Postgraduate Certificate
Reinforcement Learning

tech *technological university*

tech technological university

Postgraduate Certificate
Reinforcement Learning

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

Website: **www.techtitute.com/in/engineering/postgraduate-certificate/reinforcement-learning**

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01
Introduction

Reinforcement Learning is used in a variety of fields, from robotics and artificial intelligence to video games and Economics. It is therefore essential to have professionals who understand and can apply reward optimization and policy search algorithms and techniques to improve existing systems and create new innovative products. For this reason, TECH has decided to launch this program and offer engineers the opportunity to develop skills in OpenAI environments, as well as learn about neural networks and reinforcement learning algorithms. In addition, the program is delivered in a 100% online format using the Relearning methodology, which allows students to study at their own pace and at the time that best suits them.

Become a leader in the field of reinforcement learning and create innovative and effective solutions in various fields. Join the future of technology and innovation!"

Reinforcement Learning is fundamental in the creation of innovative and effective solutions in various fields. It is used in robotics to create motion control systems and in artificial intelligence to improve decision making. It is also used in the development of video games and in the optimization of energy efficiency in buildings. In addition, it offers an opportunity for engineers to develop highly specialized skills that are highly demanded in the industry such as policy gradient optimization, creation of OpenAI environments, neural network-based credit evaluation, and implementation of reinforcement learning algorithms.

The Postgraduate Certificate in Reinforcement Learning is a response to the current needs of industry and technology in relation to reinforcement learning. This field is fundamental in the creation of algorithms that optimize results, providing competitive advantages to companies that integrate its application. Policy gradient optimization, which is used to optimize neural network policies, is also taught. Therefore, this university qualification has been designed to offer engineers the opportunity to develop theoretical and practical skills to solve complex problems and create innovative solutions.

The Reinforcement Learning program is delivered in a 100% online format, allowing students to learn at their own pace and adapt to their schedules. Relearning methodology is used to provide an effective and unique learning experience. Students have access to OpenAI environments, allowing them to experiment and learn about creating them and using reinforcement learning algorithms. Time difference learning and Q-Learning is fundamental to reinforcement learning and is addressed throughout the program.

It is a program that offers a unique and effective learning experience, taught in a 100% online format and using the Relearning methodology. This allows students to distribute the course load according to their schedules and to be able to combine it with other areas of their lives. In addition, you will have access to a virtual campus full of theoretical, practical and additional content that will facilitate the integration of knowledge and which can be accessed 24 hours a day, 365 days a year.

This **Postgraduate Certificate in Reinforcement Learning** contains the most complete and up-to-date program on the market. Its most outstanding features are:

◆ The development of case studies presented by experts in Reinforcement Learning

◆ The graphic, schematic, and practical contents with which they are created, provide practical information on the disciplines that are essential for professional practice

◆ Practical exercises where self-assessment can be used to improve learning

◆ Its special emphasis on innovative methodologies

◆ Theoretical lessons, questions 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

You will obtain a recognized university qualification that will increase your employment opportunities and salaries"

"

You will learn autonomously and collaboratively, using a variety of resources, from readings and videos to tutorials and practical projects"

You will have access to practical and challenging projects that will allow you to apply your knowledge and demonstrate your skills.

The Relearning methodology will allow you to consolidate and apply your knowledge effectively and efficiently.

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

Its multimedia content, developed with the latest educational technology, will allow the professional a situated and contextual learning, that is, a simulated environment that will provide an immersive training programmed to train in real situations.

The design of this program focuses on Problem-Based Learning, in which the professional will have to try to solve the different professional practice situations that will arise throughout the academic course. For this purpose, the student will be assisted by an innovative interactive video system created by renowned experts.

02
Objectives

This program aims to provide engineers with a solid and advanced understanding of reinforcement learning concepts and techniques, enabling them to apply them in practical environments and solve complex problems. Throughout the program, specific topics of the syllabus, such as policy gradient optimization, neural network-based credit evaluation and the implementation of reinforcement learning algorithms, will be explored in depth, allowing engineers to specialize in specific areas and differentiate themselves in the job market.
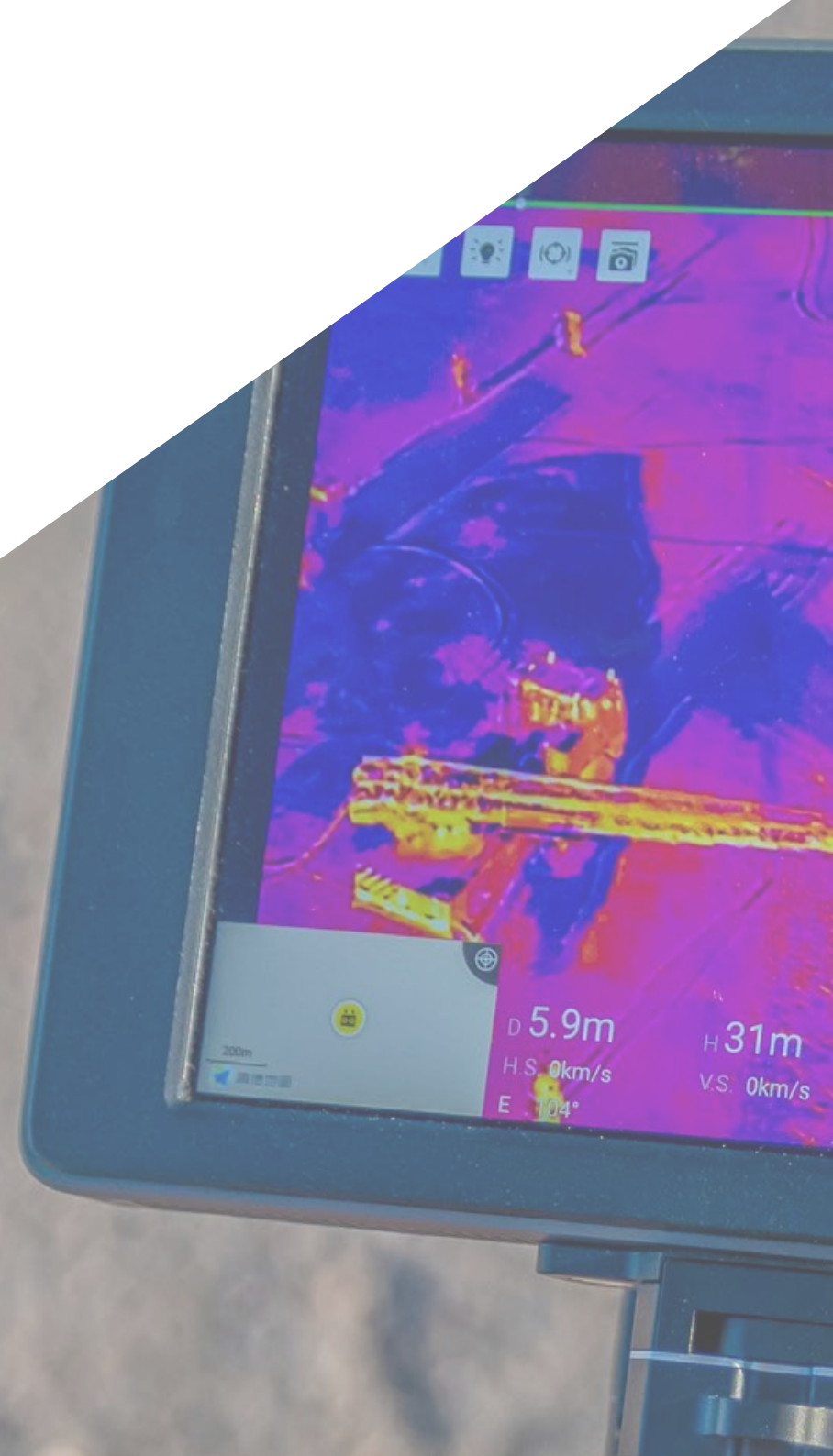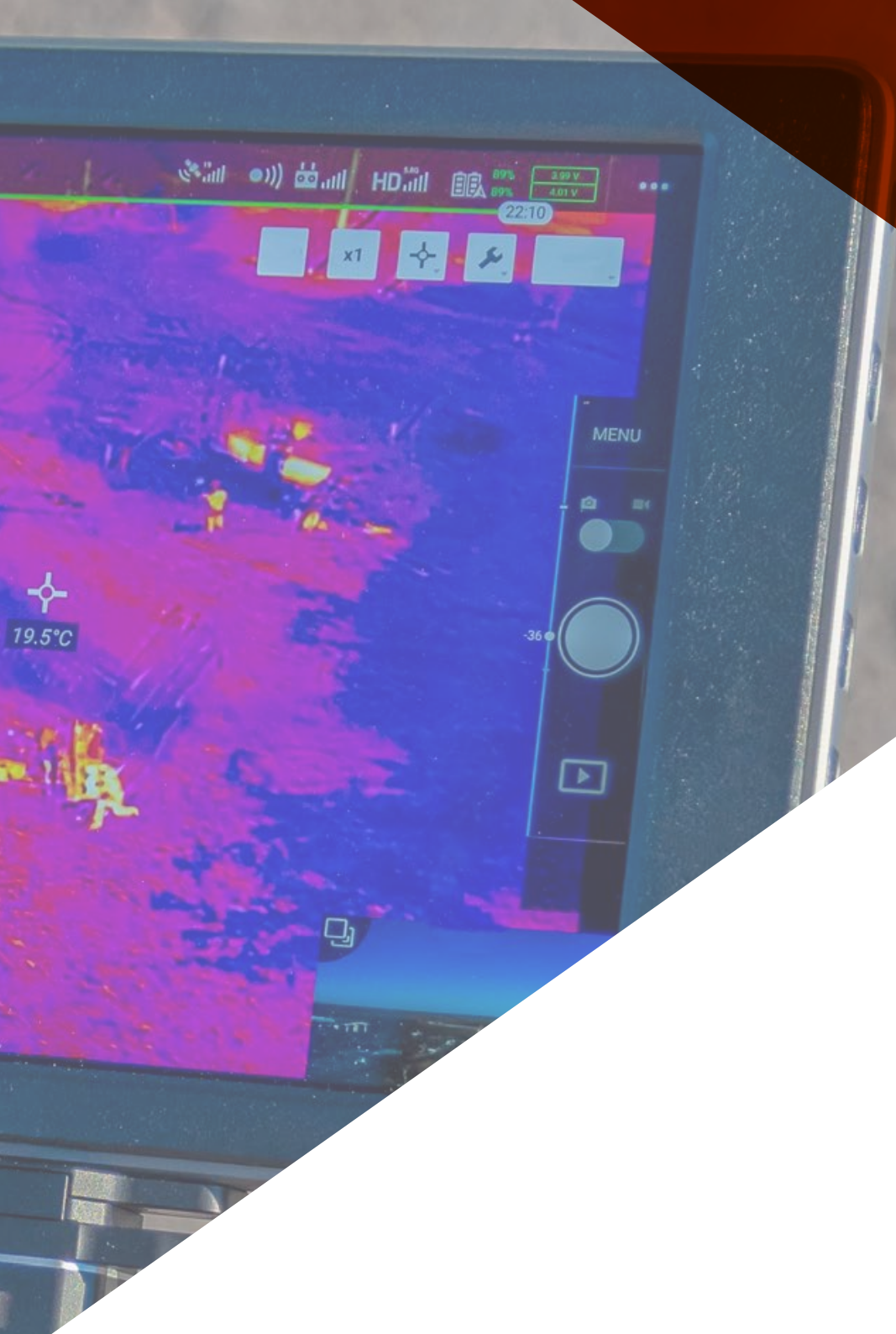
> " You will develop decision-making and complex problem-solving skills"

General Objectives

- Lay the foundation for the key concepts of mathematical functions and their derivatives
- Apply these principles to deep learning algorithms to learn automatically
- Examine the key concepts of Supervised Learning and how they apply to neural network models
- Analyze the training, evaluation, and analysis of neural network models
- Lay the foundation for the key concepts and main applications of deep learning
- Implement and optimizes neural networks with Keras
- Develop expertise in the training of deep neural networks
- Analyze the optimization and regularization mechanisms necessary for deep network training

Specific Objectives

- Use gradients to optimize an agent's policy
- Evaluate the use of neural networks to improve an agent's accuracy in making decisions
- Implement different reinforcement algorithms to improve the performance of an agent

You will gain an in-depth understanding of reinforcement learning techniques and their application in a variety of fields, from robotics to economics"

03

Course Management

This comprehensive program has been designed by a team of experts in the field of Reinforcement Learning. In this way, TECH offers students a unique opportunity to learn from the best and acquire advanced knowledge and skills in this field. Therefore, the professional team that created the syllabus is an industry leader in reinforcement learning, and has worked on cutting-edge projects in a variety of fields, from robotics and artificial intelligence to video games and economics. They not only have advanced theoretical knowledge, but also have extensive practical experience in applying this learning technique in a variety of real projects.

You will learn from the best professionals in the field of Reinforcement Learning"

Management

Mr. Gil Contreras, Armando

- Lead Big Data Scientist-Big Data at Jhonson Controls
- Data Scientist-Big Data at Opensistemas
- Fund Auditor at Creativity and Technology and PricewaterhouseCoopers
- Professor at EAE Business School
- Degree in Economics from the Instituto Tecnológico de Santo Domingo INTEC
- Master's Degree in Data Science at Centro Universitario de Tecnología y Arte
- Master MBA in International Relations and Business at Centro de Estudios Financieros CEF
- Postgraduate Degree in Corporate Finance at the Instituto Tecnológico de Santo Domingo

Professors

Mr. Villar Valor, Javier

- Director and Founder Partner Impulsa2
- Chief Operating Officer of Summa Insurance Brokers
- Responsible for identifying improvement opportunities at Liberty Seguros
- Director of Transformation and Professional Excellence at Johnson Controls Iberia
- Responsible for the organization of the company Groupama Seguros
- Responsible for Lean Six Sigma methodology at Honeywell
- Director of Quality and Purchasing at SP & PO
- Professor at the European Business School

Mr. Delgado Panadero, Ángel

- ML Engenieer at Paradigma Digital
- Computer Vision Engineer at NTT Disruption
- Data Scientist at Singular People
- Data Analyst at Parclick
- Tutor at Master in Big data and Analytics at EAE Business School
- Degree in Physics at the University of Salamanca

Structure and Content

The syllabus of the Postgraduate Certificate in Reinforcement Learning is the most cutting-edge of the current academic panorama, and addresses relevant topics in the field of reinforcement learning such as policy gradient optimization, credit evaluation based on neural networks, and the implementation of reinforcement learning algorithms. Throughout the program, the theoretical approach is combined with the practical application of the acquired knowledge in challenging projects and real applications, allowing students to acquire a deep and complete understanding of the concepts and techniques of reinforcement learning.
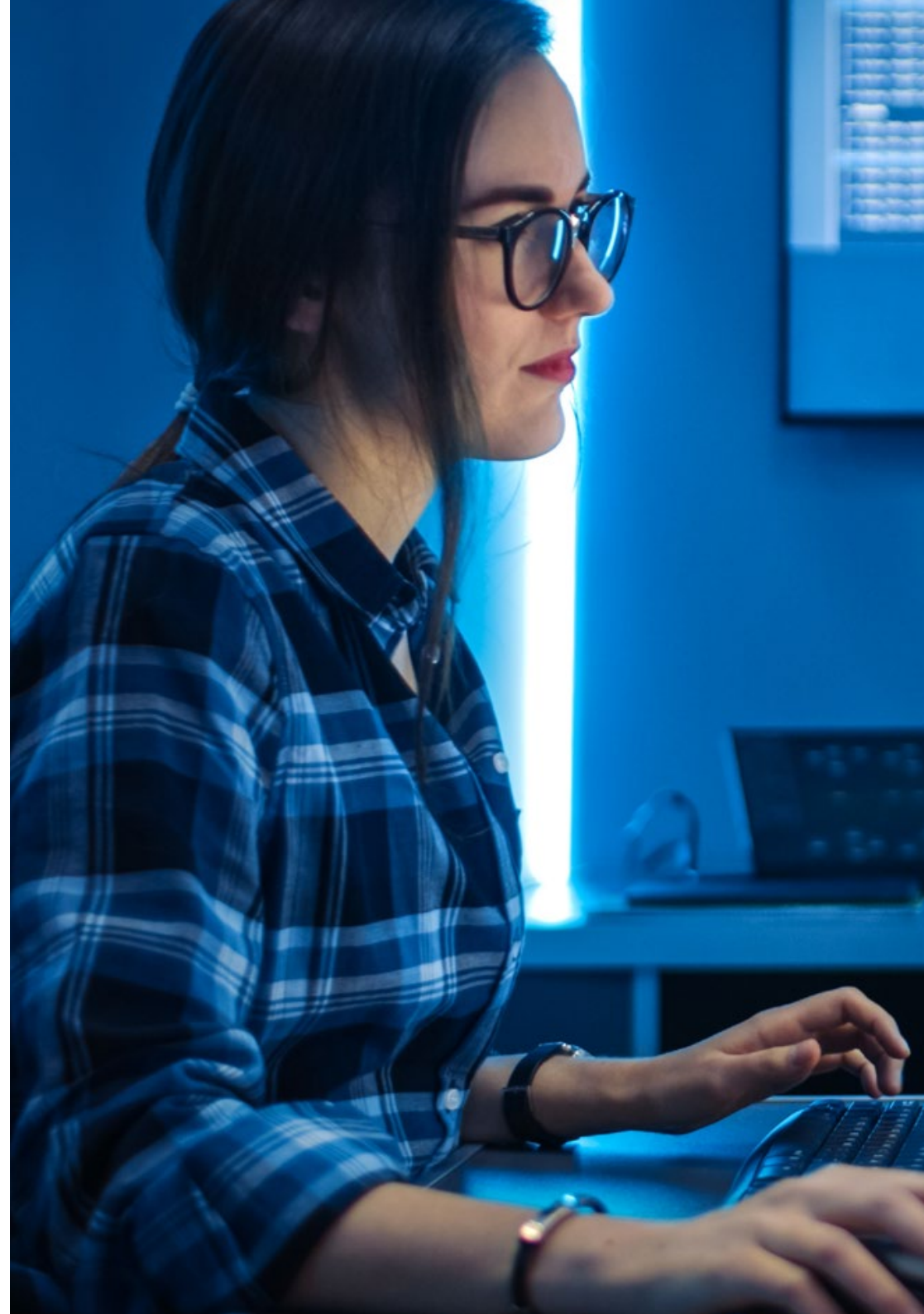
A syllabus with which you will acquire highly specialized skills that are valued in the industry"

Module 1. *Reinforcement Learning*

1.1.   Optimization of Rewards and Policy Searching

    1.1.1.   Reward Optimization Algorithms

    1.1.2.   Policy Search Processes

    1.1.3.   Reinforcement Learning for Reward Optimization

1.2.   OpenAI

    1.2.1.   OpenAI Gym Environment

    1.2.2.   Creation of OpenAI Environments

    1.2.3.   Reinforcement Learning Algorithms in OpenAI

1.3.   Neural Network Policies

    1.3.1.   Convolutional Neural Networks for Policy Searching

    1.3.2.   Deep Learning Policies

    1.3.3.   Neural Networks Policy Expansion

1.4.   Stock Assessment: the Problem of Credit Allocation

    1.4.1.   Risk Analysis for Credit Allocation

    1.4.2.   Estimation of Loan Profitability

    1.4.3.   Credit Assessment Models Based on Neural Networks

1.5.   Policy Gradients

    1.5.1.   Reinforcement Learning with Policy Gradients

    1.5.2.   Optimization of Policy Gradients

    1.5.3.   Policy Gradients Algorithms

1.6.   Markov Decision Processes

    1.6.1.   Optimization of Markov Decision Processes

    1.6.2.   Reinforcement Learning for Markov Decision Processes

    1.6.3.   Models of Markov Decision Processes

1.7.   Temporal Difference Learning and Q-Learning

    1.7.1.   Application of Temporal Differences in Learning

    1.7.2.   Application of Q-Learning in Learning

    1.7.3.   Optimization of Q-Learning Parameters

You will expand your horizons and become an expert in Reinforcement Learning"

05

Methodology

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

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.
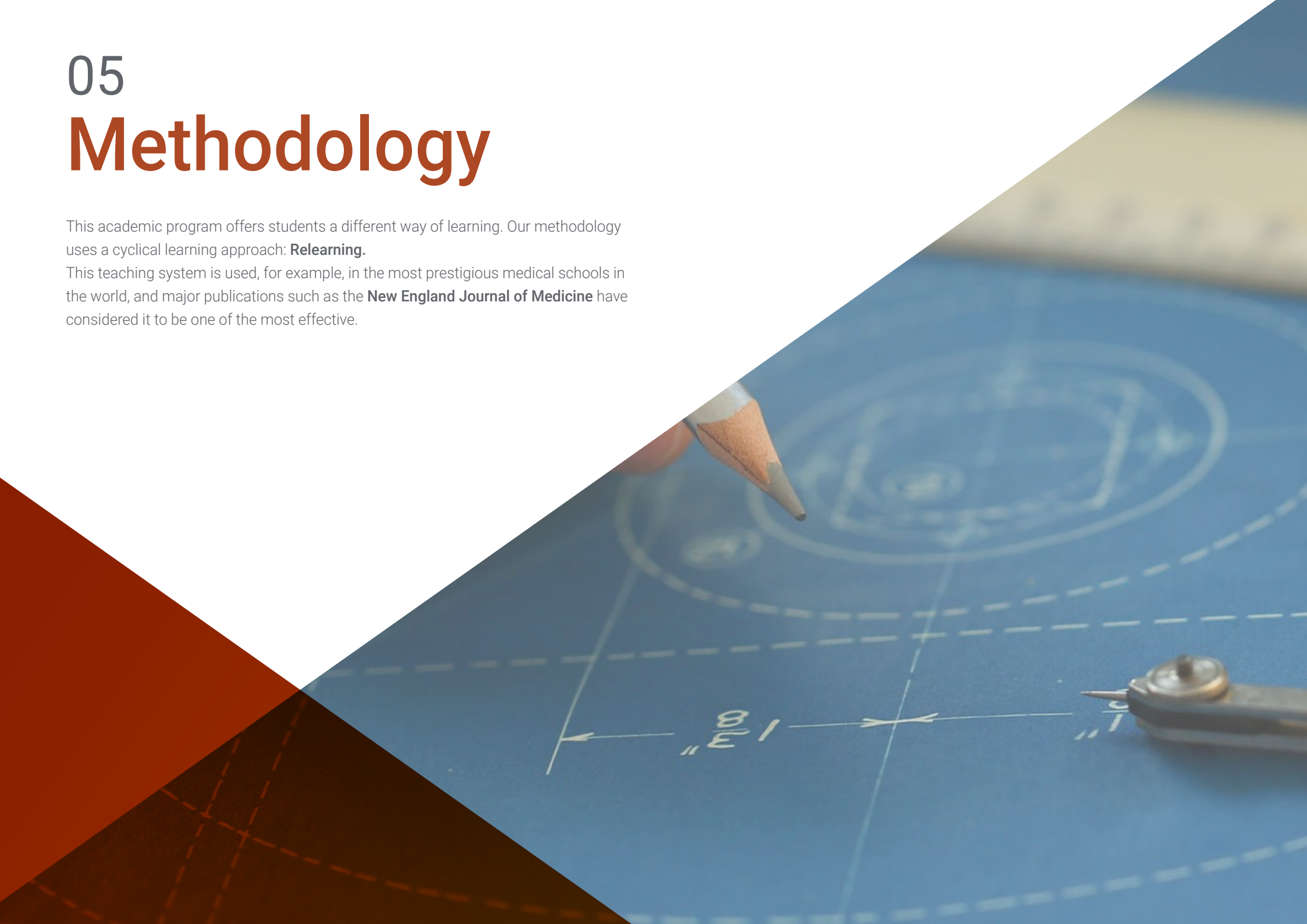
Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"

Case Study to contextualize all content

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

"

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

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

A learning method that is different and innovative

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

❝

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

The case method is the most widely used learning system in the best faculties in the world. 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 program, the studies 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.

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

Relearning Methodology

TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 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.

01 learning from evidence

02 relearning from evidence

03 testing

04 learning from an expert

05 neurocognitive context dependent learning

06 Von-Restorff effect

07 case based learning through storytelling

08 competencies testing (retesting)

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.

30%

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.

10%

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.

8%

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.

20%

25%

4%

3%
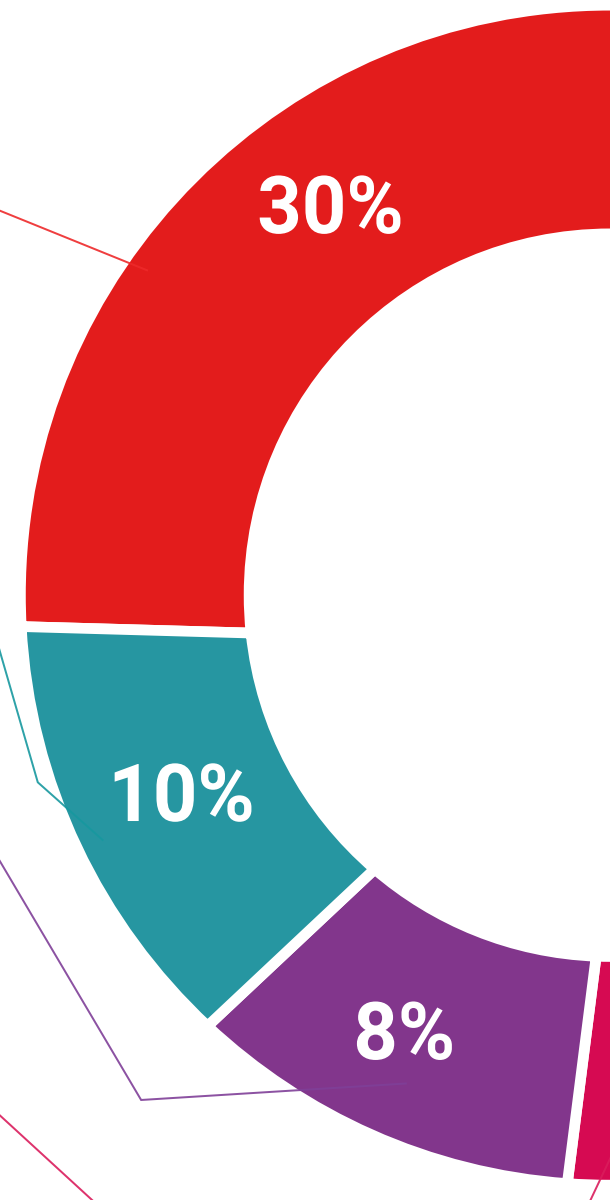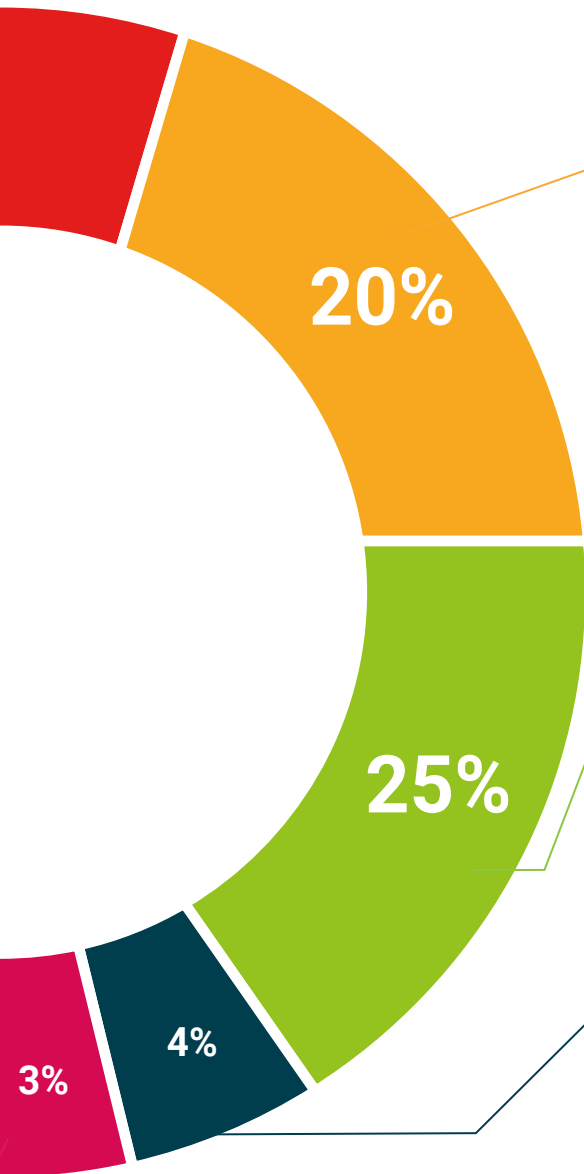
Case Studies

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

Interactive Summaries

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

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

Testing & Retesting

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

06
Certificate

The Postgraduate Certificate in Reinforcement Learning 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 Reinforcement Learning** 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 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 Reinforcement Learning**

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

Reinforcement Learning

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

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country.   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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