Postgraduate Certificate
Analog and Digital Electronics

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Postgraduate Certificate

Analog and Digital Electronics

Modality: **Online**
Duration: **6 weeks**
Certificate: **TECH Technological University**
Official Nº of hours: **150 h.**
Website: www.techtitute.com/pk/information-technology/postgraduate-certificate/analog-digital-electronics

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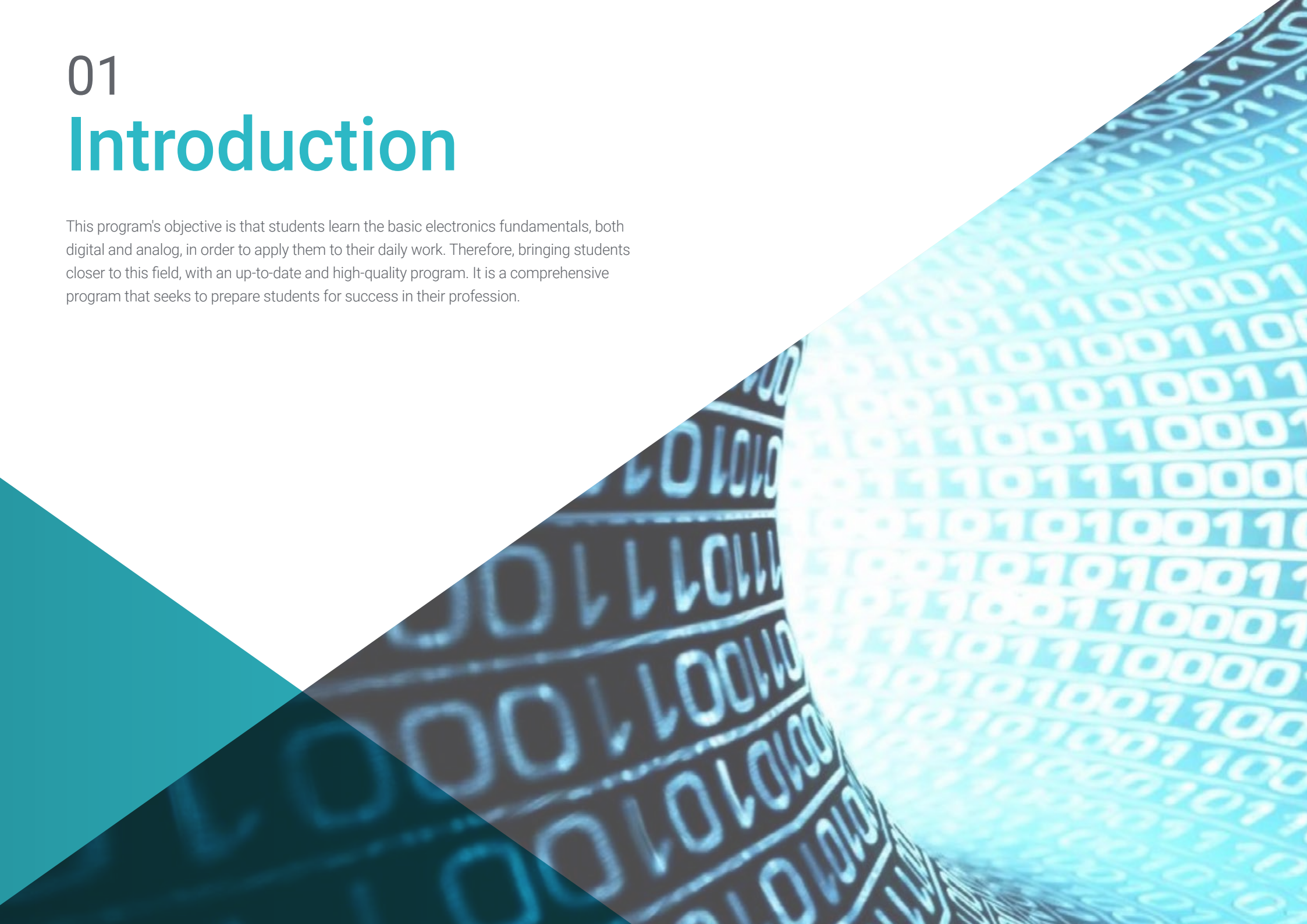
01

Introduction

This program's objective is that students learn the basic electronics fundamentals, both digital and analog, in order to apply them to their daily work. Therefore, bringing students closer to this field, with an up-to-date and high-quality program. It is a comprehensive program that seeks to prepare students for success in their profession.



If you are looking for a quality Postgraduate Certificate that will help you specialize in one of the most promising professional fields, this is your best option"

Advances in telecommunications are happening all the time, as this is one of the fastest evolving areas. It is therefore necessary to have IT experts who can adapt to these changes and have first-hand knowledge of the new tools and techniques that are emerging in this field.

This Postgraduate Certificate in Analog and Digital Electronics addresses the complete range of topics involved in this field. Its study has a clear advantage over other programs that focus on specific blocks, which prevents students from knowing the interrelation with other areas included in the multidisciplinary field of telecommunications. In addition, the teaching team of this educational program has made a careful selection of each of the topics of this program in order to offer students the most complete study opportunity possible and always linked to current events.

The program focuses on different aspects of analog and digital electronics, such as binary arithmetic, Boolean algebra, logic gates and the design of combinational circuits or sequential circuits, among other aspects.

This program is aimed at those interested in attaining a higher level of knowledge of Analog and Digital Electronics. 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.

Additionally, as it is a 100% online program, the student is not constrained by fixed timetables or the need to move to another physical location, but can access the contents at any time of the day, balancing their professional or personal life with their academic life.

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

- The development of practical cases presented by experts in Digital and Analog Electronics
- 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 in Analog and Digital Electronics
- 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

Do not miss the opportunity to take this Postgraduate Certificate in Analog and Digital Electronics with us. It's the perfect opportunity to advance your career"

This Postgraduate Certificate is the best investment you can make when selecting a refresher program to update your knowledge in Digital and Analog Electronics"

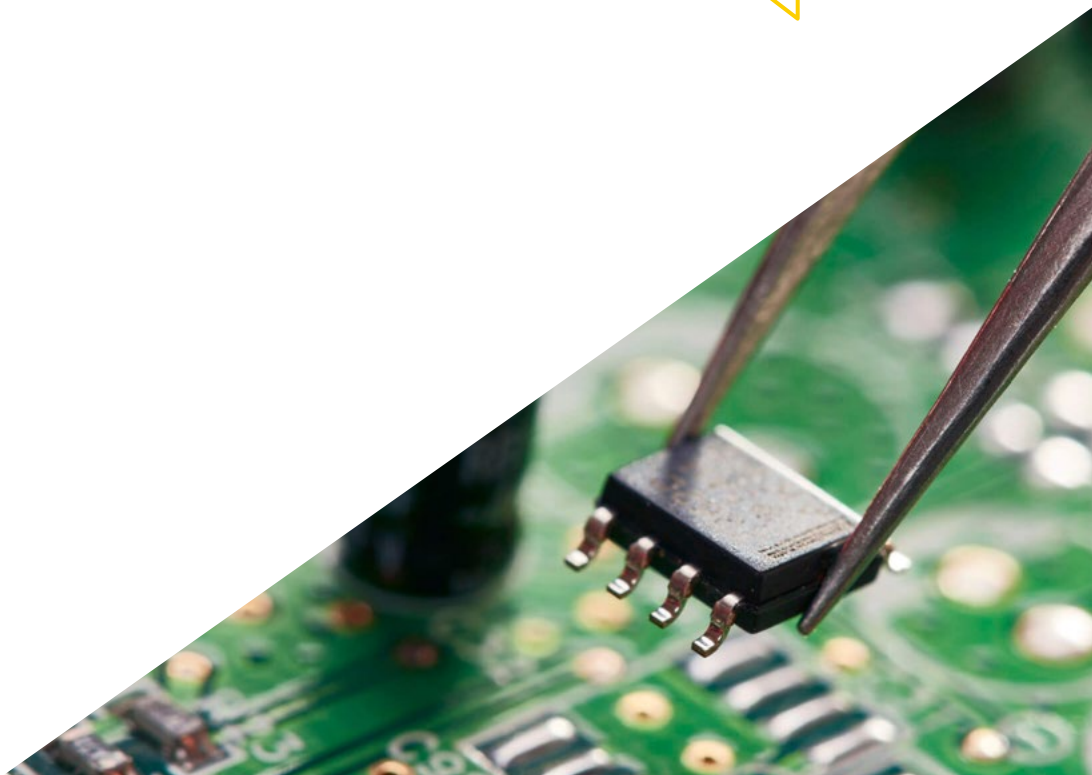
This program comes with the best educational material, providing you with a contextual approach that will facilitate your learning.

This 100% online Postgraduate Certificate will allow you to combine your studies with your professional work.

The teaching staff includes professionals from the field of design, who bring their experience to this specialization 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 education 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 during the academic year. To do so, professionals will be assisted by an innovative interactive video system created by renowned and experienced Analog and Digital Electronics experts.



02

Objectives

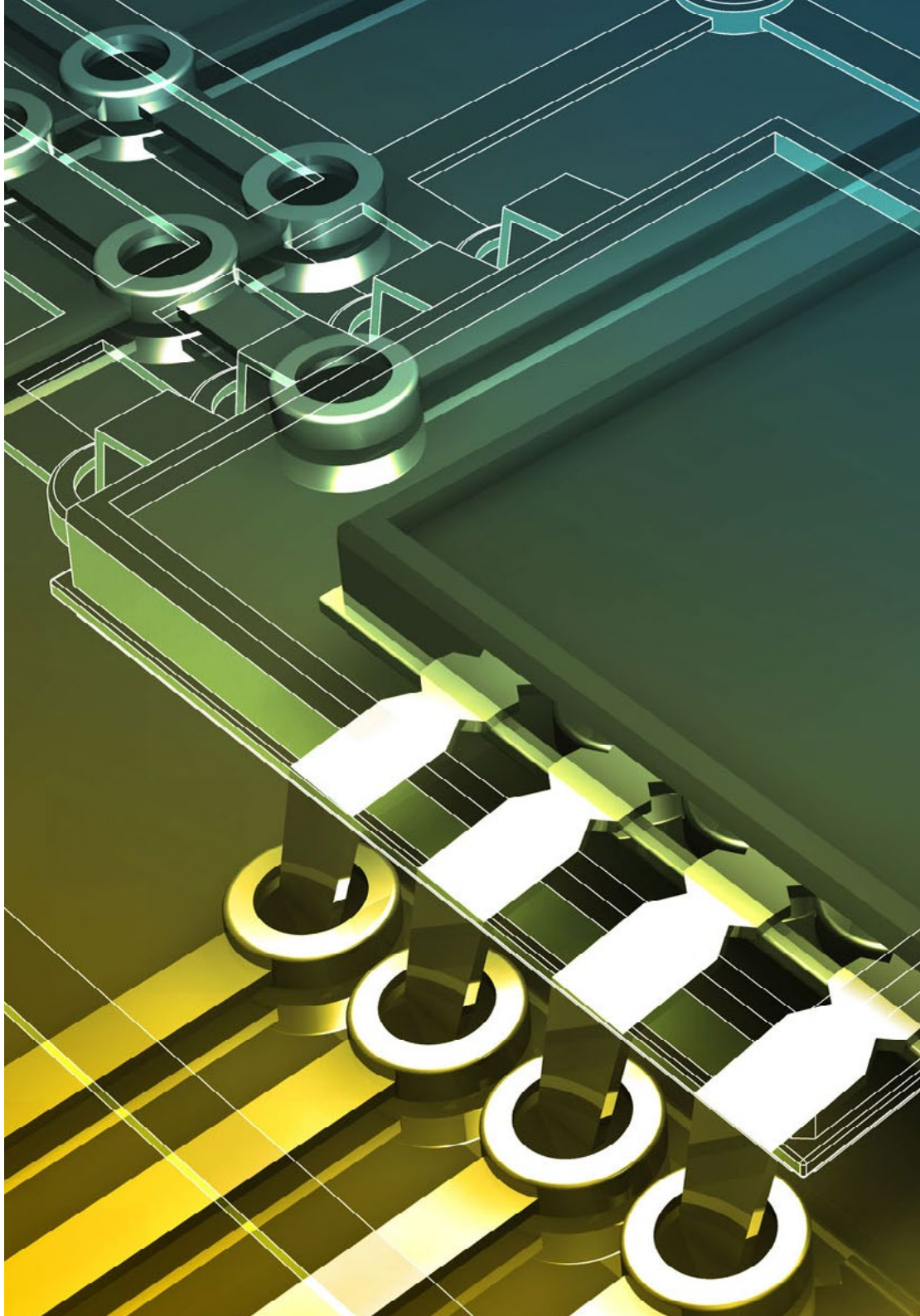
The Postgraduate Certificate in Analog and Digital Electronics is designed to facilitate the performance of the professionals in this field to enable them to master the main developments in this area.

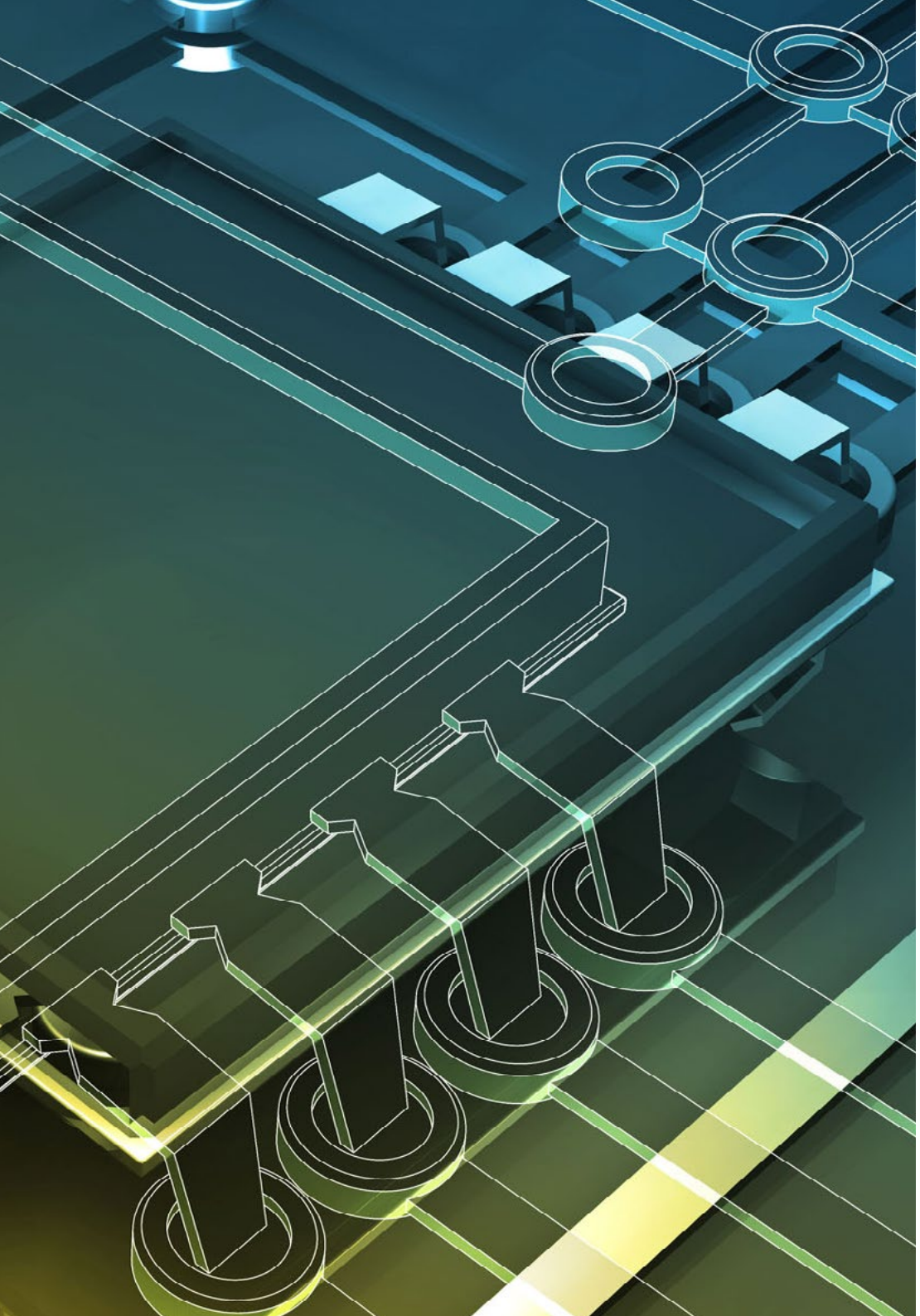
Our goal is for you to become the best professional in your sector. For this, we have the best methodology and content"

General Objective

- Prepare students to be able to develop their work with total confidence and quality in the field of Digital and Analog Electronics

Specialize in the world's leading private Spanish-speaking online university"





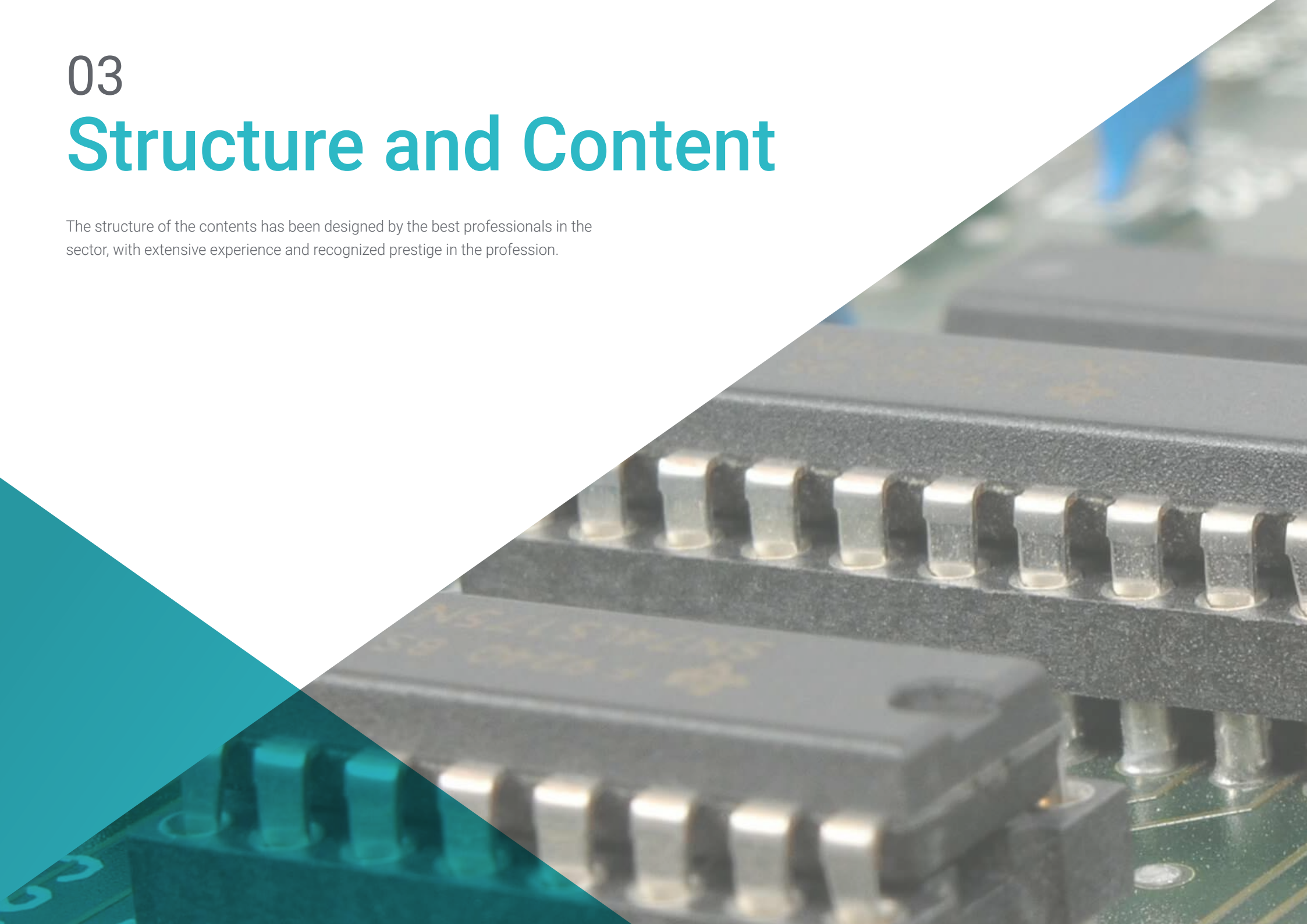
Specific Objectives

- Know the basic concepts of digital and analog electronics
- Master the different logic gates and their characteristics
- Analyze and design digital circuits, both combinational and sequential
- Distinguish and evaluate the advantages and disadvantages between sequential synchronous and asynchronous circuits, and of using a clock signal
- Know integrated circuits and logic families
- Understand the different sources of energy, especially solar photovoltaic and solar thermal energy
- Obtain basic knowledge of electrical engineering, electrical distribution and power electronics

03

Structure and Content

The structure of the contents has been designed by the best professionals in the sector, with extensive experience and recognized prestige in the profession.



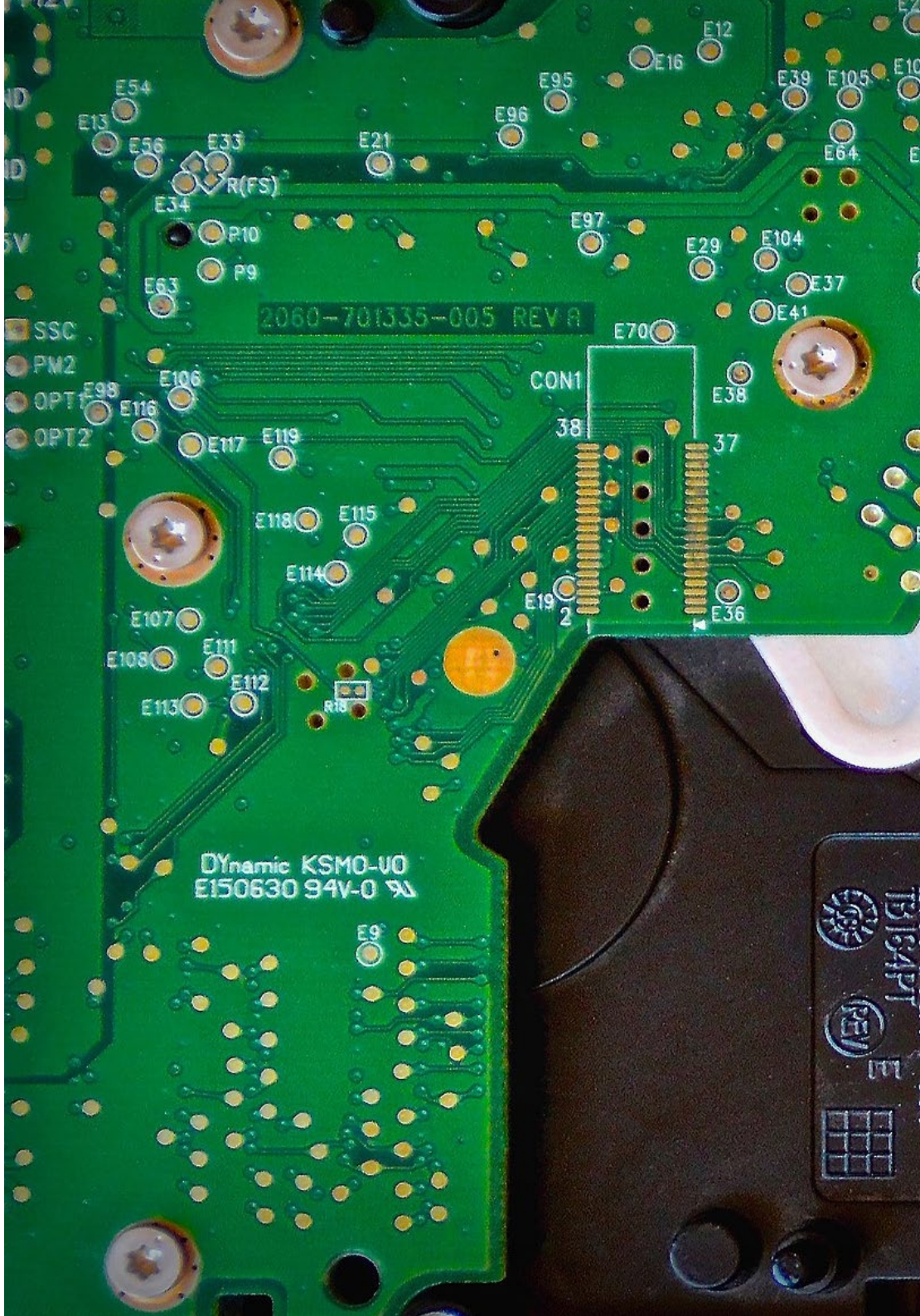
We have the most complete and up-to-date educational program on the market. We strive for excellence and for you to achieve it too"

Module 1. Analog and Digital Electronics

1.1. Introduction: Digital Concepts and Parameters
- 1.1.1. Analog and Digital Quantities
- 1.1.2. Binary Digits, Logic Levels and Digital Waveforms
- 1.1.3. Basic Logical Operations
- 1.1.4. Integrated Circuits
- 1.1.5. Programmable Logic Introduction
- 1.1.6. Measuring Tools
- 1.1.7. Decimal, Binary, Octal, Hexadecimal, BCD numbers
- 1.1.8. Arithmetic Operations with Numbers
- 1.1.9. Error Detection and Correction Codes
- 1.1.10. Alphanumeric Codes

1.2. Logic Gates
- 1.2.1. Introduction
- 1.2.2. The Investor
- 1.2.3. The AND Gate
- 1.2.4. The OR Gate
- 1.2.5. The NAND Gate
- 1.2.6. The NOR Gate
- 1.2.7. Exclusive OR and NOR Gate
- 1.2.8. Programmable Logic
- 1.2.9. Fixed Function Logic

1.3. Boolean Algebra
- 1.3.1. Boolean Operations and Expressions
- 1.3.2. Laws and Rules of Boolean Algebra
- 1.3.3. DeMorgan's Theorems
- 1.3.4. Boolean Analysis of Logic Circuits
- 1.3.5. Simplification Using Boolean Algebra
- 1.3.6. Standard Forms of Boolean Expressions
- 1.3.7. Boolean Expressions and Truth Tables
- 1.3.8. Karnaugh Maps
- 1.3.9. Minimization of a Sum of Products and Minimization of a Product of Sums



1.4. Basic Combinational Circuits
- 1.4.1. Basic Circuits
- 1.4.2. Combinational Logic Implementation
- 1.4.3. Universal Properties of NAND and NOR Gates
- 1.4.4. Combinational Logic with NAND and NOR Gates
- 1.4.5. Logic Circuit Operation with Pulse Trains
- 1.4.6. Adders
  - 1.4.6.1. Basic Adders
  - 1.4.6.2. Parallel Binary Adders
  - 1.4.6.3. Carrying Adders
- 1.4.7. Comparators
- 1.4.8. Decodifiers
- 1.4.9. Coders
- 1.4.10. Code Converters
- 1.4.11. Multiplexors
- 1.4.12. Demultiplexers
- 1.4.13. Applications

1.5. Latches, Flip-Flops and Timers
- 1.5.1. Basic Concepts
- 1.5.2. Latches
- 1.5.3. Flank-Fired Flip-Flops
- 1.5.4. Flip-Flops Performance Characteristics
  - 1.5.4.1. Type D
  - 1.5.4.2. Type J-K
- 1.5.5. Monostable
- 1.5.6. Astables
- 1.5.7. The 555 Timer
- 1.5.8. Applications

1.6. Counters and Shift Registers
- 1.6.1. Asynchronous Meter Operation
- 1.6.2. Synchronous Meter Operation
  - 1.6.2.1. Ascendant
  - 1.6.2.2. Descendant
- 1.6.3. Synchronous Meter Design
- 1.6.4. Cascade Meters
- 1.6.5. Meter Decoding
- 1.6.6. Meter Application
- 1.6.7. Basic Functions of Shift Registers
  - 1.6.7.1. Displacement Registers with Serial Input and Parallel Output
  - 1.6.7.2. Shift Registers with Parallel Input and Serial Output
  - 1.6.7.3. Displacement Registers with Input and Parallel Output
  - 1.6.7.4. Bi-Directional Shift Registers
- 1.6.8. Counters Based on Shift Registers
- 1.6.9. Counter Register Applications

1.7. Memories, Introduction to SW and Programmable Logic
- 1.7.1. Semiconductor Memory Principles
- 1.7.2. RAM Memories
- 1.7.3. ROM Memories
  - 1.7.3.1. Read-Only
  - 1.7.3.2. PROM
  - 1.7.3.3. EPROM
- 1.7.4. Flash Memory
- 1.7.5. Memory Expansion
- 1.7.6. Special Memory Types
  - 1.7.6.1. FIFO
  - 1.7.6.2. LIFO
- 1.7.7. Optical and Magnetic Memories
- 1.7.8. Programmable Logic: SPLD and CPLD
- 1.7.9. Macrocells
- 1.7.10. Programmable Logic: FPGA
- 1.7.11. Programmable Logic Software
- 1.7.12. Applications

1.8. Analog Electronics: Oscillators
- 1.8.1. Theory of Oscillators
- 1.8.2. Wien Bridge Oscillator
- 1.8.3. Other RC Oscillators
- 1.8.4. Colpitts Oscillator
- 1.8.5. Other LC Oscillators
- 1.8.6. Crystal Oscillator
- 1.8.7. Quartz Crystals
- 1.8.8. The 555 Timer
  - 1.8.8.1. Stable Operation
  - 1.8.8.2. Monostable Operation
  - 1.8.8.3. Circuits
- 1.8.9. BODE Diagrams
  - 1.8.9.1. Amplitude
  - 1.8.9.2. Phase
  - 1.8.9.3. Transfer Functions

1.9. Power Electronics: Thyristors, Thyristor Converters, Inverters
- 1.9.1. Introduction
- 1.9.2. Converter Concept
- 1.9.3. Types of Converters
- 1.9.4. Parameters to Characterize the Converters
  - 1.9.4.1. Periodic Signal
  - 1.9.4.2. Time Domain Representation
  - 1.9.4.3. Frequency Domain Representation
- 1.9.5. Power Semiconductors
  - 1.9.5.1. Ideal Elements
  - 1.9.5.2. Diodes
  - 1.9.5.3. Thyristors
  - 1.9.5.4. GTO (Gate Turn-off Thyristor)
  - 1.9.5.5. BJT (Bipolar Junction Transistor)
  - 1.9.5.6. MOSFET
  - 1.9.5.7. IGBT (Insulated Gate Bipolar Transistor)

1.9.6. AC/DC Converters. Rectifiers
- 1.9.6.1. Quadrant Concept
- 1.9.6.2. Uncontrolled Rectifiers
  - 1.9.6.2.1. Single Half-Wave Bridge
  - 1.9.6.2.2. Full-Wave Bridge
- 1.9.6.3. Controlled Rectifiers
  - 1.9.6.3.1. Single Half-Wave Bridge
  - 1.9.6.3.2. Full-Wave Controlled Bridge
- 1.9.6.4. AC/DC Converters
  - 1.9.6.4.1. DC/DC Converter Reducer
  - 1.9.6.4.2. DC/DC Converter Booster
- 1.9.6.5. DC/AC Converters. Inverters
  - 1.9.6.5.1. Square-Wave Inverter
  - 1.9.6.5.2. PWM Inverter
- 1.9.6.6. AC/AC Converters. Cycloconverters
  - 1.9.6.6.1. All/Nothing Control
  - 1.9.6.6.2. Phase Control

1.10. Electric Power Generation, Photovoltaic Installation. Legislation
- 1.10.1. Components of Solar Photovoltaic Systems
- 1.10.2. Solar Energy Introduction
- 1.10.3. Classification of Solar Photovoltaic Systems
  - 1.10.3.1. Autonomous Applications
  - 1.10.3.2. Networked Applications
- 1.10.4. ISF Elements
  - 1.10.4.1. Solar Cell: Basic Characteristics
  - 1.10.4.2. Solar Panels
  - 1.10.4.3. Regulators
  - 1.10.4.4. Accumulators. Battery Types
  - 1.10.4.5. The Investor
- 1.10.5. Networked Applications
  - 1.10.5.1. Introduction
  - 1.10.5.2. Elements of Grid-Connected Solar Photovoltaic Systems
  - 1.10.5.3. Design and Calculation of Grid-Connected Photovoltaic Systems
  - 1.10.5.4. Solar Farm Design
  - 1.10.5.5. Building-Integrated System Design
  - 1.10.5.6. Installation Interaction with Electrical Networks
  - 1.10.5.7. Analysis of Possible Disturbances and Quality of Supply
  - 1.10.5.8. Electricity Consumption Measurements
  - 1.10.5.9. System Safety and Protection
  - 1.10.5.10. Current Regulations
- 1.10.6. Renewable Energy Legislation

This program will allow you to advance in your career comfortably"

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

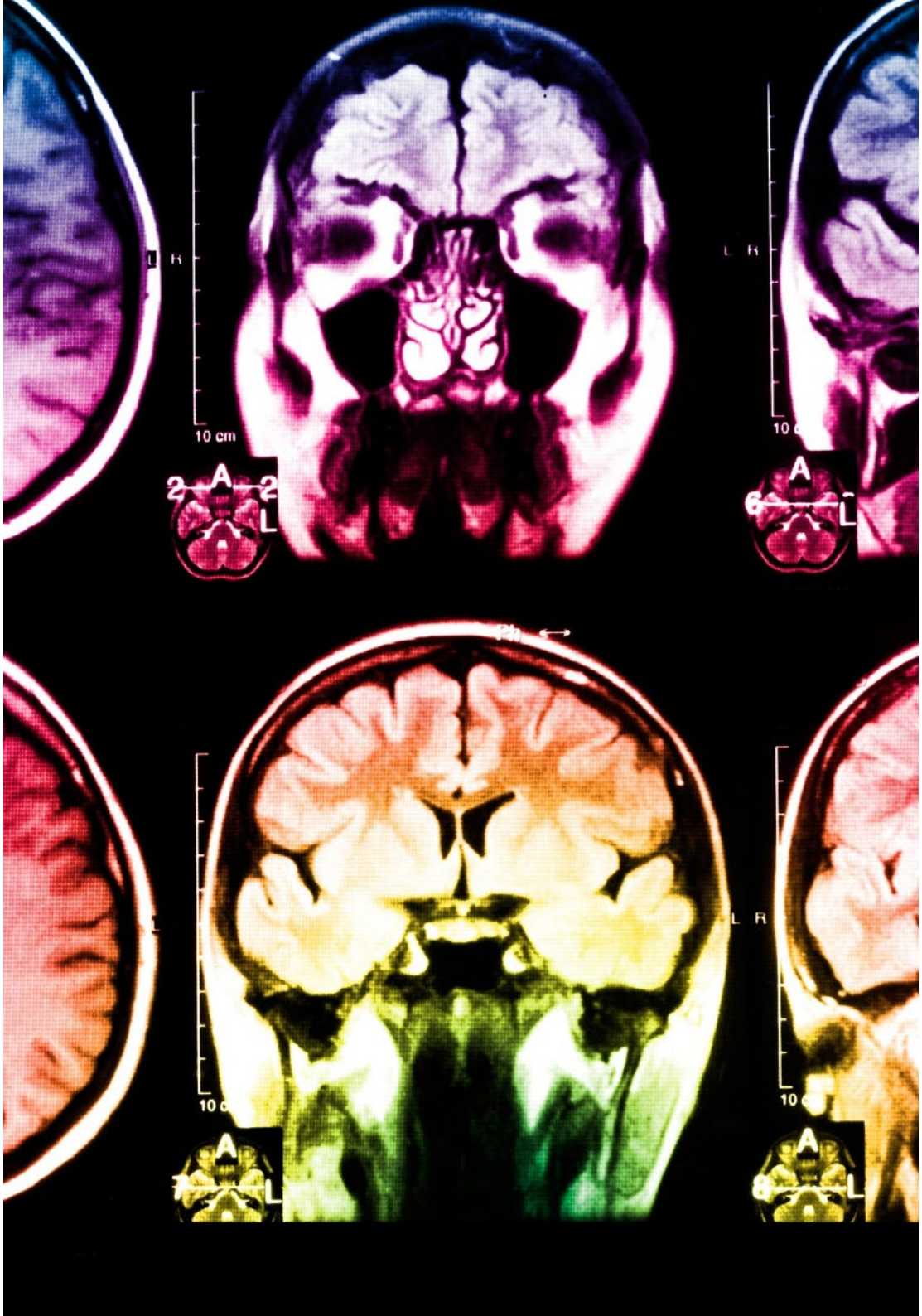
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

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 adapted in 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.

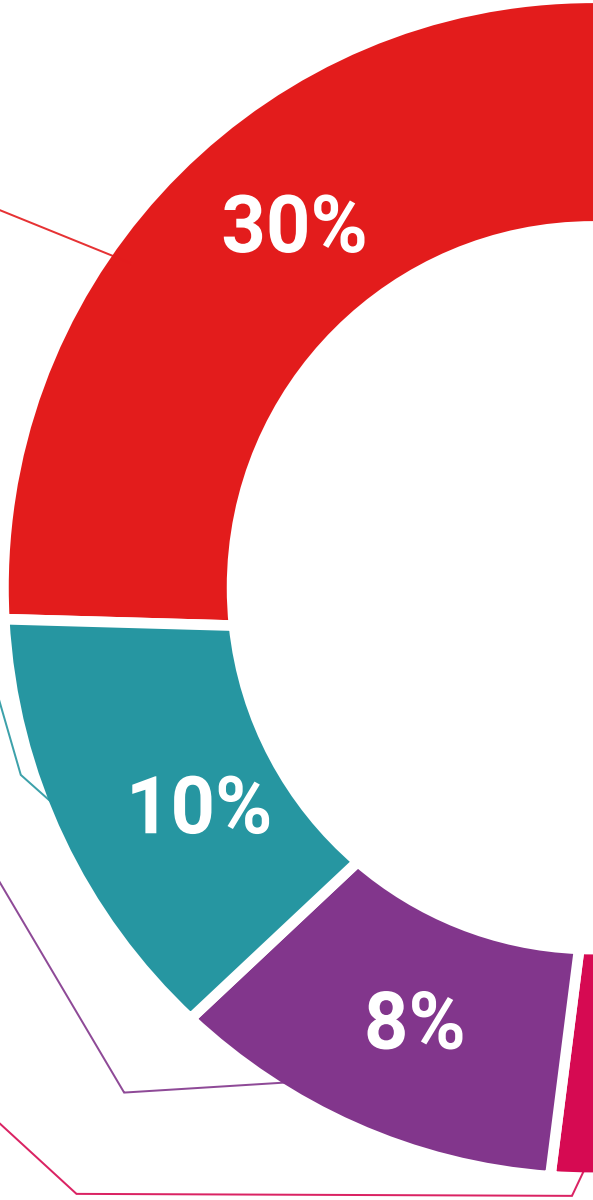
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

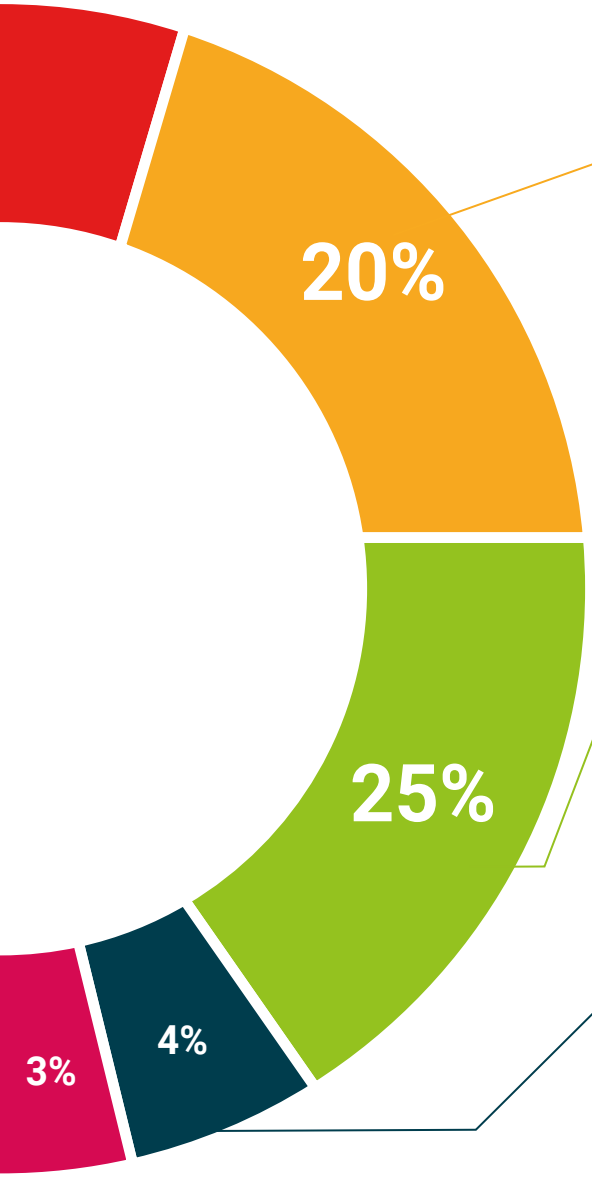
Practising Skills and Abilities

They will carry out activities to develop specific competencies and skills in each thematic 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 Analog and Digital Electronics guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.

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

This **Postgraduate Certificate in Analog and Digital Electronics** contains the most complete and up-to-date educational 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 certificate 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 Analog and Digital Electronics**

Official Nº of Hours: **150 h.**

tech technological university

Awards the following

CERTIFICATE

to

Mr./Ms. _____, with identification number _____.

For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Analog and Digital Electronics

This is a qualification awarded by this University, equivalent to 150 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

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

June 17, 2020

Tere Guevara Navarro

Dean

Unique TECH Code: AFWORD23S techtitute.com/certificates

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

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Analog and Digital Electronics

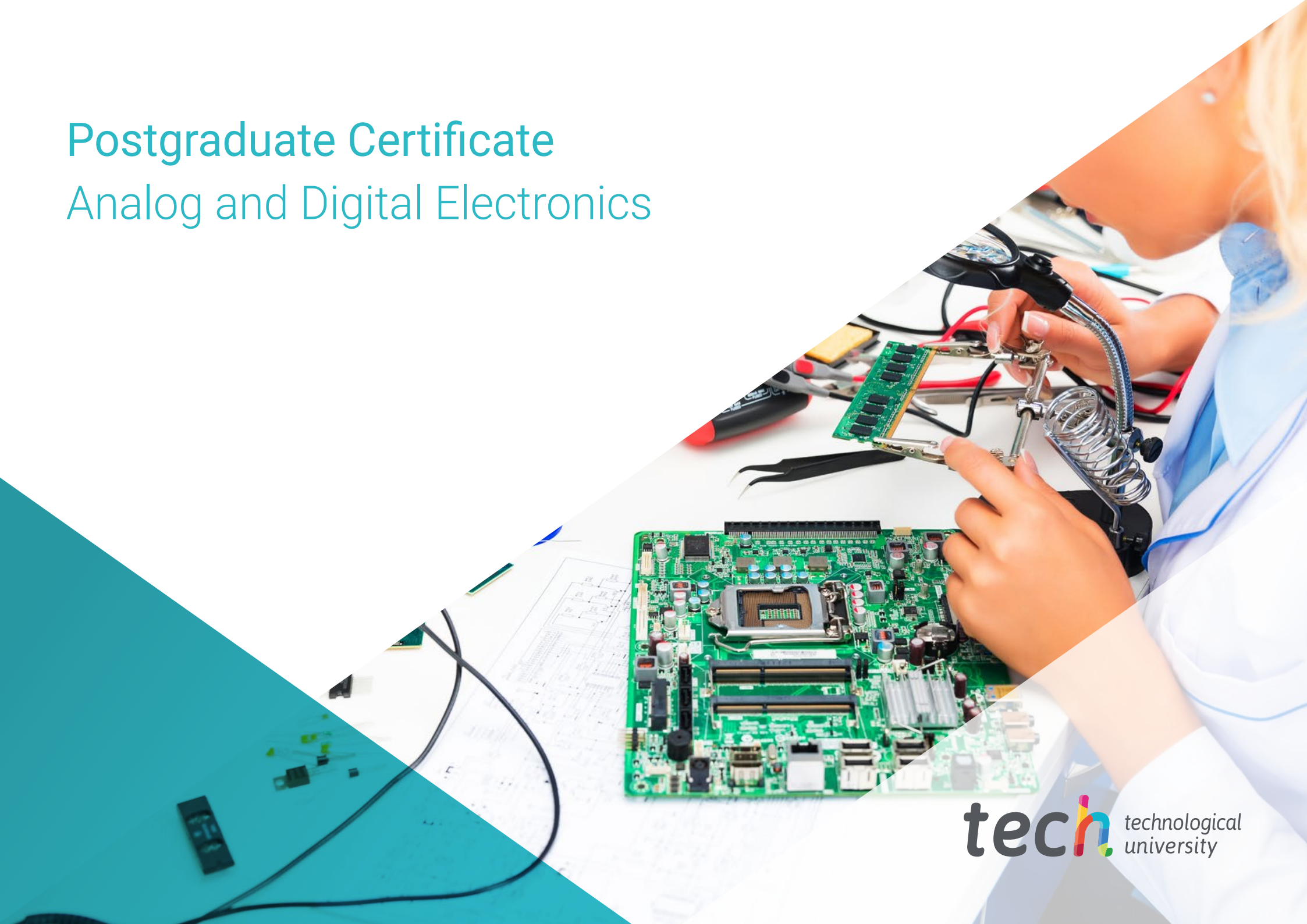
Modality: **Online**

Duration: **6 weeks**

Certificate: **TECH Technological University**

Official Nº of hours: **150 h.**

Postgraduate Certificate
Analog and Digital Electronics



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