Postgraduate Certificate
Mathematical Basis of Deep Learning

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Postgraduate Certificate
Mathematical Basis
of Deep Learning

- » Modality: **online**
- » Duration: **12 weeks**
- » Certificate: **TECH Technological University**
- » Dedication: **16h/week**
- » Schedule: **at your own pace**
- » Exams: **online**

Website: **www.techtitute.com/in/engineering/postgraduate-certificate/mathematical-basis-deep-learning**

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01

Introduction

In a constantly evolving environment such as engineering, Deep Learning has become an essential tool for data processing and complex problem solving. In this context, this TECH academic program is designed to meet the growing demand for highly qualified professionals in this area. This program has been specifically designed to respond to current market needs, providing students with quality training in Tensorflow and Deep Visual Computer, among others. The innovative methodology and the 100% online format allow students to adapt their study pace to their needs and access the theoretical and practical contents from anywhere and at any time, facilitating their learning process.

Enroll and get a cutting-edge and effective teaching with TECH Relearning. Forget about memorization and get into efficient learning"

In a constantly evolving environment such as engineering, Deep Learning has become an essential tool for data processing and complex problem solving. Therefore, the Mathematical Basis of Deep Learning is used in fields as diverse as medicine, the automotive industry, fraud detection and financial analysis, among others. That is why the demand for highly qualified professionals in this area is only increasing.

In this context, this TECH program was created to respond to the needs of the market and provide students with a quality education in this discipline. This program has been specifically designed to provide students with a thorough understanding of the fundamental mathematics underlying Deep Learning, including calculus, probability theory and statistics. In addition, students will have the opportunity to acquire advanced skills in programming in Tensorflow and Deep Visual Computer, among other tools. All of this is presented in a 100% online format, which allows students to adapt their studies to their life style and access the theoretical and practical contents from anywhere and at any time.

In order to facilitate the student's learning, TECH has developed a complete program based on the Relearning methodology for the progressive and natural repetition of the fundamental concepts. In this way, the graduate will acquire the necessary competencies at their own pace and adjusted to their life style. In addition, the completely online format will allow the professional to access the theoretical and practical contents from anywhere and at any time through a device with Internet connection, focusing only on learning. In addition, they can access the theoretical and practical content from anywhere and at any time, all you need is a device with Internet connection.

This **Postgraduate Certificate in Mathematical Basis of Deep Learning** contains the most complete and up-to-date program on the market. The most important features include:

- The development of case studies presented by experts in Deep 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 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

With TECH you will be able to project your professional career without neglecting other areas of your life, that's why it offers you a flexible teaching adapted to your needs"

" *Motivational videos, case studies, graphical and schematic content, discussion forums... Everything you need to give a boost to your professional career. Don't wait any longer"*

You will achieve your goals with the support of a teaching team specialized in neural network models and optimization.

A 100% online program with which you will obtain the most extensive and comprehensive knowledge about functions with multiple inputs and derivatives of functions with multiple inputs.

The program's teaching staff includes professionals from the sector who bring to this training the experience of their work, as well as renowned specialists from reference 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

Through the syllabus, the graduate will develop a comprehensive knowledge of the key aspects of the Mathematical Basis of Deep Learning, which will allow them to obtain a global and up-to-date perspective and achieve the proposed objectives. As a result, the student will acquire comprehensive skills in an essential, versatile and constantly growing field of engineering, which will lead them to achieve excellence in a booming sector. In order to ensure student satisfaction, TECH has established general and specific objectives that will guide the student towards success.

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Improve your skills in the creation of new functions from existing functions with this Postgraduate Certificate in Mathematical Basis of Deep Learning"

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

You will achieve your objectives thanks to the effective tools that TECH puts at your disposal in this complete Postgraduate Certificate"
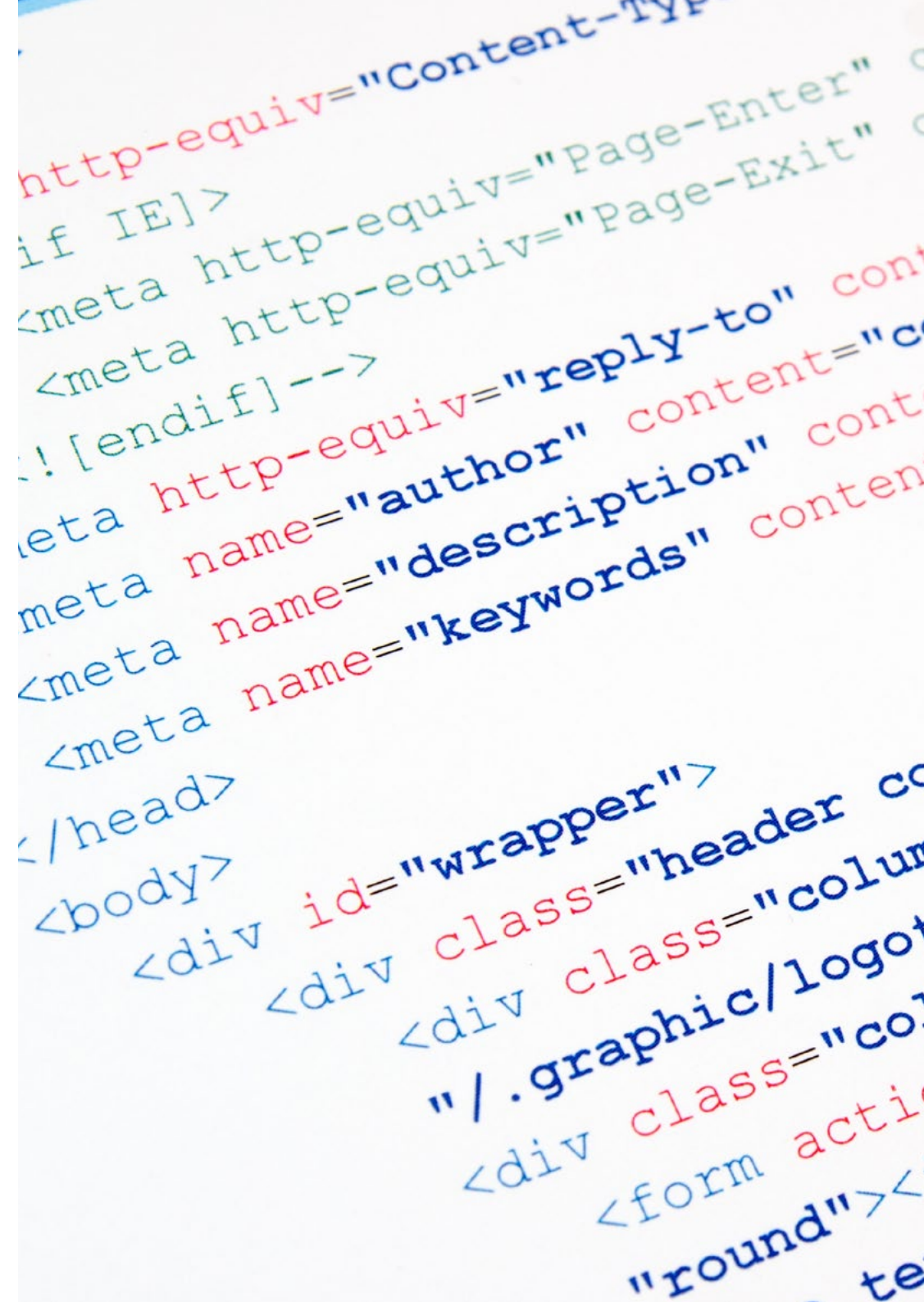
Specific Objectives

◆ Develop the chain rule for calculating derivatives of nested functions

◆ Analyze how new functions are created from existing functions and how the derivatives of these functions are computed

◆ Examine the concept of Backward Pass and how derivatives of vector functions are applied to learn automatically

◆ Learn how to use TensorFlow to build custom models

◆ Understand how to load and process data using TensorFlow tools

◆ Understand the key concepts of NLP natural language processing with RNN and attention mechanisms

◆ Explore the functionality of Hugging Face transformer libraries and other natural language processing tools to apply to vision problems

◆ Learn how to build and train autoencoder models, GANs, and diffusion models

◆ Understand how autoencoders can be used to efficiently encode data

◆ Analyze how linear regression works and how it can be applied to neural network models

◆ Lay the foundations for optimizing hyperparameters to improve the performance of neural network models

◆ Determine how the performance of neural network models can be evaluated using the training set and the test set

03
Course Management

TECH has carefully selected a highly specialized teaching team in the field of Deep Learning to teach the Postgraduate Certificate focused on Mathematical Basis, aimed at engineering professionals. This program seeks to offer quality teaching, relying on the experience and practice of the teaching team. Students enrolled in this program will be able to update themselves in a field in constant expansion, benefiting from the experience of the teaching team.

"

Guarantee your professional future by training yourself with the most complete and up-to-date Postgraduate Certificate in the academic market. In addition, with the help of the best professionals in the sector"

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. 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

Mr. Matos, Dionis

- Data Engineer at Wide Agency Sodexo
- Data Consultant at Tokiota Site
- Data Engineer at Devoteam Testa Home
- Business Intelligence Developer at Ibermatica Daimler
- Máster Big Data and Analytics /Project Management(Minor) at EAE Business School

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

04
Structure and Content

This syllabus has been created taking into account the pedagogical methodology that distinguishes TECH, the Relearning. Pioneers in its use, this learning technique guarantees that the specialist will obtain a more natural and effective academic experience, reiterating the most important concepts in Mathematical Basis of Deep Learning throughout the program. This way, not only a more effective assimilation of the syllabus is achieved, but also a considerable saving in the hours of study necessary to complete it.

Choose your schedule, pace of study and location. TECH provides the resources and gives you access to them 24 hours a day"

Module 1. *Deep Learning* Mathematical Fundamentals

Module 2. Deep Learning Principles

A Postgraduate Certificate prepared by experts for you to acquire deep knowledge in the Mathematical Basis of Deep Learning"

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.

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.

30%

10%

8%

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 Mathematical Basis of Deep 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 Mathematical Basis of Deep 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 Mathematical Basis of Deep Learning**

Official Nº of Hours: **300 h.**

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Awards the following
CERTIFICATE
to

Mr./Ms. _____, with identification number _____.
For having passed and accredited the following program

POSTGRADUATE CERTIFICATE
in

Mathematical Basis of Deep Learning

This is a qualification awarded by this University, equivalent to 300 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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