

# Postgraduate Certificate

Electroencephalogram (EEG) in Specific  
Pathology in Adult and Neurocritical  
Patients





## Postgraduate Certificate Electroencephalogram (EEG) in Specific Pathology in Adult and Neurocritical Patients

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

Website: [www.techtute.com/in/medicine/postgraduate-certificate/electroencephalogram-eeeg-specific-pathology-adult-neurocritical-patients](http://www.techtute.com/in/medicine/postgraduate-certificate/electroencephalogram-eeeg-specific-pathology-adult-neurocritical-patients)

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# 01

# Introduction

Knowing how to interpret an electroencephalogram is no small task. There are a multitude of neurophysiological disorders and syndromes that must be known by the professional to ensure an accurate diagnosis, as well as to grasp the differences between the different types of epilepsies and conditions in order to address them in a much more effective way. This knowledge is valuable for any healthcare professional seeking to grow in their work, so TECH has developed a complete program in pathological electroencephalogram with which the practitioner can obtain the necessary skills to be a reference in the field of clinical neurophysiology.







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*You will know how to interpret any kind of EEG, pinpointing anomalies with certainty and becoming a much higher professional in the process”*

As neurophysiological conditions, such as epilepsy, are so common in a large part of the population, the correct reading of electroencephalograms is vital to diagnose and treat them successfully. This task falls to those medical professionals who have the most training in this area, so it is an efficient growth path for all kinds of professionals seeking to obtain a salary and job improvement.

This TECH program places special emphasis on the different types of epilepsy and syndromes that can be diagnosed through an encephalogram, distinguishing between age ranges from neonates to the elderly. This in-depth knowledge of these conditions, coupled with the monitoring of an EGG in ICU and surgery, means that the professional is in demand in the most urgent and important clinical settings.

The didactic material also covers the specific nomenclature used in the ICU and other healthcare environments, so that the student can also improve his or her own communication with colleagues in different hospital areas. This makes teaching transversal and unique, allowing the graduate to be in the most complex neurophysiological clinical cases.

This Postgraduate Certificate is also offered in an online format that allows students to combine the course load with their professional and personal responsibilities. It is, therefore, a unique educational offer in which it is the student who decides when, where and how to study and not the other way around.

This **Postgraduate Certificate in Electroencephalogram (EEG) in Specific Pathology in Adult and Neurocritical Patients** contains the most complete and up-to-date educational program on the market. The most important features include:

- ◆ Case studies presented by medical experts in neurophysiology and electroencephalogram.
- ◆ The graphic, schematic, and highly practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice.
- ◆ Practical exercises where the self-assessment process can be carried out 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



*Effectively diagnosing any neurophysiological pathology will make you prevail in the healthcare field as a reference professional"*



*If you think your healthcare career needs a boost towards clinical neurophysiology, this program gives you the most up to date diagnostic keys"*

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.

*Enroll today in this Postgraduate Certificate and don't miss the opportunity to learn the most advanced neurophysiological diagnostic techniques.*

*Being an essential part of any medical team, your chances of professional growth will increase significantly.*



# 02 Objectives

The objective of this program is that students know how to diagnose and correctly address the various pathologies detectable in an electroencephalogram. This includes all types of epilepsies, as well as syndromes and disorders of various types, which will make the graduate a decisive pillar in dealing with highly complex neurophysiological clinical cases. This will mean for the physician a professional improvement and a guaranteed career advancement to more relevant medical fields.







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*You will be able to address any kind of neurophysiological anomaly, which will give you the privilege of accessing the most complex clinical cases in the field"*



## General Objectives

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- ◆ Obtain a global and updated vision of Neurophysiological 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.







## Specific Objectives

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- ◆ Diagnostic training of electroclinical syndromes of all stages of life (specific patterns)
- ◆ Consolidation of knowledge on electroencephalography applied to epilepsies, from the diagnostic phase to pharmacological, neuromodulatory and/or surgical therapeutic management
- ◆ Update on national and international guidelines and protocols for electroencephalogram in ICU and status epilepticus. Pattern identification and decision making
- ◆ Deepen understanding of the methodology and application of high-density EEG and generator localization



*TECH will make that prosperous healthcare future you can only dream of now a reality"*

03

# Course Management

TECH has taken great care to find the best professionals in the clinical neurophysiological area to develop all the content available in this Postgraduate Certificate. Thanks to the high professional and personal quality of the teachers, the student will feel welcomed in an educational team whose only objective is to see them grow within the health panorama, offering them all their help and the most advanced knowledge in pathological electroencephalograms.







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*The personalized attention you will receive in this Postgraduate Certificate will make a major difference in your path to the highest level of healthcare"*

## Management



### Dr. Martínez Pérez, Francisco

- ♦ Clinical Neurophysiology Service. Puerto de Hierro University Hospital, Majadahonda
- ♦ Advanced neurophysiological studies at the MIP Salud Clinic - 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 (SENEFC, 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 the Neurophysiology Department of the Hospital Clínico San Carlos de Madrid.
- ◆ Coordinator of the Patient Safety Process of the Neurosciences Institute of the HCSC
- ◆ Specialist in Clinical Neurophysiology at the Hospital Clínico San Carlos de 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 Area of Neuroscience of the Health Research Institute of the Hospital Clínico San Carlos 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

TECH uses the most advanced educational methodology in the market to develop all the content of this program, structured in a dynamic and precise way for the student. Thanks to this effort, the student obtains the skills and knowledge imparted in the most efficient way possible, making the program the most cost-effective at the professional level. The audiovisual support of a large part of the theory presented greatly reduces the teaching load, motivating a lighter and more attractive study for the student.







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*Get your Postgraduate Certificate in Electroencephalogram (EEG) in Specific Pathology in Adult and Neurocritical Patients directly, without a final paper”*

**Module 1. Electroencephalogram (EEG) in Electroclinical Syndromes and in the Neurocritical Patient. Precision Neurophysiological Techniques in the Diagnosis and Treatment of Epilepsy.**

- 1.1. Electroclinical Syndromes of the Neonate and Infant
  - 1.1.1. Neonatal Period
    - 1.1.1.1. Ohtahara Syndrome
    - 1.1.1.2. Early Myoclonic Encephalopathy
    - 1.1.1.3. Self-limited Neonatal Seizures. Self-limited Familial Neonatal Epilepsy
    - 1.1.1.4. Neonatal-onset Structural Focal Epilepsy
  - 1.1.2. Infant Period
    - 1.1.2.1. West Syndrome
    - 1.1.2.2. Dravet Syndrome
    - 1.1.2.3. Febrile Plus Seizures and Genetic Epilepsy with Febrile Plus Seizures
    - 1.1.2.4. Myoclonic Epilepsy of the Infant
    - 1.1.2.5. Familial and Non-familial Self-limited Infant Epilepsy
    - 1.1.2.6. Epilepsy of the Infant with Migrating Focal Seizures
    - 1.1.2.7. Myoclonic Status in Non-Progressive Encephalopathies
    - 1.1.2.8. Epilepsy in Chromosomal Disorders
- 1.2. Electroclinical Syndromes in Children
  - 1.2.1. Role of EEG and Video-EEG in the Diagnosis and Classification of Epileptic Syndromes with Onset between 3 and 12 Years of Age
    - 1.2.1.1. Background and Current Clinical Practice
    - 1.2.1.2. Methodological Design and Recording Protocols
    - 1.2.1.3. Interpretation, Diagnostic Value of Findings, Report
    - 1.2.1.4. Integration of EEG into Syndrome-Etiology Taxonomy
  - 1.2.2. Genetic Generalized Epilepsies (idiopathic, IGE)
    - 1.2.2.1. Typical EEG Features of EGI and Methodological Principles
    - 1.2.2.2. Epilepsy with Infantile Absence
    - 1.2.2.3. Epilepsy with Juvenile Absence
    - 1.2.2.4. Other EGI Phenotypes (3-12 years)
    - 1.2.2.5. Epilepsies with Reflex Seizures
  - 1.2.3. Genetic Focal Epilepsies (Idiopathic, EFI)
    - 1.2.3.1. Typical EEG Features of EFI and Methodological Principles
    - 1.2.3.2. Focal Idiopathic Focal Epilepsy with Centrotemporal Spikes
    - 1.2.3.3. Panayiotopoulos Syndrome
    - 1.2.3.4. Other EFI Phenotypes (3-12 years)
  - 1.2.4. Non-idiopathic Focal Epilepsies (FE). Lobar Syndromes
    - 1.2.4.1. Typical EEG Features of EF and Methodological Principles
    - 1.2.4.2. Frontal Lobe Epilepsy
    - 1.2.4.3. Temporal Lobe Epilepsy
    - 1.2.4.4. Epilepsy of the Posterior Cortex
    - 1.2.4.5. Other Locations (insula, cingulum, hemispheric lesions)
  - 1.2.5. Epileptic Encephalopathies (EE) and Related Syndromes (3-12 years)
    - 1.2.5.1. Typical EEG Features of EE and Methodological Principles
    - 1.2.5.2. Lennox-Gastaut Syndrome
    - 1.2.5.3. Encephalopathy with Electrical Sleep Electrical Status Sickness (ESES) and Landau-Kleffner Syndrome.
    - 1.2.5.4. Epilepsy with Myoclonus-atonic Seizures (Doose Syndrome)
    - 1.2.5.5. Epilepsy with Myoclonic Absence
- 1.3. Adolescent and Adult Electroclinical Syndromes
  - 1.3.1. Role of EEG in the Diagnosis of Epileptic Syndromes in Adolescents and Adults
  - 1.3.2. Genetic Generalized Epilepsy in Adolescents and Adults
    - 1.3.2.1. Juvenile Myoclonic Epilepsy
    - 1.3.2.2. Juvenile Absence Epilepsy
    - 1.3.2.3. Epilepsy with Generalized Tonic-Clonic Seizures
    - 1.3.2.4. Other Phenotypes of EGI in Adolescents and Adults
  - 1.3.3. Non-idiopathic Focal Epilepsy in Adolescents and Adults. Lobar Syndromes
    - 1.3.3.1. Frontal Lobe
    - 1.3.3.2. Temporal Lobe
    - 1.3.3.3. Other Locations
  - 1.3.4. Other Non-Age-Dependent Epileptic Syndromes
  - 1.3.5. Epilepsy in the Elderly

- 1.4. EEG Nomenclature in ICU
  - 1.4.1. Minimum Requirements for Reporting in the Neurocritically Ill Patient
  - 1.4.2. Background Tracing
  - 1.4.3. Epileptiform Discharges of Sporadic Occurrence
  - 1.4.4. Rhythmic and/or Periodic Patterns
  - 1.4.5. Electrical and Electro-clinical Crises
  - 1.4.6. Short-term Rhythmic Discharges (BIRDs)
  - 1.4.7. Ictal-interictal Pattern (*ictal-interictal continuum*)
  - 1.4.8. Other Terminology
- 1.5. EEG in Altered Level of Consciousness, Coma and Brain Death
  - 1.5.1. EEG Findings in Encephalopathy
  - 1.5.2. EEG Findings in Coma
  - 1.5.3. Brain Electrical Inactivity
  - 1.5.4. Evoked Potentials in Conjunction with EEG in Patients with Altered Level of Consciousness
- 1.6. Status Epilepticus (I)
  - 1.6.1. Context
    - 1.6.1.1. "Time is Brain".
    - 1.6.1.2. Pathophysiology.
  - 1.6.2. Definition and Timing
  - 1.6.3. Classification. Diagnostic Axes
    - 1.6.3.1. Axis I. Semiology
    - 1.6.3.2. Axis II. Etiology
    - 1.6.3.3. Axis III. EEG Correlate
    - 1.6.3.4. Axis IV. Age
- 1.7. Status Epilepticus (II)
  - 1.7.1. Non-convulsive Status Epilepticus: Definition
  - 1.7.2. Semiology
    - 1.7.2.1. Nonconvulsive Status in Comatose Patients
    - 1.7.2.2. Nonconvulsive Status in Patients without Coma
      - 1.7.2.2.1. Dyscognitive Status: With Altered Level of Consciousness (or Dialeptic) and Aphasic
      - 1.7.2.2.2. Continued Aura
      - 1.7.2.2.3. Autonomous Status
    - 1.7.3. EEG Criteria for the Determination of Non-convulsive Status (Salzburg criteria)
- 1.8. Continuous EEG / Video-EEG Monitoring in ICU
  - 1.8.1. Utility and Conditions
  - 1.8.2. Recommended Indications and Duration
    - 1.8.2.1. Adult and Pediatric Population
    - 1.8.2.2. Neonates
  - 1.8.3. Clinical Tools
  - 1.8.4. New Devices
- 1.9. Epilepsy Surgery
  - 1.9.1. Pre-surgical Video-EEG
    - 1.9.1.1. Superficial
    - 1.9.1.2. Invasive
    - 1.9.1.3. Semi-invasive
  - 1.9.2. Intraoperative Monitoring
- 1.10. The High Density Electroencephalogram. Generator Location and Source Analysis
  - 1.10.1. Signal Acquisition
    - 1.10.1.1. General Aspects
    - 1.10.1.2. Type, Location and Number of Electrodes
    - 1.10.1.3. The Importance of the Reference
  - 1.10.2. Digitization of Electrode Location
  - 1.10.3. Debugging, Artifacts and Signal Cleaning
  - 1.10.4. Blind Source Separation
  - 1.10.5. Brain Dipoles
  - 1.10.6. Brain Maps
    - 1.10.6.1. Adaptive Spatial Filters
  - 1.10.7. Skull and Brain Modeling
    - 1.10.7.1. Spherical Models
    - 1.10.7.2. Surface Element Model
  - 1.10.8. Finite Element Model
  - 1.10.9. Generator Location: Inverse Problem
    - 1.10.9.1. Single Current Dipole Model
  - 1.10.10. Imaging Methods

05

# Methodology

This training program provides you with 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.





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*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"*

## 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 abundance 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.

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*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.





## Relearning Methodology

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

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 Relearning 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.

*Relearning 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

The Postgraduate Certificate in Electroencephalogram (EEG) in Specific Pathology of the Adult and Neurocritical Patient. Precision Neurophysiological Techniques in the Diagnosis and Treatment of Epilepsy guarantees, in addition to the most rigorous and up to date training, access to a Postgraduate Certificate issued by TECH Technological University.





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



This **Postgraduate Certificate in Electroencephalogram (EEG) in Specific Pathology in Adult and Neurocritical Patients** contains the most complete and up-to-date scientific program on the market.

After passing the assessments, the student will receive the 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 Electroencephalogram (EEG) in Specific Pathology in Adult and Neurocritical Patients**

Official N° of Hours: **150 h.**



\*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.

health future  
confidence people  
education information tutors  
guarantee accreditation teaching  
institutions technology learning  
community commitment  
personalized service innovation  
knowledge present  
online training  
development languages  
virtual classroom



## Postgraduate Certificate Electroencephalogram (EEG) in Specific Pathology in Adult and Neurocritical Patients

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- » Duration: 6 weeks
- » Certificate: TECH Technological University
- » Dedication: 16h/week
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# Postgraduate Certificate

Electroencephalogram (EEG) in Specific  
Pathology in Adult and Neurocritical Patients