

# Postgraduate Certificate Advanced Programming

```
(Global Scope)
... ao[i][1] + ao[i][2];
... indices[i][v];
... positions[i][j][0];
... positions[i][j][1];
... positions[i][j][2];
... normals[i][0];
*(d++) = normals[i][1];
*(d++) = normals[i][2];
*(d++) = du + (uvs[i][j][0] ? b : a);
*(d++) = dv + (uvs[i][j][1] ? b : a);
*(d++) = ao[i][j];
*(d++) = light[i][j];
}
}

void make_cube(
float *data, float ao[6][4], float light[6][4],
int left, int right, int top, int bottom, int front, int back,
float x, float y, float z, float n, int w)
{
int wleft = blocks[w][0];
int wright = blocks[w][1];
int wtop = blocks[w][2];
int wbottom = blocks[w][3];
int wfront = blocks[w][4];
int wback = blocks[w][5];
... faces
}
```



## Postgraduate Certificate Advanced Programming

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

Website: [www.techtute.com/us/information-technology/postgraduate-certificate/advanced-programming](http://www.techtute.com/us/information-technology/postgraduate-certificate/advanced-programming)

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# 01

# Introduction

The student will be able to broaden their education with this program in Advanced Programming. You will acquire programming knowledge, especially in relation to object-oriented programming, and different types of relationships between existing classes. All this, in a practical and rigorous way, completely online.



```
border: 1px solid #ccc !important; border-radius: 4px; overflow: auto !i  
: none; -o-user-select: none; user-select: none; transition:  
ease-out 0s;}
```

“

*This Postgraduate Certificate will allow you to update your knowledge in Advanced Programming in a practical way, 100% online, without renouncing to the maximum academic rigor"*

This program is intended for those interested in achieving a higher level of knowledge in Advanced Programming. The main objective is for students to specialize their knowledge in simulated work environments and conditions in a rigorous and realistic manner so they can later apply it in the real world.

This program will prepare scientifically and technologically, as well as to develop the professional practice of software engineering, with a transversal and versatile approach adapted to the new technologies and innovations in this field. You will obtain wide knowledge in Advanced Programming from professionals in the sector.

The students will be able to take the opportunity and study this program in a 100% online format, without neglecting their obligations.

This **Postgraduate Certificate in Advanced Programming** contains the most complete and up-to-date program on the market. The most important features include:

- ◆ Development of 100 simulated scenarios presented by experts in Advanced Programming
- ◆ The graphic, schematic and practical contents with which they are conceived provide scientific and practical information on geography
- ◆ News on the latest developments in Advanced Programming
- ◆ It contains practical exercises where the self-assessment process can be carried out to improve learning
- ◆ Interactive learning system based on the case method and its application to real practice
- ◆ All of this will be complemented by 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

“*Learn the latests techniques and strategies with this program and achieve success as an IT Engineer”*

“*Learn about Advanced Programming with this intensive program, from the comfort of your home*”

It includes in its teaching staff professionals belonging to the field of education, who bring to this program their work experience, in addition to recognized specialists belonging to reference societies and prestigious universities.

Thanks to its multimedia content developed with the latest educational technology, this Postgraduate Certificate will allow the professional a situated and contextual learning, that is to say, a simulated environment that will provide an immersive learning programmed to learn in real situations.

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise throughout the program. For this purpose, the professional will be assisted by an innovative interactive video system created by renowned experts in Advanced Programming with extensive teaching experience.

*Take advantage of the latest educational technology to get updated on Advanced Programming without leaving your home.*

*Learn about the latest techniques in Advanced Programming from experts in the field.*



# 02 Objectives

The objective of this program is to provide IT professionals with the knowledge and skills necessary to carry out their activity using the most advanced protocols and techniques of the moment. Through a work approach that is totally adaptable to the students, this Postgraduate Certificate will progressively lead them to acquire the competencies that will propel them to a higher professional level.





“

*Achieve the knowledge level you desire and dominate fundamental concepts in Advanced Programming with this high-level educational program”*



## General Objectives

- ♦ Scientific and technological education, as well as preparation for the professional practice of computer engineering, all this with a transversal and versatile training adapted to new technologies and innovations in this field
- ♦ To obtain a wide knowledge in computation field, computer structure and advanced programming, including mathematical, statistical and physical basis essential in engineering



*Enroll in the best Postgraduate Certificate in Advanced Programming on the current university panorama".*





## Specific Objectives

- ◆ To deepen the knowledge of programming, especially in relation to object-oriented programming, and different types of relationships between existing classes
- ◆ To know different design patterns for object-oriented problems
- ◆ To learn about event-driven programming and user interface development with Qt
- ◆ To acquire essential knowledge of concurrent programming, processes and threads
- ◆ To learn how to manage use of threads and synchronization, as well as the resolution of common problems in concurrent programming
- ◆ To understand the importance of documentation and testing in software development

03

# Structure and Content

The contents structure has been designed by a team of computer engineering professionals, aware of the relevance of today's education to deepen this area of knowledge, in order to humanistically enrich the student and raise the level of knowledge in Advanced Programming through the latest educational technologies available.





“

*This Postgraduate Certificate in Advanced Programming contains the most complete and updated learning program on the market"*

## Module 1. Advanced Programming

- 1.1. Introduction to Object-Oriented Programming
  - 1.1.1. Introduction to Object-Oriented Programming
  - 1.1.2. Class Design
  - 1.1.3. Introduction to UML for Problem Modeling
- 1.2. Relationships Between Classes
  - 1.2.1. Abstraction and Inheritance
  - 1.2.2. Advanced Inheritance Concepts
  - 1.2.3. Polymorphism
  - 1.2.4. Composition and Aggregation
- 1.3. Introduction to Design Patterns for Object-Oriented Problems
  - 1.3.1. What are Design Patterns?
  - 1.3.2. Factory Pattern
  - 1.3.3. Singleton Pattern
  - 1.3.4. Observer Pattern
  - 1.3.5. Composite Pattern
- 1.4. Exceptions
  - 1.4.1. What are Exceptions?
  - 1.4.2. Exception Catching and Handling
  - 1.4.3. Throwing Exceptions
  - 1.4.4. Exception Creation
- 1.5. User Interfaces
  - 1.5.1. Introduction to Qt
  - 1.5.2. Positioning
  - 1.5.3. What Are Events?
  - 1.5.4. Events: Definition and Catching
  - 1.5.5. User Interface Development



- 1.6. Introduction to Concurrent Programming
  - 1.6.1. Introduction to Concurrent Programming
  - 1.6.2. The Concept of Process and Thread
  - 1.6.3. Interaction Between Processes or Threads
  - 1.6.4. Threads in C++
  - 1.6.5. Advantages and Disadvantages of Concurrent Programming
- 1.7. Thread Management and Synchronization
  - 1.7.1. Life Cycle of a Thread
  - 1.7.2. *Thread* Class
  - 1.7.3. Thread Planning
  - 1.7.4. Thread Groups
  - 1.7.5. Daemon Threads
  - 1.7.6. Synchronization
  - 1.7.7. Locking Mechanisms
  - 1.7.8. Communication Mechanisms
  - 1.7.9. Monitors
- 1.8. Common Problems in Concurrent Programming
  - 1.8.1. The Problem of Consuming Producers
  - 1.8.2. The Problem of Readers and Writers
  - 1.8.3. The Problem of the Philosophers' Dinner Party
- 1.9. Software Documentation and Testing
  - 1.9.1. Why is it Important to Document Software?
  - 1.9.2. Design Documentation
  - 1.9.3. Documentation Tool Use
- 1.10. Software Testing
  - 1.10.1. Introduction to Software Testing
  - 1.10.2. Types of Tests
  - 1.10.3. Unit Test
  - 1.10.4. Integration Test
  - 1.10.5. Validation Test
  - 1.10.6. System Test

# 04 Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.





“

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

## Case Study to contextualize all content

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

“

*At TECH, you will experience a learning methodology that is shaking the foundations of traditional universities around the world”*



*You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.*



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

### A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

“*Our program prepares you to face new challenges in uncertain environments and achieve success in your career”*

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

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

## Relearning Methodology

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

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

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

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

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



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

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

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

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

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



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



### Study Material

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

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



### Classes

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

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



### Practising Skills and Abilities

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



### Additional Reading

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





#### Case Studies

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



#### Interactive Summaries

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

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



#### Testing & Retesting

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



# 05 Certificate

The Postgraduate Certificate in Advanced Programming guarantees, in addition to the most rigorous and updated training, access to a Postgraduate Certificate 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 Certificate in Advanced Programming** 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 Certificate in Advanced Programming**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**



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



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