

Postgraduate Certificate

Algorithm and Complexity



Postgraduate Certificate Algorithm and Complexity

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: www.techtitute.com/us/information-technology/postgraduate-certificate/algorithm-complexity

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01

Introduction

Learning the main strategies for algorithm design, as well as the different methods and measures for algorithm computation is essential for any IT professional that wish to specialize in Algorithm and Complexity. In this program, the students will know the latest developments in the field and develop their skills from professionals with extensive experience in the sector.



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This Postgraduate Certificate will allow you to update your knowledge in Algorithm and Complexity a practical way, 100% online, without renouncing to the maximum educational rigor”

This program is aimed at those people interested in reaching a higher level of knowledge in Algorithm and Complexity. 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 IT engineering, with a transversal and versatile approach adapted to the new technologies and innovations in this field. Students will gain extensive knowledge on Algorithm and Complexity from professionals in the field.

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 Algorithm and Complexity** 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 Algorithm and Complexity
- ◆ Its graphic, schematic and practical contents, with which they are conceived gather scientific and practical information on Algorithm and Complexity
- ◆ News on the latest developments in Algorithm and Complexity
- ◆ 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 the success as an IT Engineer”

“*Learn about Algorithm and Complexity with this intensive program, from the comfort of your home*”

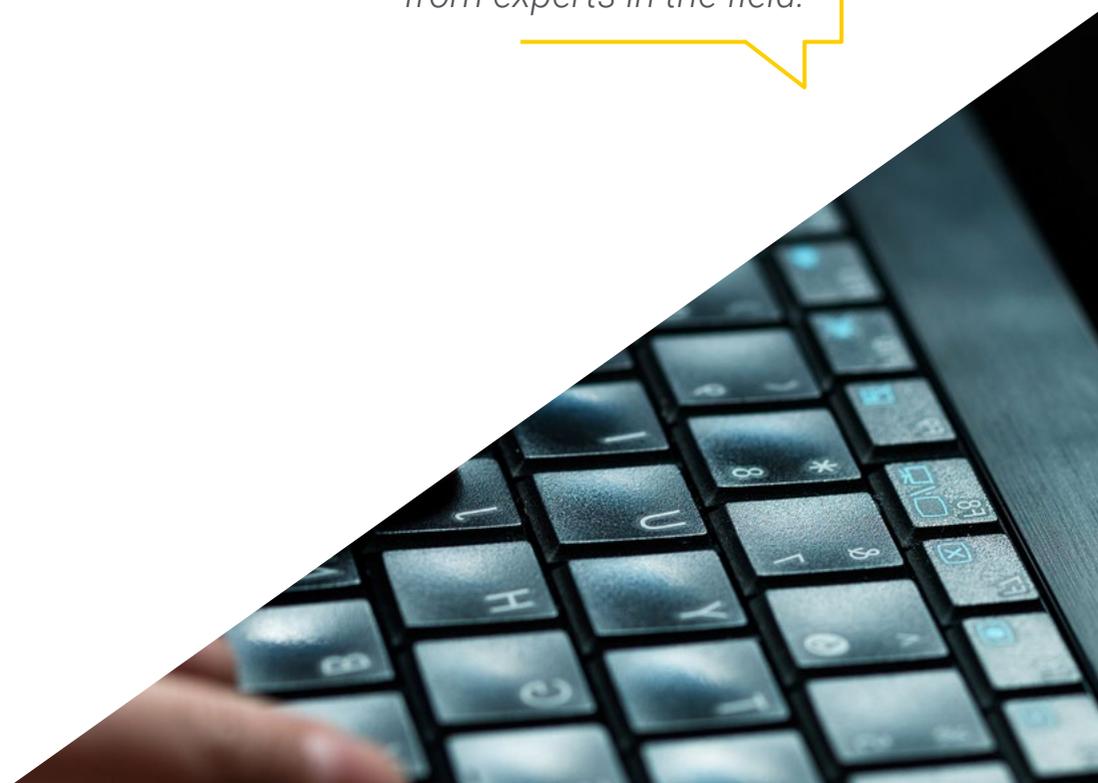
It includes in its teaching staff professionals belonging to the field of IT engineering, who bring to this program their work experience, in addition to recognized specialists belonging to reference societies and prestigious universities.

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 students must try to solve the different professional practice situations that arise throughout the program. For this purpose, the professionals will be assisted by an innovative interactive video system created by renowned and experienced experts in Algorithm and Complexity and extensive teaching experience.

Make the most of the latest educational technology to get up to date in Algorithm and Complexity without leaving your home.

Learn about the latest techniques in Algorithm and Complexity from experts in the field.





General Objectives

- ◆ Prepare scientifically and technologically, as well as to develop the professional practice of IT engineering, with a transversal and versatile approach adapted to the new technologies and innovations in this field
- ◆ Obtain wide knowledge in the field of IT engineering, structure of computers and in Algorithm and Complexity, including the mathematical, statistical and physical basis which is essential in engineering



Enroll in the best Postgraduate Certificate in Algorithm and Complexity on the current university escenario





Specific Objectives

- ◆ Learn the main strategies for algorithm design, as well as the different methods and measures for algorithm computation
- ◆ Know the main sorting algorithms used in software development
- ◆ Understand the operation of the different algorithms with trees, heaps and graphs
- ◆ Understand the operation of Greedy algorithms, their strategy and examples of their use in the main known problems. We will also learn the use of greedy algorithms on graphs
- ◆ We will learn the main strategies of minimum path search, with the approach of essential problems of the field and algorithms for their resolution
- ◆ Understand the Backtracking technique and its main uses, as well as other alternative techniques

03

Structure and Content

The structure of the contents has been designed by a team of IT engineering professionals, aware of the relevance of current preparation in order to delve into this area of knowledge in order to humanistically enrich the students and raise the level of knowledge in Algorithmics and Complexity through the latest educational technologies available.

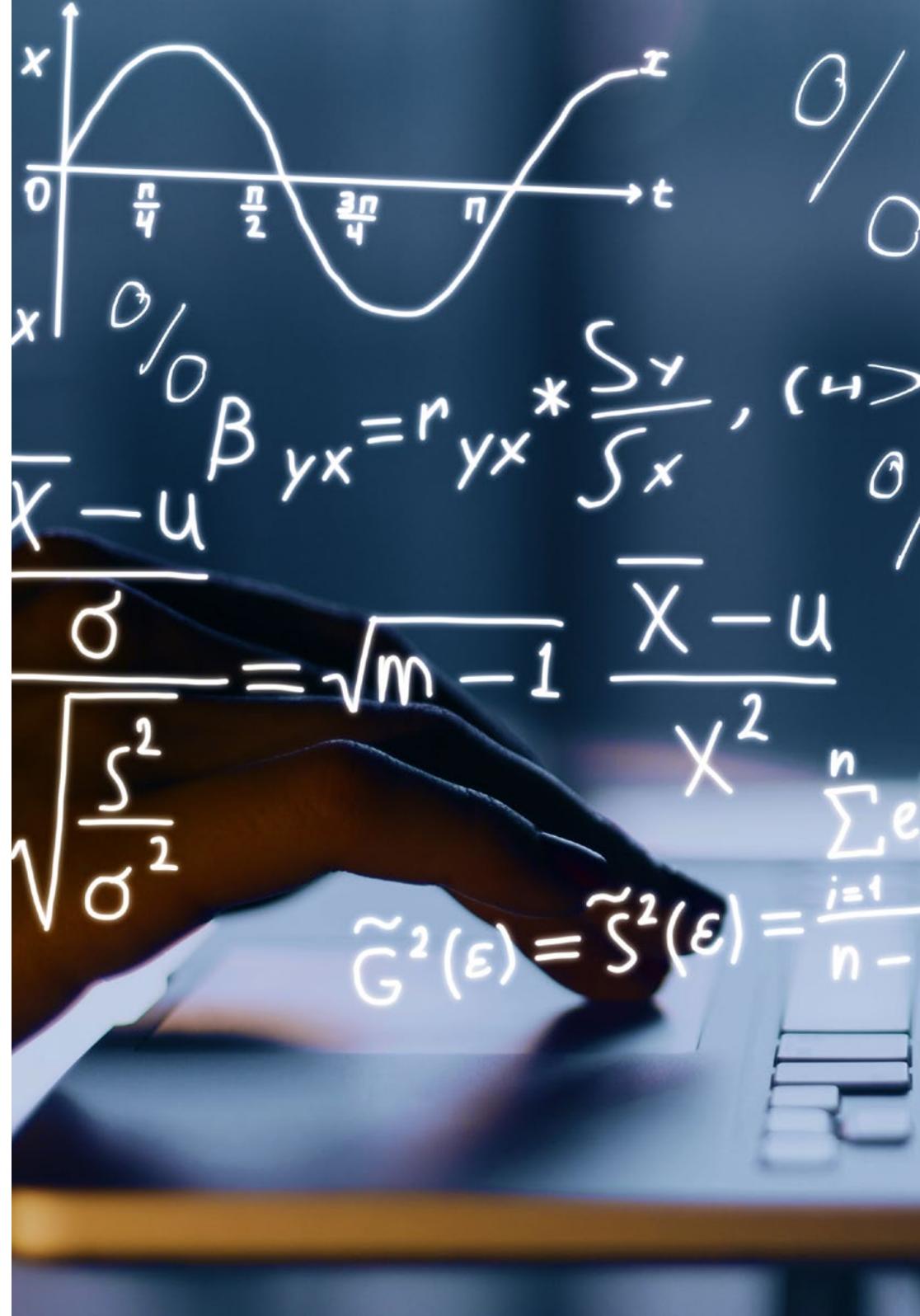


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This Postgraduate Certificate in Algorithm and Complexity contains the most complete and up-to-date program on the market”

Module 1. Algorithm and Complexity

- 1.1. Introduction to Algorithm Design Strategies
 - 1.1.1. Recursion
 - 1.1.2. Divide and Conquer
 - 1.1.3. Other Strategies
- 1.2. Efficiency and Analysis of Algorithms
 - 1.2.1. Efficiency Measures
 - 1.2.2. Measuring the Size of the Input
 - 1.2.3. Measuring Execution Time
 - 1.2.4. Worst, Best and Average Case
 - 1.2.5. Asymptotic Notation
 - 1.2.6. Criteria for Mathematical Analysis of Non-Recursive Algorithms
 - 1.2.7. Mathematical Analysis of Recursive Algorithms
 - 1.2.8. Empirical Analysis of Algorithms
- 1.3. Sorting Algorithms
 - 1.3.1. Concept of Sorting
 - 1.3.2. Bubble Sorting
 - 1.3.3. Sorting by Selection
 - 1.3.4. Sorting by Insertion
 - 1.3.5. Merge Sort
 - 1.3.6. Quicksort
- 1.4. Algorithms with Trees
 - 1.4.1. Tree Concept
 - 1.4.2. Binary Trees
 - 1.4.3. Tree Paths
 - 1.4.4. Representing Expressions
 - 1.4.5. Ordered Binary Trees
 - 1.4.6. Balanced Binary Trees
- 1.5. Algorithms Using Heaps
 - 1.5.1. Heaps
 - 1.5.2. The Heapsort Algorithm
 - 1.5.3. Priority Queues



- 1.6. Graph Algorithms
 - 1.6.1. Representation
 - 1.6.2. Traversal in Width
 - 1.6.3. Depth Travel
 - 1.6.4. Topological Sorting
- 1.7. Greedy Algorithms
 - 1.7.1. Greedy Strategy
 - 1.7.2. Elements of the Greedy Strategy
 - 1.7.3. Currency Exchange
 - 1.7.4. Traveler's Problem
 - 1.7.5. Backpack Problem
- 1.8. Minimal Path Finding
 - 1.8.1. The Minimum Path Problem
 - 1.8.2. Negative Arcs and Cycles
 - 1.8.3. Dijkstra's Algorithm
- 1.9. Greedy Algorithms on Graphs
 - 1.9.1. The Minimum Covering Tree
 - 1.9.2. Prim's Algorithm
 - 1.9.3. Kruskal's Algorithm
 - 1.9.4. Complexity Analysis
- 1.10. Backtracking
 - 1.10.1. Backtracking
 - 1.10.2. Alternative Techniques



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

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.

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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.

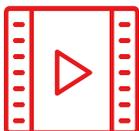
Relearning will allow you to learn with less effort and better performance, involving you more in your training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.

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.



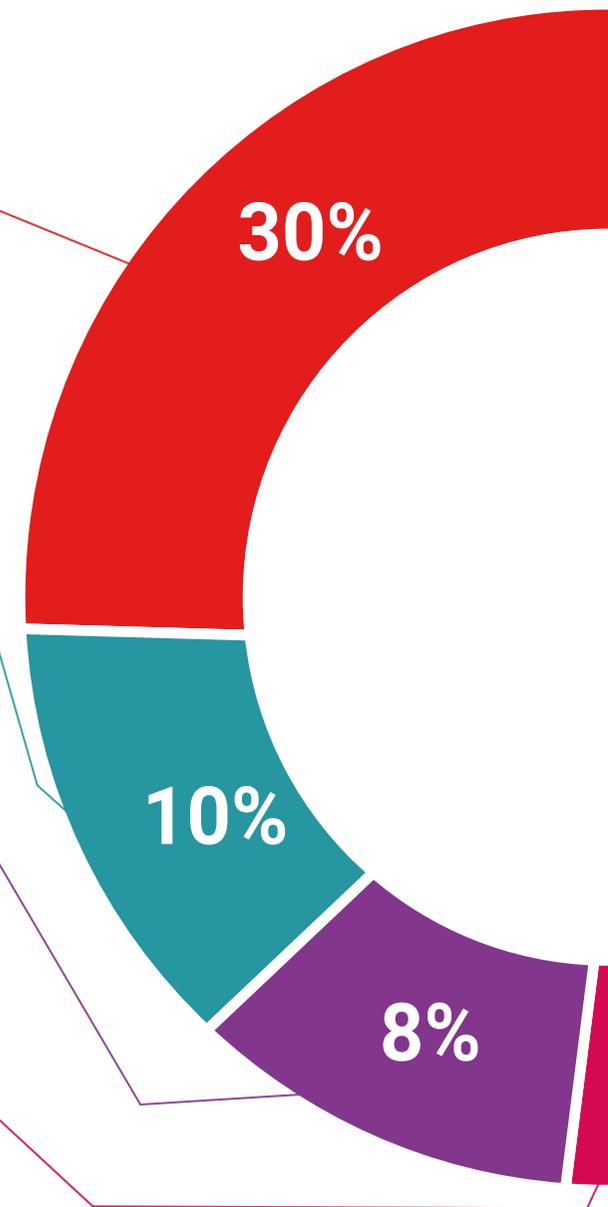
Practising Skills and Abilities

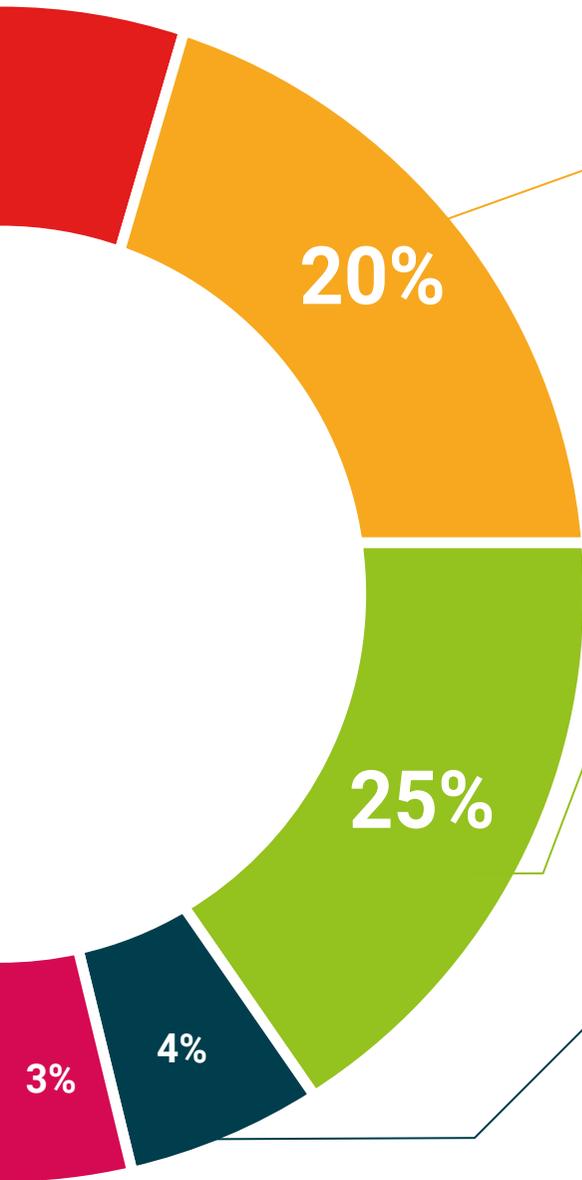
They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



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 Algorithm and Complexity guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.



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Successfully complete this program and receive your Postgraduate Certificate without having to travel or fill out laborious paperwork”

This **Postgraduate Certificate in Algorithm and Complexity** contains the most complete and up-to-date program on the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Certificate** issued by **TECH Technological University** via tracked delivery*.

The diploma issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Certificate, and meets the requirements commonly demanded by labor exchanges, competitive examinations and professional career evaluation committees.

Title: **Postgraduate Certificate in Algorithm and Complexity**

Official N° of Hours: **150 h.**



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

future
health confidence people
education information tutors
guarantee accreditation teaching
institutions technology learning
community commitment
personalized service innovation
knowledge present quality
development language
classroom



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