Postgraduate Certificate

Meteorological and Climate Physics

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Postgraduate Certificate
Meteorological and Climate Physics

- 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/meteorological-climate-physics**

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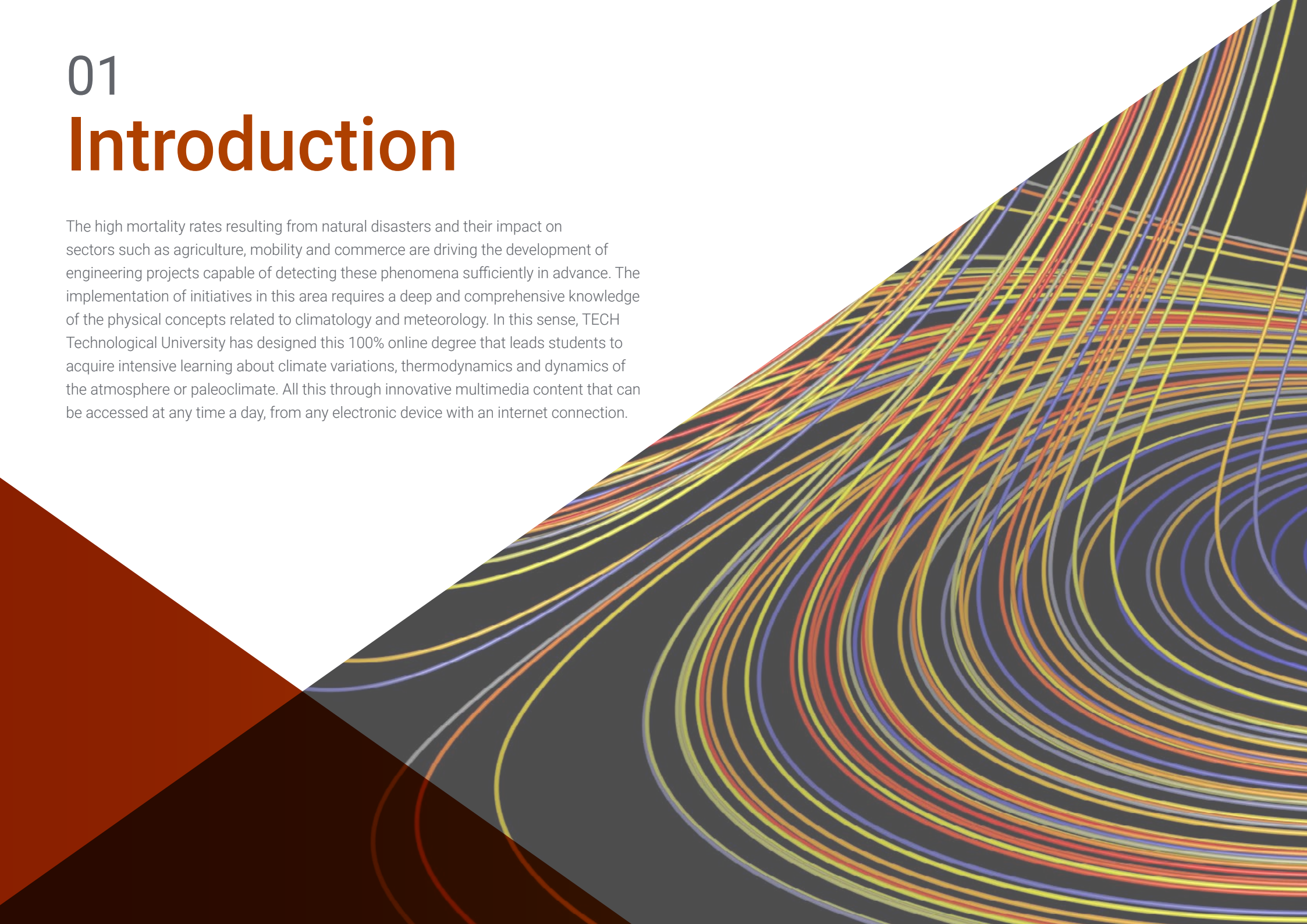
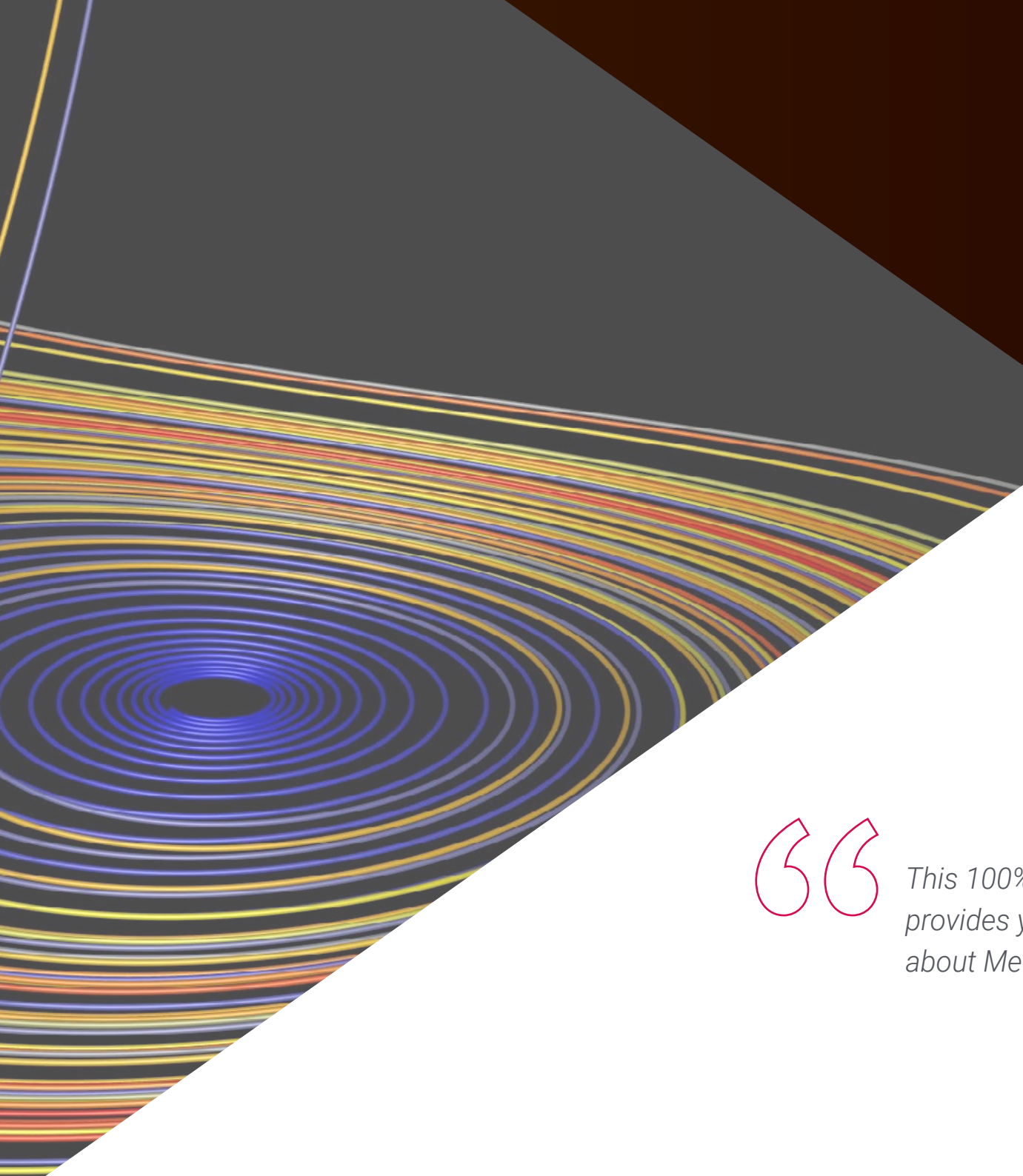
01

Introduction

The high mortality rates resulting from natural disasters and their impact on sectors such as agriculture, mobility and commerce are driving the development of engineering projects capable of detecting these phenomena sufficiently in advance. The implementation of initiatives in this area requires a deep and comprehensive knowledge of the physical concepts related to climatology and meteorology. In this sense, TECH Technological University has designed this 100% online degree that leads students to acquire intensive learning about climate variations, thermodynamics and dynamics of the atmosphere or paleoclimate. All this through innovative multimedia content that can be accessed at any time a day, from any electronic device with an internet connection.





This 100% online, flexible diploma course provides you with the most rigorous learning about Meteorological and Climate Physics"

From the Bhola cyclone, the flooding of the Yangtze River to hurricanes Katrina or the Indonesian Tsunami, they mark the natural catastrophes with the greatest impact in the most recent history of mankind. The importance of having predictive technological devices are key to risk reduction in this field.

Therefore, it is essential that engineering professionals have a deep knowledge of Meteorological and Climate Physics, which allows them to create projects in this line or in other sectors such as aeronautics where these concepts are key. Given this reality, TECH Technological University has created this Postgraduate Certificate which Benefits the graduates the most advanced knowledge of this science in just 6 weeks.

This is an academic itinerary that will lead students to delve into the general structure of the atmosphere, radiative energy exchange, thermodynamics and dynamics of the atmosphere and climate change. For this purpose, it has video summaries, videos in detail, readings and case studies that make up the extensive library of teaching resources for this degree.

In addition, thanks to the Relearning system, based on the continuous repetition of key concepts, the professional engineer will consolidate them in a simple way, thus reducing the hours of study and memorization.

Students have before them an avant-garde, flexible and comfortable academic option. All that is required is an electronic device (computer, tablet or cell phone) with Internet connection to access, at any time, the syllabus hosted on the virtual platform. An ideal option for those seeking a Postgraduate Certificate and compatible with the most demanding responsibilities.

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

- Practical case studies are presented by experts in Physics
- 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
- 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

Thanks to the Relearning system, you will forget about long hours of study and will be able to grasp key concepts in an easier way”

Are you aware of the scientific evidence on Global Warming? Immerse yourself in this cutting-edge university degree"

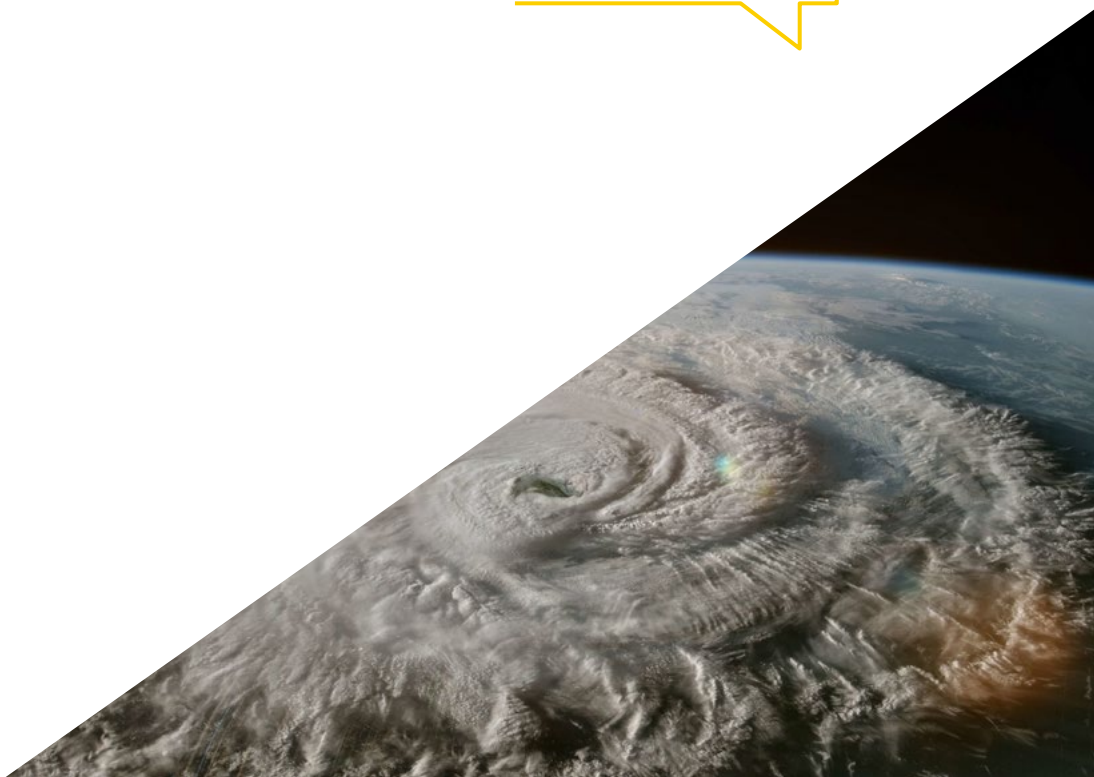
Incorporate to your engineering knowledge the latest physical advances in Atmospheric Dynamics and Thermodynamics.

Delve into the artificial modification of clouds and precipitation whenever you wish, from a digital device.

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

Its 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 education programmed to learn in real situations.

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



02

Objectives

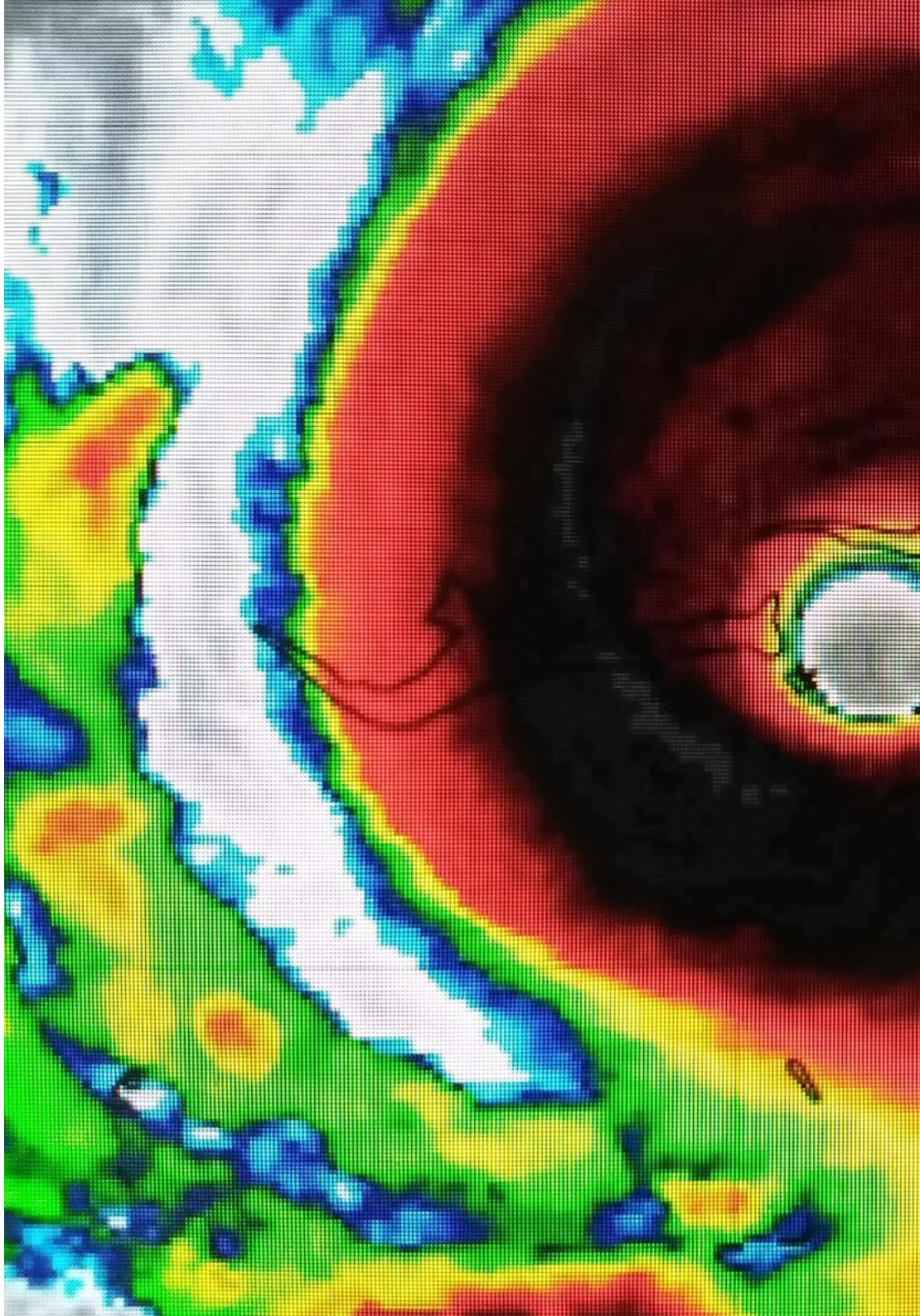
The syllabus of this Diploma has been designed to provide the engineer with the most advanced and current knowledge on Meteorological and Climate Physics. This learning will allow you to incorporate in only 150 hours of class time the most profound concepts on thermodynamics and dynamics of the atmosphere, radiative energy exchange or the artificial modification of clouds and precipitation in your projects. A unique educational opportunity that only offer TECH Technological University.

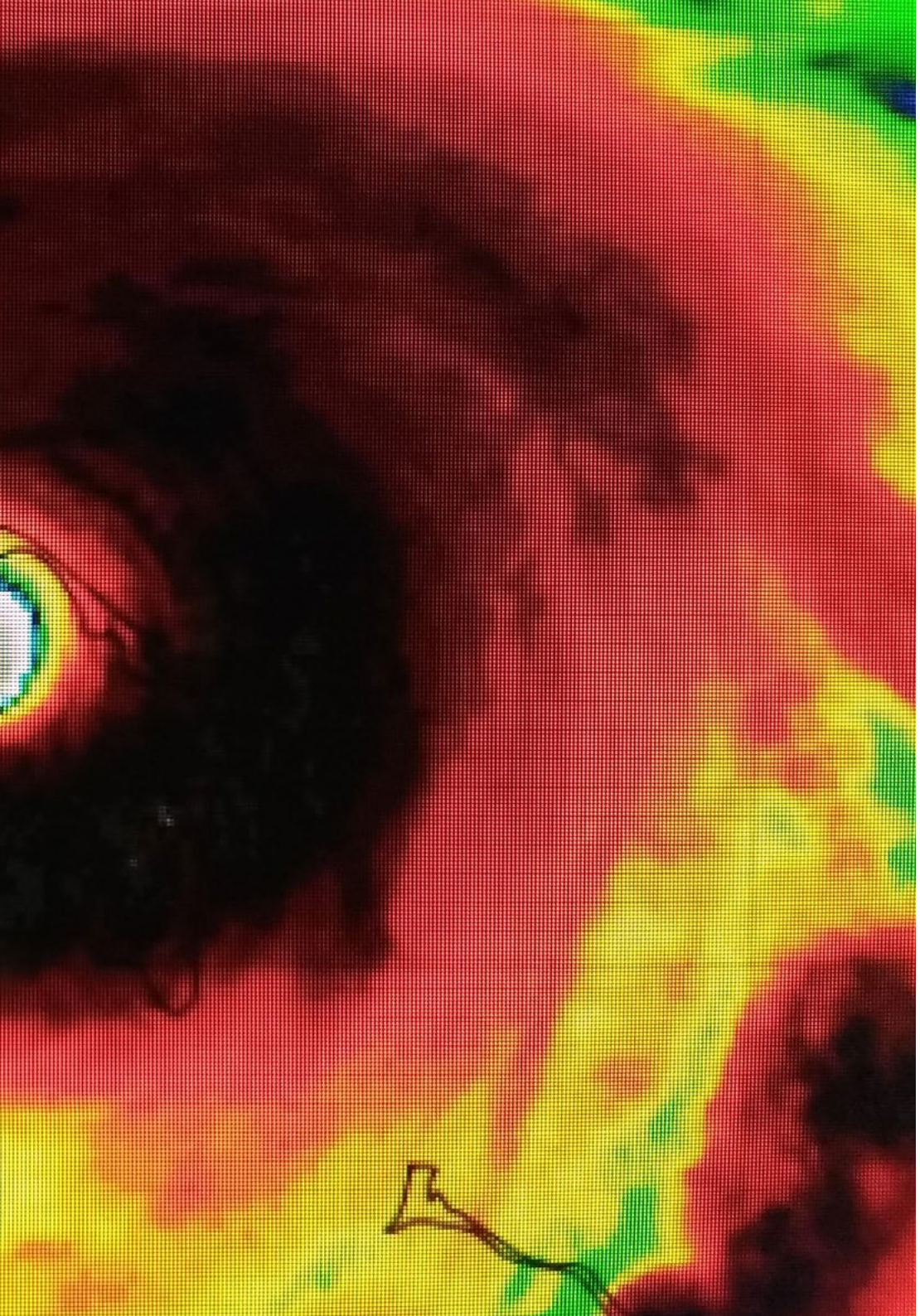
Get a practical approach through the case study simulations provided by this 100% online university degree"

General Objectives

- Know the general properties of the climate system and the factors that influence changes in climate
- Understand the four principles of thermodynamics and apply them to the study of thermodynamic systems
- Apply processes of analysis, synthesis and critical reasoning

This degree allows you to self-manage your study time and make it compatible with your daily personal activities"





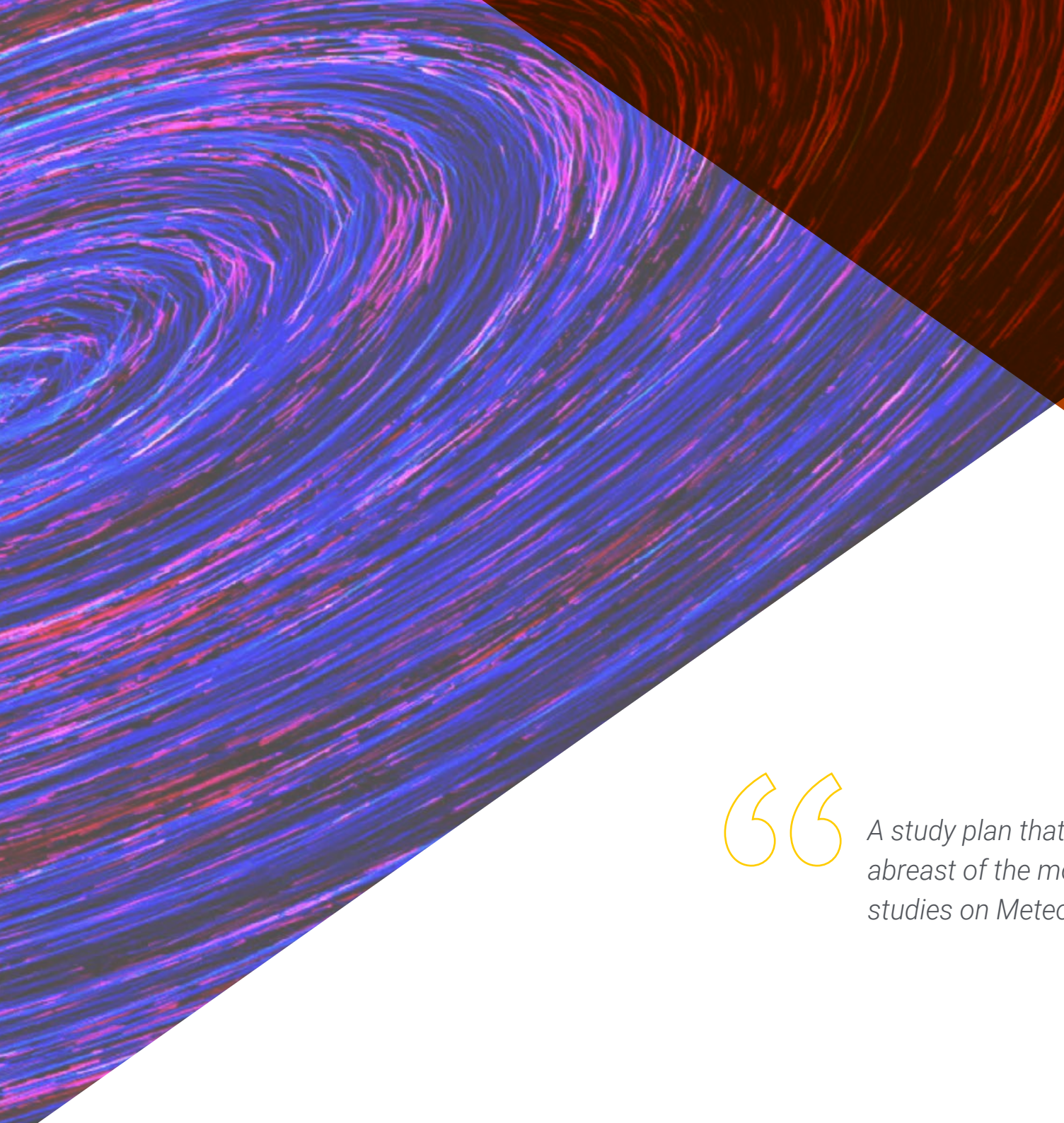
Specific Objectives

- Know the general characteristics and properties of the atmosphere from the meteorological point of view
- Achieve basic knowledge of the radiative properties of the Earth-atmosphere system
- Recognize the thermodynamic properties of the atmosphere and its most frequent meteorological evolutions
- Identify the processes that lead to cloud formation and precipitation and the fundamental forces involved in air motion

03

Structure and Content

TECH Technological University offers students numerous didactic material based on multimedia pills, specialized readings and case studies with which they can obtain an advanced and attractive learning about Meteorological and Climate Physics. An intensive 6-week course that will allow the future engineer to keep abreast of the latest research in this field and integrate it into their engineering projects. All of this, in addition to innovative multimedia content that can be accessed 24 hours a day , from any Digital device with Internet connection.



A study plan that will allow you to keep abreast of the most rigorous scientific studies on Meteorology and climatology"

Module 1. Meteorology and Climatology

1.1. General Structure of the Atmosphere
- 1.1.1. Weather and Climate
- 1.1.2. General Characteristics of the Earth's Atmosphere
- 1.1.3. Atmospheric Composition
- 1.1.4. Horizontal and Vertical Structure of the Atmosphere
- 1.1.5. Atmospheric Variables
- 1.1.6. Observing Systems
- 1.1.7. Meteorological Scales
- 1.1.8. Equation of State
- 1.1.9. Hydrostatic Equation

1.2. Atmospheric Motion
- 1.2.1. Air Masses
- 1.2.2. Extratropical Cyclones and Fronts
- 1.2.3. Mesoscale and Microscale Phenomena
- 1.2.4. Fundamentals of Atmospheric Dynamics
- 1.2.5. Air Motion: Apparent and Real Forces
- 1.2.6. Equations of Horizontal Motion
- 1.2.7. Geostrophic Wind, Friction Force and Gradient Wind
- 1.2.8. Atmospheric General Circulation

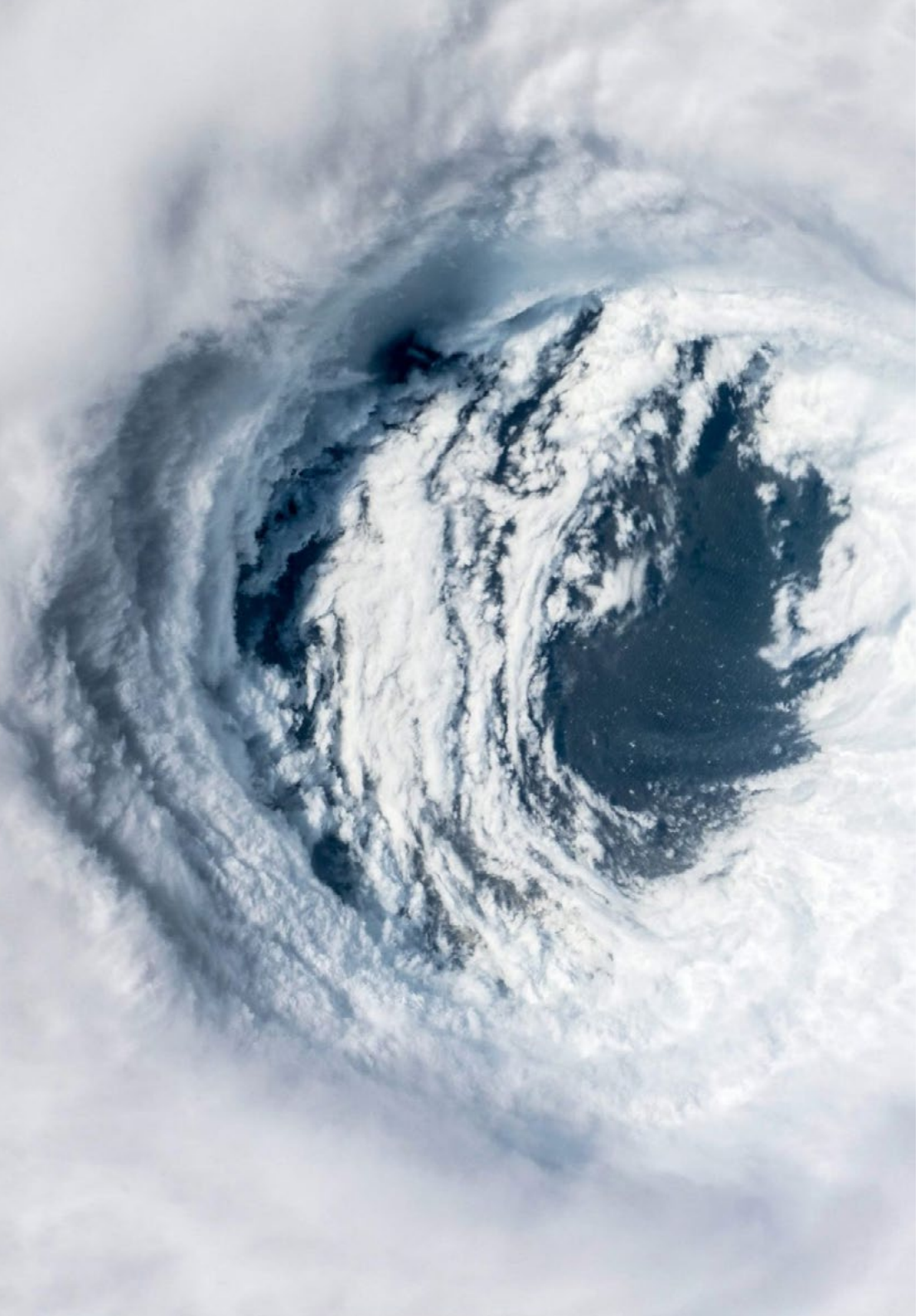
1.3. Radiative Energy Exchange in the Atmosphere
- 1.3.1. Solar and Terrestrial Radiation
- 1.3.2. Absorption, Emission and Reflection of Radiation
- 1.3.3. Earth-Atmosphere Radiative Exchanges
- 1.3.4. Greenhouse Effect
- 1.3.5. Radiative Balance at the Top of the Atmosphere
- 1.3.6. Radiative Forcing of the Climate
  - 1.3.6.1. Natural and Anthropogenic Climate Forcing
  - 1.3.6.2. Climate Sensitivity

1.4. Thermodynamics of the Atmosphere
- 1.4.1. Adiabatic Processes: Potential Temperature
- 1.4.2. Stability and Instability of Dry Air
- 1.4.3. Saturation and Condensation of Water Vapor in the Atmosphere
- 1.4.4. Rise of Moist Air: Saturated and Pseudoadiabatic Adiabatic Evolution
- 1.4.5. Condensation Levels
- 1.4.6. Stability and Instability of Humid Air

1.5. Cloud Physics and Precipitation
- 1.5.1. General Cloud Formation Processes
- 1.5.2. Cloud Morphology and Classification
- 1.5.3. Cloud Microphysics: Condensation Nuclei and Ice Nuclei
- 1.5.4. Precipitation Processes: Rain, Snow and Hail Formation
- 1.5.5. Artificial Modification of Clouds and Precipitation

1.6. Atmospheric Dynamics
- 1.6.1. Inertial and Non-Inertial Forces
- 1.6.2. Coriolis Force
- 1.6.3. Equation of Motion
- 1.6.4. Horizontal Pressure Field
- 1.6.5. Pressure Reduction at Sea Level
- 1.6.6. Horizontal Pressure Gradient
- 1.6.7. Pressure-Density
- 1.6.8. Isohipsas
- 1.6.9. Equation of Motion in the Intrinsic Coordinate System
- 1.6.10. Horizontal Frictionless Flow. Geostrophic Wind. Gradient Wind
- 1.6.11. Friction Effect
- 1.6.12. Wind at Height
- 1.6.13. Local and Small-Scale Wind Regimes
- 1.6.14. Pressure and Wind Measurements

1.7. Synoptic Meteorology
- 1.7.1. Baric Systems
- 1.7.2. Anticyclones
- 1.7.3. Air Masses
- 1.7.4. Frontal Surfaces
- 1.7.5. Warm Fronts
- 1.7.6. Cold Front
- 1.7.7. Frontal Depressions. Occlusion Occluded Front



1.8. General Circulation
- 1.8.1. General Characteristics of the General Circulation
- 1.8.2. Surface and Overhead Observations
- 1.8.3. Single-Cell Model
- 1.8.4. Tricellular Model
- 1.8.5. Jet Streams
- 1.8.6. Ocean Currents
- 1.8.7. Ekman Transport
- 1.8.8. Global Distribution of Precipitation
- 1.8.9. Teleconnections. El Niño-Southern Oscillation. The North Atlantic Oscillation

1.9. Climate System
- 1.1.1. Climate Classifications
- 1.1.2. Köppen Classification
- 1.1.3. Components of the Climate System
- 1.1.4. Coupling Mechanisms
- 1.1.5. Hydrological Cycle
- 1.1.6. Carbon Cycle
- 1.1.7. Response Times
- 1.1.8. Feedback
- 1.1.9. Climate Models

1.10. Climate Change
- 1.10.1. Concept of Climate Change
- 1.10.2. Data Collection. Paleoclimatic Techniques
- 1.10.3. Evidence of Climate Change. Paleoclimate
- 1.10.4. Current Global Warming
- 1.10.5. Energy Balance Model
- 1.10.6. Radiative Forcing
- 1.10.7. Causal Mechanisms of Climate Change
- 1.10.8. General Circulation Models and Projections

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 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.

Relearning Methodology

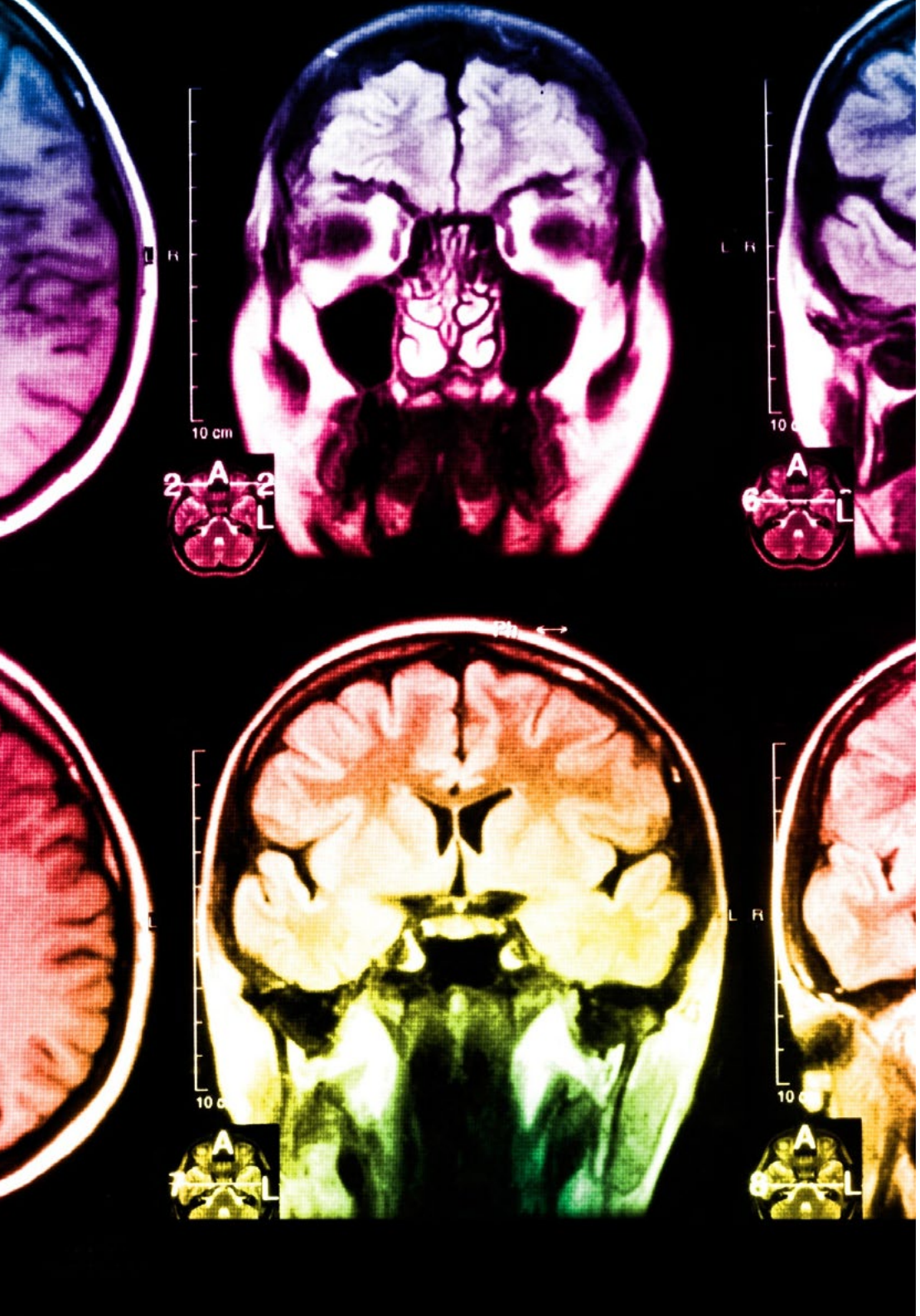
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.



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.

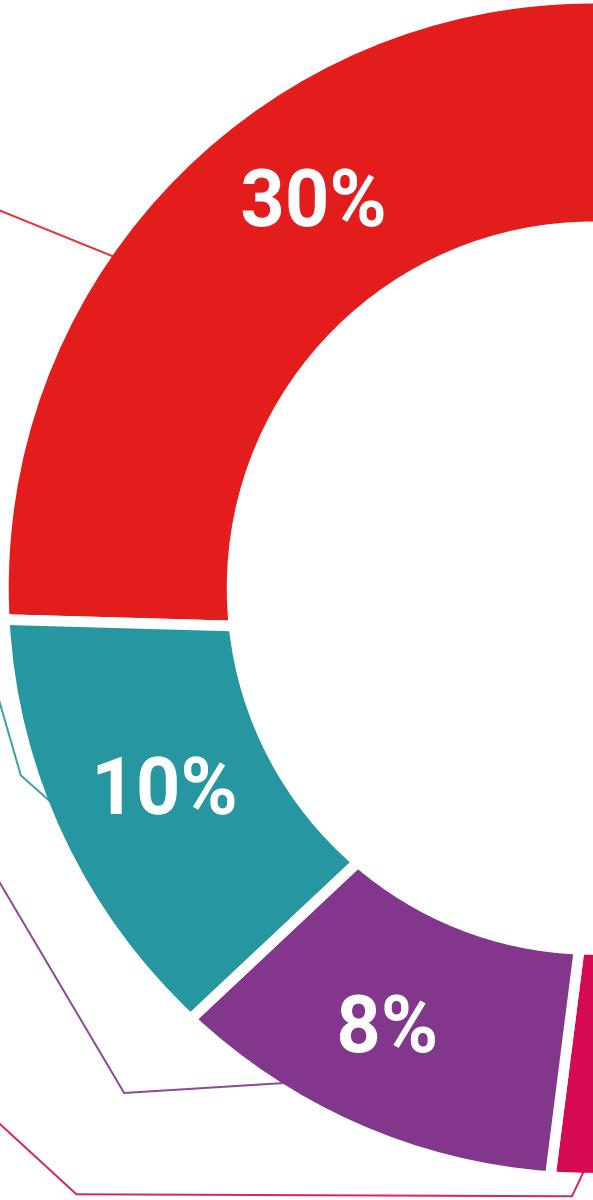
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

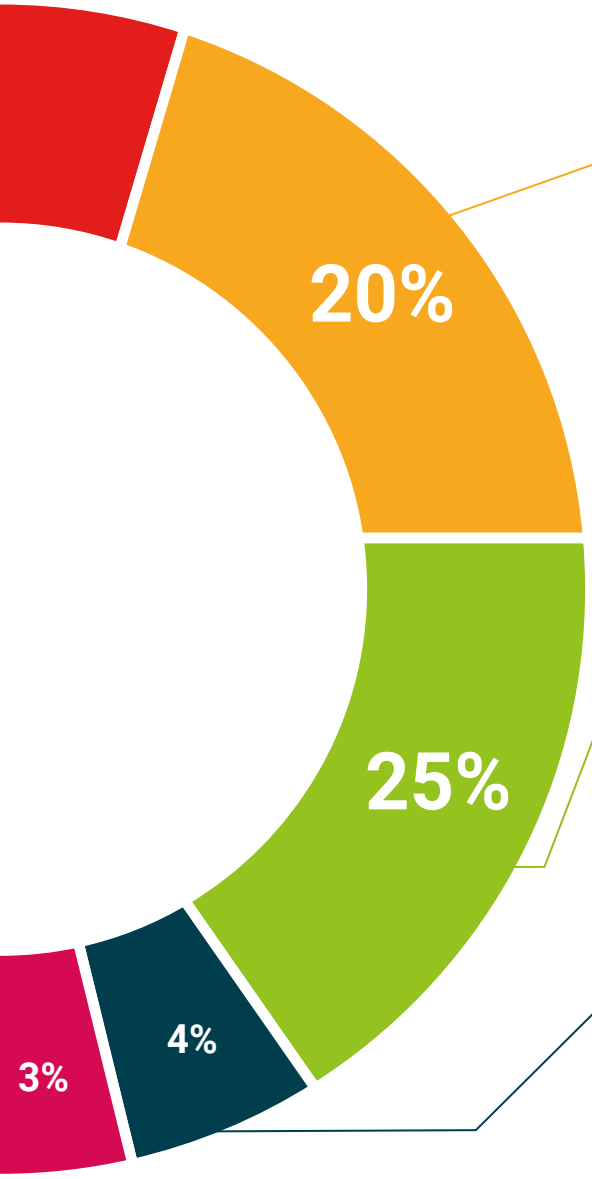
Practising Skills and Abilities

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 Meteorological and Climatic Physics 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 Meteorological and Climate Physics** 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 Meteorological and Climate Physics**

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

Meteorological and Climate Physics

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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Postgraduate Certificate

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