Postgraduate Certificate

Brain Electrogenesis. Recording and Analysis Techniques. Electroencephalogram Development

tech global university

tech global university

Postgraduate Certificate

Brain Electrogenesis. Recording and Analysis Techniques. Electroencephalogram Development

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

Website: www.techtitute.com/us/medicine/postgraduate-certificate/brain-electrogenesis-recording-analysis-techniques-electroencephalogram-development

Index

01 Introduction p. 4

02 Objectives p. 8

03 Course Management p. 12

04 Structure and Content p. 16

05 Methodology p. 22

06 Certificate p. 30

01

Introduction

Electroencephalograms represent one of the most common medical tools to detect pathologies related to neurophysiology, mainly epilepsies, so their use is widespread and extensive. Despite the relevance of this method, few professionals have a full and real understanding of all the fields it covers. For this reason, TECH has prepared a very complete program in which the student will study the standard protocols for performing EGG, as well as the most common records and specific procedures in adults and infants. As a result, the student will excel in the use of electroencephalograms, which will give a unique value to their daily work, allowing them to access more prestigious medical positions.

Master electroencephalograms and prove that you are a physician capable of meeting even greater healthcare challenges"

A medical professional who aspires to major professional improvements should look for a demanded and current specialization, with which to stand out from his or her colleagues. Clinical neurophysiology, and more specifically electroencephalograms, are often overlooked when looking for a particular specialty given their common use for the diagnosis of various pathologies.

But this is precisely its strong and attractive point for the medical professional who wants to stand out, because having a full understanding of the most intrinsic and detailed aspects of encephalograms, they will quickly become an essential part of the healthcare organization chart in which they find themselves.

This TECH Postgraduate Certificate brings together, therefore, an extensive and complete syllabus ranging from standard protocols and maneuvers for performing EGG to slow and epileptiform anomalies that the professional may encounter. It also focuses on quantified EGG, a current method that requires state-of-the-art software to see the dynamic changes that occur during cognitive processing tasks, giving the clinician the ability to identify which areas of the brain may be compromised and which are functioning properly.

A completely online program that adapts to the needs of its students, giving them the possibility of taking it completely at their own pace and specific needs. The student has access to all the didactic material from the first day of the Postgraduate Certificate, being able to download it to any device with internet access.

This **Postgraduate Certificate in Brain Electrogenesis. Recording and Analysis Techniques. Electroencephalogram Development** contains the most complete and up to date educational program on the market. The most important features include:

- The development of case studies presented by medical experts in neurophysiology and electroencephalograms
- The graphic, schematic, and eminently 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

You will be prepared to know how to recognize any abnormalities in the EEGs you perform, which will make you vital to your healthcare team"

Your own staff will benefit from having you as a reference when performing EGG on all kinds of patients"

You have in your hands the possibility of specializing in a unique and distinctive field in the healthcare field. Don't miss it and enroll now.

By adding this Postgraduate Certificate to your resume, you will have more chances to move up the career ladder and gain access to more prestigious healthcare positions.

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.

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 training programmed to train in real situations.

The design of this Program focuses on Problem-Based Learning, by means of which the professional will have to try to solve the different situations of Professional Practice, which will be posed throughout the Program. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.

02

Objectives

The objective of this TECH course is to provide its students with the necessary knowledge to excel in the healthcare field and climb the ladder to positions of greater responsibility and financial remuneration. Therefore, the program emphasizes the importance of EGG as a neurophysiological diagnostic method for patients of all ages, giving the physician the ability to interpret EGG results more efficiently and effectively.

Enroll today in this Postgraduate Certificate and start now to improve your knowledge in electroencephalograms that will take you to the top of your career".

General Objectives

- Obtain a global and updated vision of Neurophysiologic diagnosis in its different training areas, allowing the student to acquire useful and updated knowledge, homogenize criteria following national and international standards.
- Generate in students the desire to broaden their knowledge and apply what they have learned to daily practice, to the development of new diagnostic indications and to research.

Your knowledge of Electroencephalograms will earn you a more privileged position within your work team"

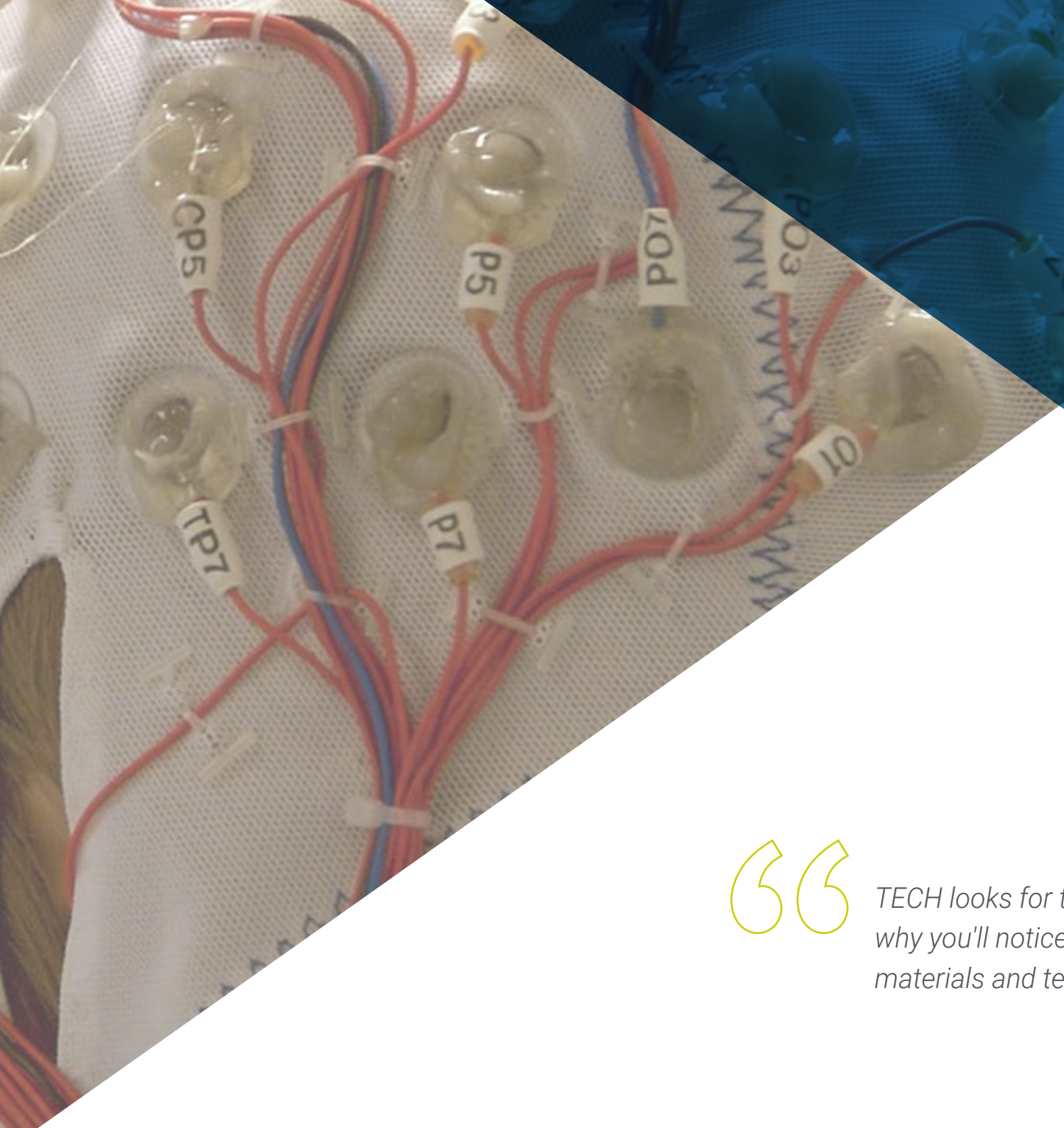
Specific Objectives

- Acquire knowledge of the biophysical, analytical and technical fundamentals as a pillar for learning the genesis of the graphoelements that we will find in an EEG recording
- Deepen in the development and chronobiology of the electroencephalogram
- Identification of physiological and pathological EEG patterns and their correlation with age, level of wakefulness/sleep, consciousness, pharmacological interference and clinical significance
- Locate anomalies, spatio-temporal value, limitations and advantages of the technique
- Identify normal artifacts and patterns that may mimic pathological graphoelements
- Learning from quantified EEG methodology and application

03

Course Management

The teachers in charge of this educational program have been chosen by TECH for their extensive professional merits and experience leading the electroencephalography area of their hospital. In this way, the student not only acquires the most relevant competencies in this field, but also management and organizational skills that will be of great use when applying for higher positions in the health care organization.



TECH looks for the best for you. That's why you'll notice the quality of the teaching materials and teaching staff immediately"

Management

Dr. Martínez Pérez, Francisco

- Clinical Neurophysiology Service. Puerto de Hierro University Hospital, Majadahonda
- Advanced Neurophysiologic studies at Clínica MIP Health-Integrated Personalized Integrated Medicine
- Neurophysiology Techniques applied at the Vitruvian Institute of Biomechanics and Surgery.
- Medical Specialist in Clinical Neurophysiology
- Degree in Medicine and Surgery from the Complutense University of Madrid
- Master's Degree in Sleep: Physiology and Pathology, Pablo Olavide University.
- Master's Degree in Neurological Electrodiagnosis from the University of Barcelona.
- Researcher, University lecturer, professor of the Master's Degree in Sleep Medicine.
- Author of several guidelines and consensuses for different medical societies (SENFC, SES, AEP) and the National Commission of the Specialty.
- XXI Century National Prize in Medicine
- European Award in Medicine

Professor

Dr. Balugo Bengoechea, Paloma

- Head of the Electroencephalography and Evoked Potentials areas of the Clinical Neurophysiology Service of Hospital Clinico San Carlos, Madrid.
- Coordinator of the Patient Safety Process of the HCSC Neurosciences Institute.
- Medical Specialist in Clinical Neurophysiology at the Hospital Clinico San Carlos of Madrid
- Master's Degree in Epilepsy
- Master's Degree in Sleep: Physiology and Medicine
- Diploma of Advanced Studies in Neuroscience
- Member of the neurological diseases research group of the Neuroscience Area of the Health Research Institute of the Hospital Clínico San Carlos (IdISSC).

The leading professionals in the field have come together to offer you the most comprehensive knowledge in this field, so that you can develop with total guarantees of success"

04

Structure and Content

The structure and contents of this TECH program aim to provide the student with the knowledge related to electroencephalography in the most efficient and practical way for them. In this way, the Postgraduate Certificate is supported by high quality audiovisual material, as well as real case studies where the student sees in contextual form the theory taught by the teachers.

Thanks to the audiovisual support and the real case studies, you will improve in a very short time all your health competences in electroencephalography"

Module 1. Brain Electrogenesis. Recording and Analysis Techniques. Electroencephalogram Development

1.1. Biophysical Fundamentals of EEG Recording
- 1.1.1. Context
- 1.1.2. Brief Mathematical Reminder
  - 1.1.2.1. Vector Analysis
  - 1.1.2.2. Determinants and Matrices
- 1.1.3. Brief Introduction to Electromagnetism
  - 1.1.3.1. Field and Potential Concepts
  - 1.1.3.2. Maxwell's Equations
- 1.1.4. Brain Electrical Fields

1.2. Technical and Analytical Fundamentals of EEG
- 1.2.1. Context
- 1.2.2. Analog-to-digital Conversion (ADC)
- 1.2.3. Filters
- 1.2.4. Digital Signal Analysis
  - 1.2.4.1. Spectral Analysis
  - 1.2.4.2. Analysis of Wavelets
- 1.2.5. Determination of the Interaction between Two Signals

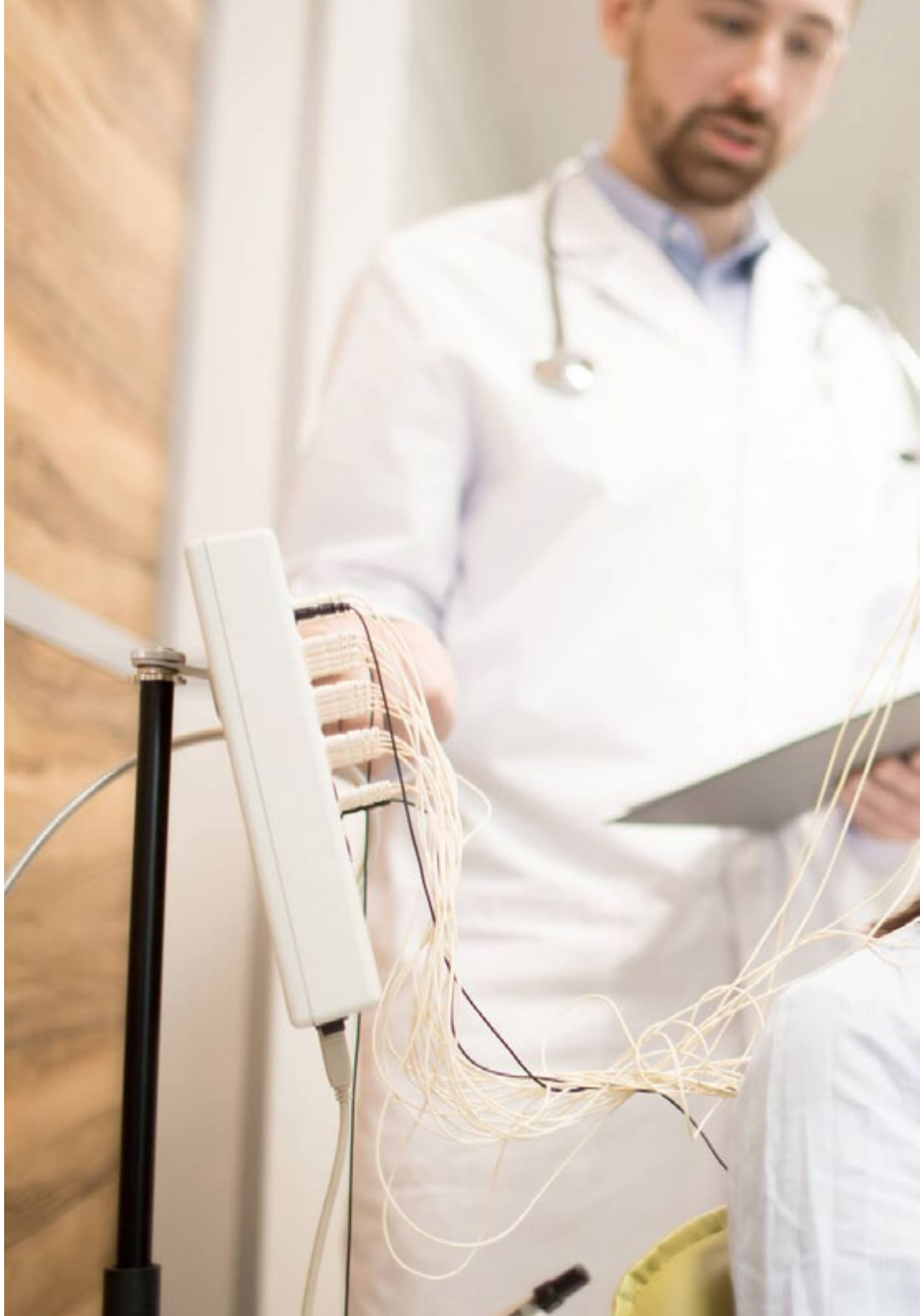
1.3. Protocols and Standards for EEG and Video-EEG, Activation Maneuvers. Artifact Detection
- 1.3.1. EEG and Video-EEG
  - 1.3.1.1. Registration Conditions
  - 1.3.1.2. Electrodes
  - 1.3.1.3. By-passes and Assemblies
  - 1.3.1.4. Records
- 1.3.2. Vídeo-EEG
  - 1.3.2.1. Technical Aspects
  - 1.3.2.2. Indications
- 1.3.3. Routine Stimulation Maneuvers
  - 1.3.3.1. Ocular Opening and Closing
  - 1.3.3.2. Pulmonary Hyperventilation
  - 1.3.3.3. Intermittent Light Stimulation
- 1.3.4. Other Non-standard Methods of Activation
  - 1.3.4.1. Other Visual Activation Procedures
  - 1.3.4.2. Activation through Sleep
  - 1.3.4.3. Other Activation Methods
- 1.3.5. Introduction and Importance of Artifacts
  - 1.3.5.1. General Principles of Detection
  - 1.3.5.2. Most Common Artifacts
  - 1.3.5.3. Artifact Removal
- 1.3.6. Key Concepts

1.4. Normal Adult EEG
- 1.4.1. Normal EEG in Wakefulness
  - 1.4.1.1. Alpha Rhythm
  - 1.4.1.2. Beta Rhythm
  - 1.4.1.3. Mu Rhythm
  - 1.4.1.4. Lambda Waves
  - 1.4.1.5. Low-voltage Tracing
  - 1.4.1.6. Theta Activity
- 1.4.2. Normal EEG in Sleep
  - 1.4.2.1. NREM Sleep
  - 1.4.2.2. REM Sleep
- 1.4.3. Variants of Normality/Patterns of Uncertain Significance

1.5. Child EEG, Development and Maturation (I)

1.5.1. Technical Considerations
1.5.2. Age-dependent EEG Characteristics
1.5.2.1. Continuity
1.5.2.2. Bilateral Hemispheric Synchrony
1.5.2.3. Voltage
1.5.2.4. Variability
1.5.2.5. Reactivity
1.5.2.6. Age-dependent Waves
1.5.2.6.1. Beta-Delta Complex
1.5.2.6.2. Temporary Theta and Alpha Wave Bursts
1.5.2.6.3. Acute Frontal Waves
1.5.3. EEG in Wakefulness and Sleep
1.5.3.1. Wakefulness
1.5.3.2. NREM Sleep
1.5.3.3. REM Sleep
1.5.3.4. Indeterminate and Transitional Sleep
1.5.3.5. Reactivity to Stimuli
1.5.4. Special patterns/Variants of Normality
1.5.4.1. Bifrontal Delta Activity
1.5.4.2. Temporary Sharp Waves
1.5.5. Key Concepts
1.6. Child EEG, Development and Maturation (II). Physiological EEG from Infant to Adolescent
1.6.1. Technical Considerations
1.6.2. EEG in Infants from 2 to 12 Months of Age
1.6.3. EEG in Early Childhood 12 to 36 months
1.6.4. EEG in Preschool Age, from 3 to 5 years old.
1.6.5. EEG in Older Children, 6 to 12
1.6.6. EEG in Adolescents, 13 to 20 Years old
1.6.7. Key Concepts
1.7. Slow Anomalies, Description and Significance
1.7.1. Focal Slow Anomalies
1.7.1.1. Summary
1.7.1.2. Pattern Description
1.7.1.3. Clinical Significance of Slow Focal Waves
1.7.1.4. Disorders Causing Slow Focal Waves
1.7.2. Asynchronous Generalized Slow Anomalies
1.7.2.1. Summary
1.7.2.2. Pattern Description
1.7.2.3. Clinical Significance of Generalized Asynchronous Waves
1.7.2.4. Disorders Causing Generalized Asynchronous Waves
1.7.3. Synchronous Generalized Slow Waves
1.7.3.1. Summary
1.7.3.2. Pattern Description
1.7.3.3. Clinical Significance of Generalized Asynchronous Waves
1.7.3.4. Disorders Causing Generalized Asynchronous Waves
1.7.4. Conclusions
1.8. Focal and Generalized Intercritical Epileptiform Anomalies
1.8.1. General Considerations
1.8.2. Identification Criteria
1.8.3. Location Criteria
1.8.4. Intercritical Epileptiform Anomalies and Their Interpretation
1.8.4.1. Spikes and Sharp Waves
1.8.4.2. Benign Focal Epileptiform Discharges
1.8.4.3. Wave-Point
1.8.4.3.1. Slow Wave-Point
1.8.4.3.2. Wave-Point at 3 Hz
1.8.4.3.3. Polypoint or Wave Polypoint
1.8.4.4. Hypsarrhythmia
1.8.4.5. Focal Intercritical Anomalies in Generalized Epilepsies
1.8.5. Summary/key points
1.9. Ictal EEG. Types of Seizures and Electroclinical Correlates

1.9.1. Generalized Onset Seizures
1.9.1.1. Motor start
1.9.1.2. Non-motor Start
1.9.2. Focal Onset Seizures
1.9.2.1. State of Consciousness
1.9.2.2. Motor/non-motor Start
1.9.2.3. Focal with Progression to Bilateral Tonic-Clonic
1.9.2.4. Hemispheric Lateralization
1.9.2.5. Lobar Location
1.9.3. Crisis of Unknown Onset
1.9.3.1. Motor/non-motor
1.9.3.2. Unclassified
1.9.4. Key Concepts
1.10. Quantified EEG
1.10.1. Historical Utilization of Quantified EEG in Clinical Practice
1.10.2. Application of Quantified EEG Methods
1.10.2.1. Types of Quantified EEG
1.10.2.1.1. Power Spectrum
1.10.2.1.2. Synchronization Measures
1.10.3. Quantified EEG in Current Clinical Practice
1.10.3.1. Classification of Encephalopathies
1.10.3.2. Seizure Detection
1.10.3.3. Advantages of Continuous EEG Monitoring
1.10.4. Key Concepts



Take the leap now and don't wait any longer to join an educational family of winners, chosen by the best healthcare professionals to succeed in their careers"

05

Methodology

This training program provides you with a different way of learning. Our methodology uses a cyclical learning approach: ***Re-learning***.

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 Re-learning, 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"

At TECH we use the Case Method

What should a professional do in a given situation? Throughout the program, students will face multiple simulated clinical cases, based on real patients, in which they will have to do research, establish hypotheses, and ultimately resolve the situation. There is an adundance of scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

With TECH you will experience a way of learning that is shaking the foundations of traditional universities around the world.

According to Dr. Gérvas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that the case is based on current professional life, trying to recreate the real conditions in the physician's professional practice.

Did you know that this method was developed in 1912, at Harvard, for law students? The case method consisted of presenting students with real-life, complex situations for them to make decisions and justify their decisions on how to solve them. In 1924, Harvard adopted it as a standard teaching method"

The effectiveness of the method is justified by four fundamental achievements:

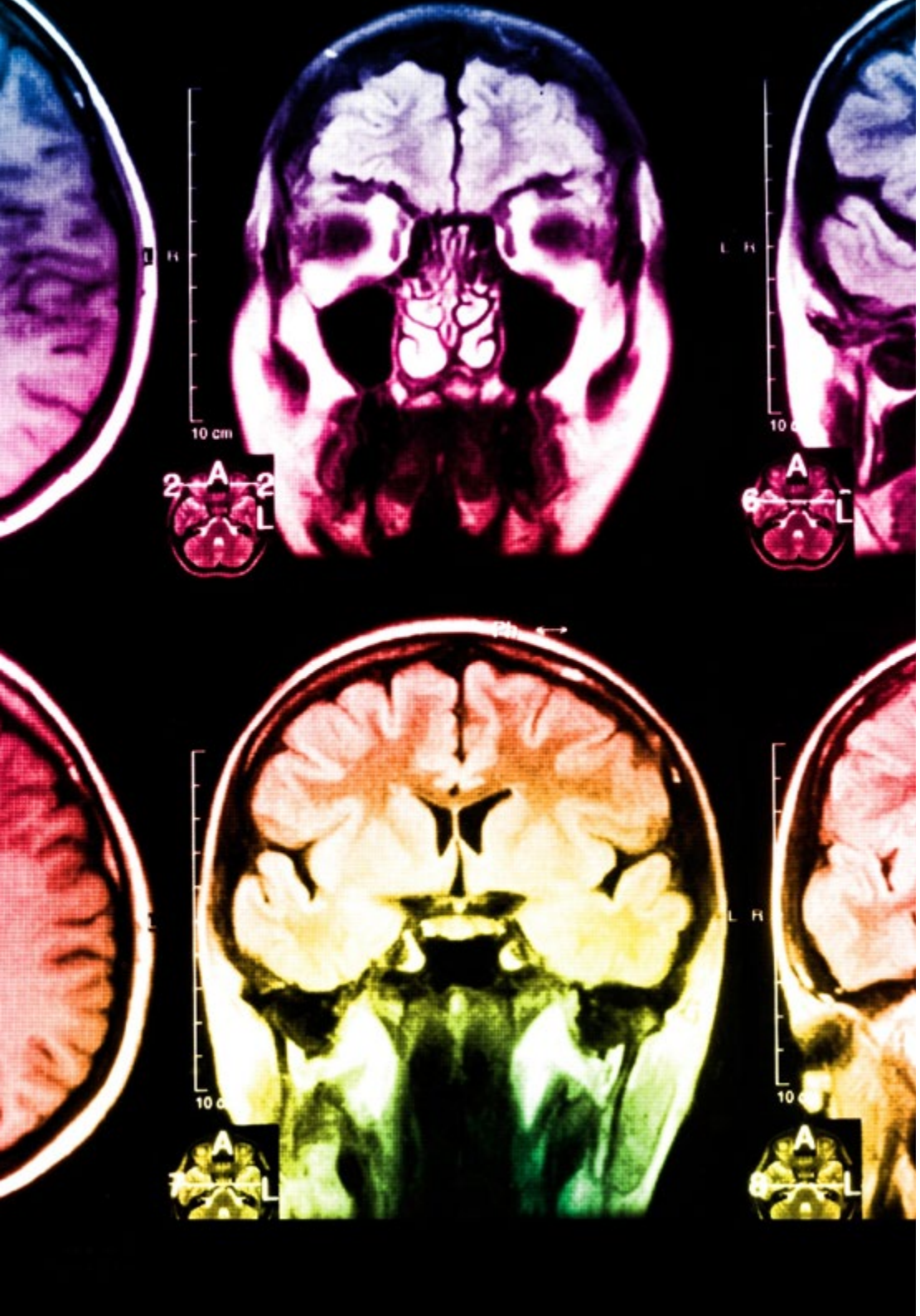
1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.

Re-learning Methodology

At TECH we enhance the Harvard case method with the best 100% online teaching methodology available: Re-learning.

This university is the first in the world to combine the study of clinical cases with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, a real revolution with respect to the mere study and analysis of cases.

Professionals will learn through real cases and by resolving complex situations in simulated learning environments. These simulations are developed using state-of-the-art software to facilitate immersive learning.



At the forefront of world teaching, the Re-learning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best Spanish-speaking online university (Columbia University).

With this methodology, more than 250,000 physicians have been trained with unprecedented success in all clinical specialties regardless of surgical load. Our pedagogical methodology is developed in a highly competitive environment, with a university student body with a high socioeconomic profile and an average age of 43.5 years old.

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

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.

The overall score obtained by TECH's learning system is 8.01, according to the highest international standards.

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.

Surgical Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current medical techniques. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.

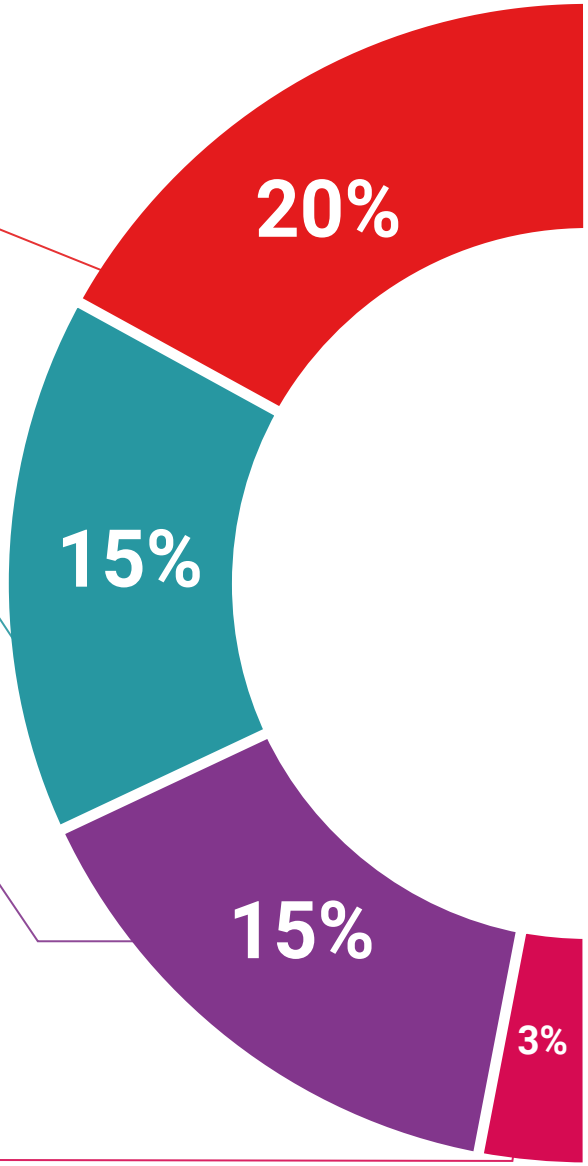
Interactive Summaries

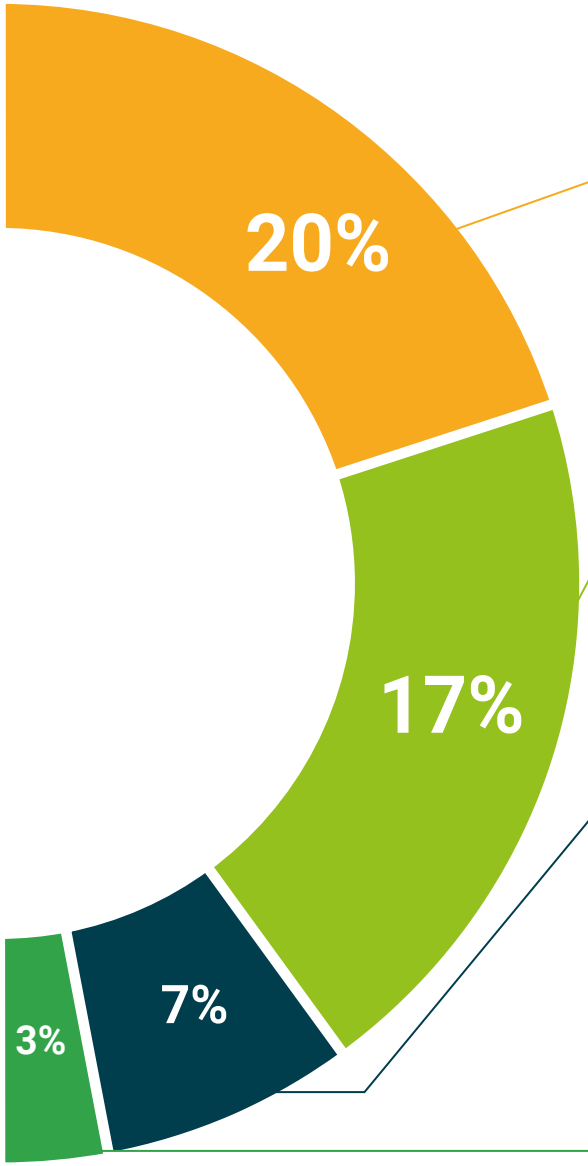
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive multimedia content presentation training Exclusive system was awarded by Microsoft as a "European Success Story".

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.





Expert-led case studies and case analysis

Effective learning ought to be contextual. Therefore, TECH presents real cases in which the expert will guide students, focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.

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 your goals.

Classes

There is scientific evidence on the usefulness of learning by observing experts: The system termed Learning from an Expert strengthens knowledge and recall capacity, and generates confidence in the face of difficult decisions in the future.

Quick Action Guides

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical, and effective way to help students progress in their learning.

06

Certificate

El Postgraduate Certificate en Brain Electrogenesis. Recording and Analysis Techniques. Electroencephalogram Development guarantees, in addition to the most rigorous and up to date training, access to a Postgraduate Certificate issued by TECH Global University.

Successfully complete this training program and receive your certificate without travel or laborious paperwork"

This program will allow you to obtain your **Postgraduate Certificate in Brain Electrogenesis. Recording and Analysis Techniques. Electroencephalogram Development** 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.

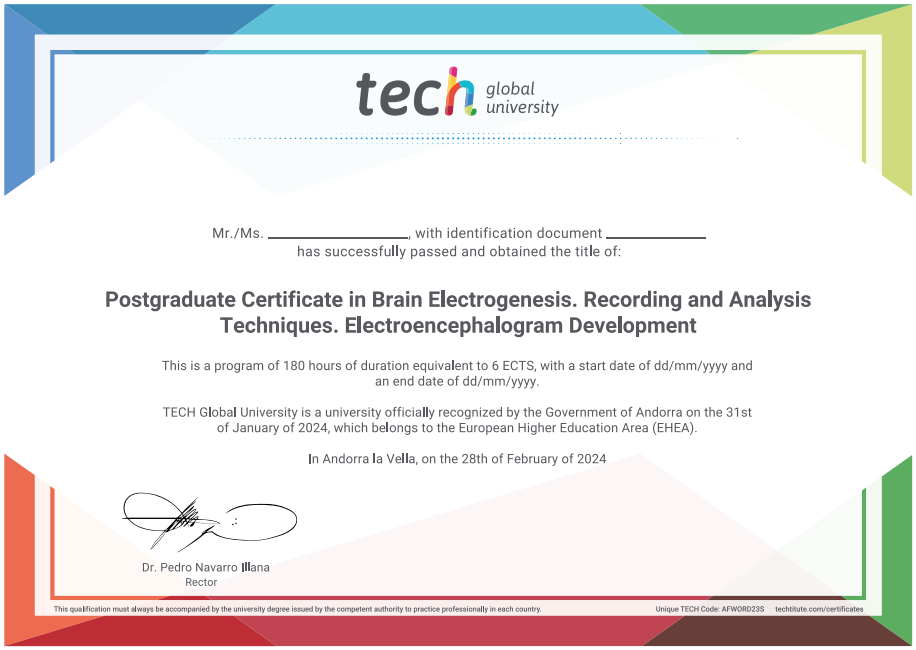
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Brain Electrogenesis. Recording and Analysis Techniques. Electroencephalogram Development**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**


tech global university

Mr./Ms. _____, with identification document _____
has successfully passed and obtained the title of:

Postgraduate Certificate in Brain Electrogenesis. Recording and Analysis Techniques. Electroencephalogram Development

This is a program of 180 hours of duration equivalent to 6 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024

Dr. Pedro Navarro Illana
Rector

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 diploma issued with an apostille, TECH Global University will make the necessary arrangements to obtain it, at an additional cost.

tech global university

Postgraduate Certificate

Brain Electrogenesis. Recording and Analysis Techniques. Electroencephalogram Development

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

Postgraduate Certificate

Brain Electrogenesis. Recording and Analysis Techniques. Electroencephalogram Development

tech global university