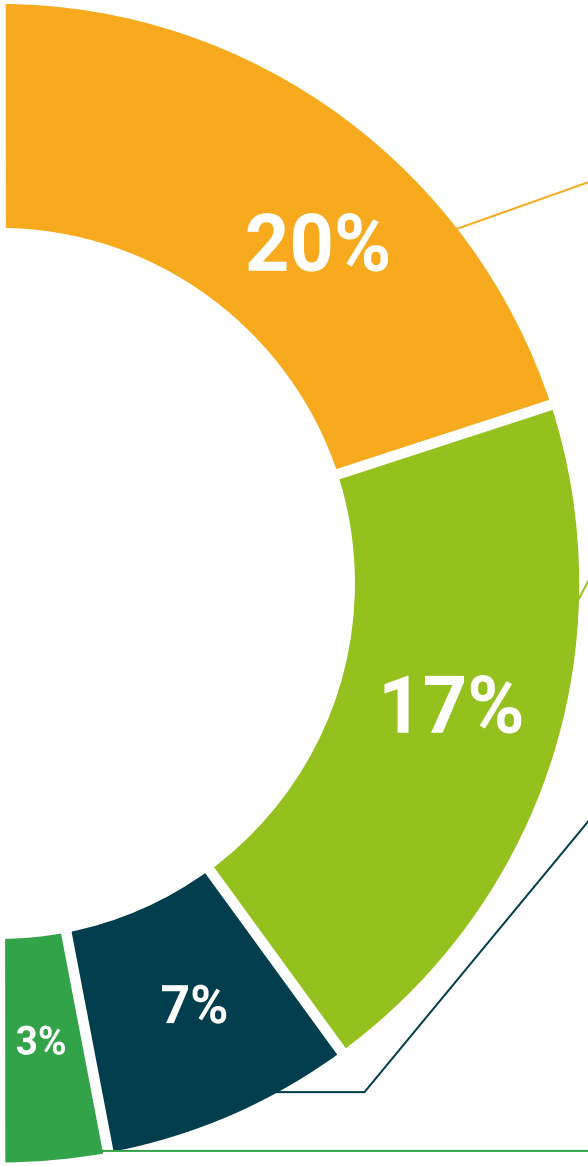
We present the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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.

06

Teaching Staff

The Teaching Staff is made up of a team of highly qualified experts with extensive experience in both the academic world and the software development industry. In fact, these professors not only have a solid theoretical background, but have also worked on real projects, which allows them to offer a practical and up-to-date perspective on the challenges and best practices in the field of OOP and Design Patterns. In short, each of the mentors is committed to the overall education of the students, providing dynamic lessons that combine theory and practice.

The teaching staff is defined by their passion for teaching, dedication and practical experience, which ensures that you acquire the necessary skills to excel in the development of high-quality software"

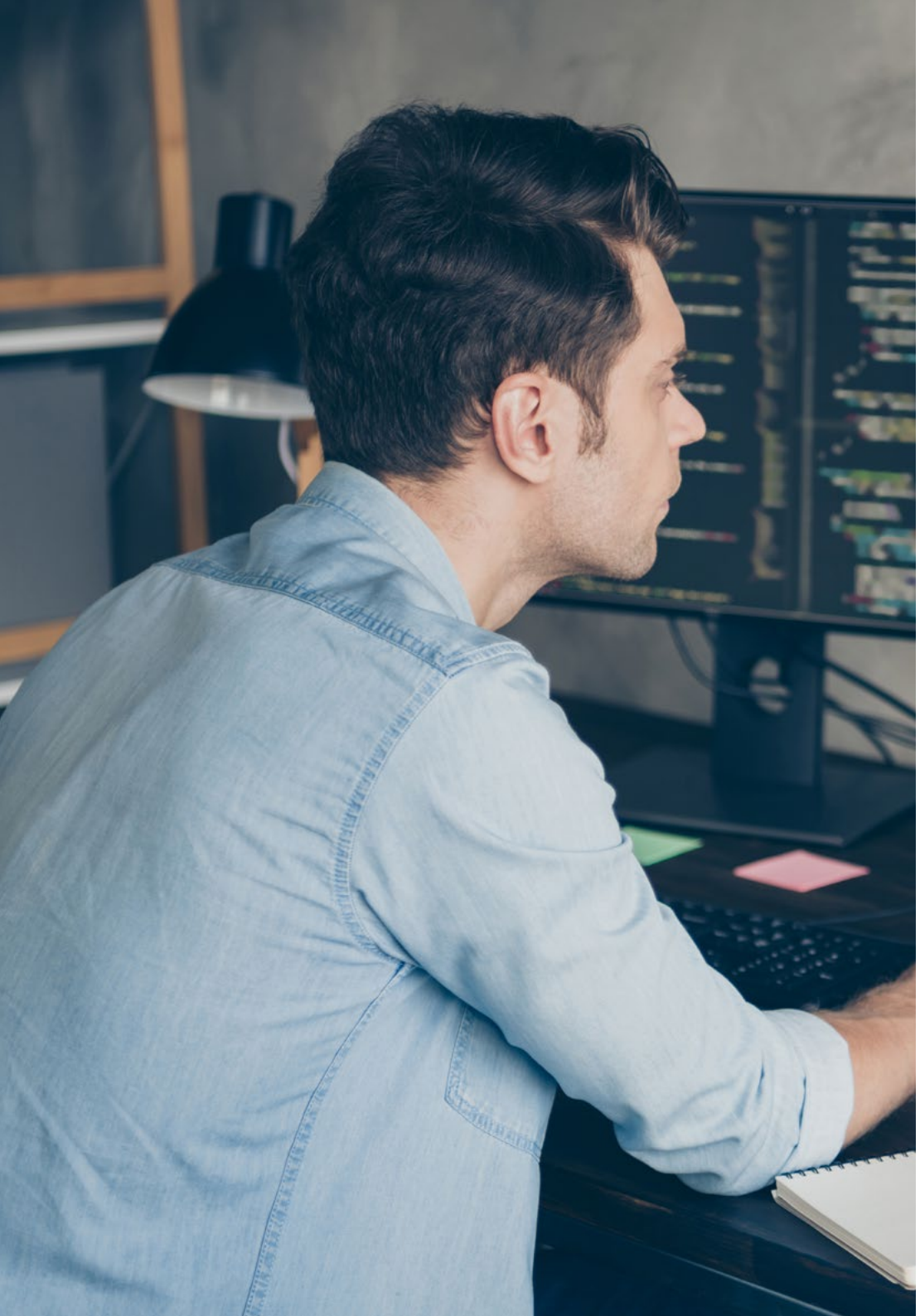
Management

Dr. Lucas Cuesta, Juan Manuel

- Senior Software Engineer and Analyst at Indizen – Believe in Talent
- Senior Software Engineer and Analyst at Krell Consulting and IMAGiNA Artificial Intelligence
- Software Engineer at Intel Corporation
- Software Engineer at Intelligent Dialog Systems
- PhD in Electronic Systems Engineering for Intelligent Environments from the Polytechnic University of Madrid
- Graduate in Telecommunications Engineering at the Polytechnic University of Madrid
- Master's Degree in Electronic Systems Engineering for Intelligent Environments from the Polytechnic University of Madrid

Mr. Márquez Ruiz de Lacanal, Juan Antonio

- Software Developer at GTD Defense & Security Solutions
- Software Developer at Solera Inc
- Development and Research Engineer at GRVC Sevilla
- Co-founder of Unmute
- Co-founder of VR Educa
- Academic Exchange in Engineering and Entrepreneurship at the University of California, Berkeley
- Degree in Industrial Engineering from the University of Sevilla



Professors

Mr. Grillo Hernández, José Enrique

- Application Developer and Technology Analyst
- Senior Mobile Applications Developer at Globant
- Android Developer at Plexus Tech
- Senior Android Developer at RoadStr
- Senior Mobile Developer at Avantgarde IT-Information Technology Services
- Project Leader at Smartdess
- Developer at Educatablet
- Technology Analyst at Corporate Mobile Solutions
- Master's Degree in System Engineering from the Simón Bolívar University

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

07

Certificate

This Postgraduate Certificate in Object-Oriented Programming and Design Patterns from Scratch guarantees, in addition to the most rigorous and up-to-date program, access to an Postgraduate Certificate diploma issued by TECH Global University.

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

This private qualification will allow you to obtain a diploma for the **Postgraduate Certificate in Object-Oriented Programming and Design Patterns from Scratch** 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: **Postgraduate Certificate in Object-Oriented Programming and Design Patterns from Scratch**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**


tech global university

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

Postgraduate Certificate in Object-Oriented Programming and Design Patterns from Scratch

This is a private qualification of 180 hours of duration equivalent to 6 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

*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.

tech global university

Postgraduate Certificate
Object-Oriented Programming and Design Patterns from Scratch

- Modality: **online**
- Duration: **6 weeks**
- Certificate: **TECH Global University**
- Accreditation: **6 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Postgraduate Certificate

Object-Oriented Programming and Design Patterns from Scratch

tech global university