Postgraduate Certificate
Structural Calculation of Mechatronic Systems and Components

tech technological university

Postgraduate Certificate
Structural Calculation of Mechatronic Systems and Components

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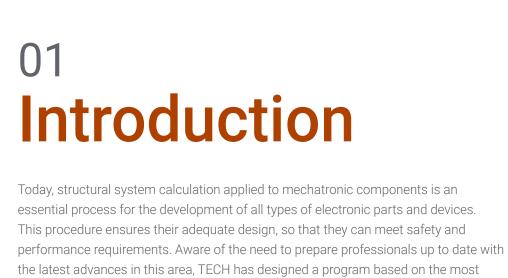» Schedule: **at your own pace**
» Exams: **online**

Website: **www.techtitute.com/pk/engineering/postgraduate-certificate/structural-calculation-mechatronic-systems-components**

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01

Introduction

Today, structural system calculation applied to mechatronic components is an essential process for the development of all types of electronic parts and devices. This procedure ensures their adequate design, so that they can meet safety and performance requirements. Aware of the need to prepare professionals up to date with the latest advances in this area, TECH has designed a program based on the most advanced calculation techniques for structural design. The qualification stands out for the use of the most advanced computer programs for structural calculation. In addition, its 100% online materials allow the student to study it comfortably with just an Internet access device.

Thanks to this Postgraduate Certificate you will master the most advanced techniques of Structural Calculation of Mechatronic Systems and Components"

The increasing complexity in the development of mechatronic components has made the structural calculation of these elements a task that requires great precision. In this way, automobiles, air vehicles and other industrial tools combine more and more mechanical and electronic devices, making their design a demanding activity for the professional. In this context, TECH has implemented an innovative study program that contains the most advanced concepts and activities related to Structural Calculation of Mechatronic Systems and Components.

The educational itinerary will facilitate the development of practical skills in a flexible way for the handling of the most modern technology and information systems used in this sector. To this end, students will study the finite element method and material modeling in an exhaustive manner. Furthermore, with the 100% online methodology of this program, graduates will be able to complete the program comfortably, since they will be able to learn using pedagogical resources of high educational rigor: interactive summaries, videos in detail or case studies, among others.

In addition, the syllabus will be supported the innovative *Relearning* teaching system that Basics on repetition to guarantee the mastery of its different aspects. At the same time, it mixes the learning process with real situations so that the knowledge is acquired in a natural and progressive way.

This **Postgraduate Certificate in Structural Calculation of Mechatronic Systems and Components** contains the most complete and up-to-date program on the market. The most important features include:

- The development of practical cases presented by experts in Structural Calculation of Mechatronic Systems and Components
- The graphic, schematic, and practical contents which provide Therapeutics 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

Thanks to this Postgraduate Certificate you will master the most advanced computer programs for the Structural Calculation of Mechatronic Components"

This program will allow you to stand out in sectors such as aviation or automotive. Make the most of this opportunity and enrol"

Don't miss the opportunity to boost your career at TECH, the best digital university in the world according to Forbes.

Become an expert in structural calculation of systems thanks to TECH.

The program's teaching staff includes professionals from the field who contribute their work experience to this educational 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 education programmed to learn in real situations.

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the academic year For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.

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Objectives

The objective of this Postgraduate Certificate is to provide the professional with the latest techniques and tools in Structural Calculation applied to Mechatronic Systems and Components. With this goal in mind, TECH has designed a complete and up to date educational itinerary that will allow the student to stand out professionally in the industrial sector. All this, studying with the best online methodology and the most effective teaching resources.

❝

TECH will allow you to specialize in Structural Calculation of Mechatronic Systems and Components in only only 6 weeks. Do not miss this opportunity"

General Objectives

- Establish the type of analysis and FEM calculation model to reproduce the real test of a mechatronic component
- Solve a representative analysis of a real test using engineering tools based on the finite element method
- Critically analyze the results obtained from a finite element calculation

Specific Objectives

- Establish the most suitable material model to represent the behavior of a material under its test conditions
- Define the boundary conditions representing a real test
- Determine the results needed in a finite element calculation to assess the feasibility of a design

This Postgraduate Certificate is what you need to advance your professional career immediately"

03

Course Management

This Postgraduate Certificate has a teaching staff of great prestige in the field of Mechatronics. Therefore, TECH has carefully selected the faculty of this educational program, composed of active professionals specialized in the Structural Calculation of Mechatronic Systems and Components. In this way, students will be able to immediately apply everything they have learned in their daily work, since they will acquire very useful skills from the extensive experience of the teachers.

The best teaching staff will allow you to master the most advanced techniques in Structural Calculation of Mechatronic Systems and Components"

Address

Dr. López Campos, José Ángel

- Specialist in design and numerical simulation of mechanical systems
- Calculation Engineer at ITERA TÉCNICA S.L.
- PhD in Industrial Engineering from the University of Vigo
- Master's Degree in Automotive Engineering from the University of Vigo
- Master's Degree in Competition Vehicle Engineering, Antonio de Nebrija University
- Postgraduate Diploma FEM from the Polytechnic University of Madrid
- Degree in Mechanical Engineering from the University of Vigo

Professors

Dr. Segade Robleda, Abraham

- Specialist in Mechanics and Machinery Intensification
- Professor of Industrial Engineering
- PhD in Industrial Engineering
- Degree in Industrial Engineering
- University Specialist in Theory and Practical Application of the Finite Element Method
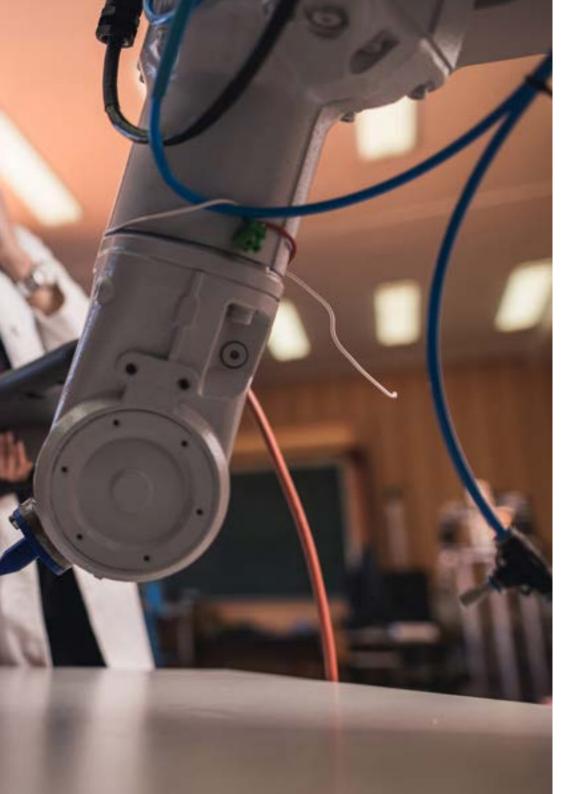- Advanced Studies in Mechanical, Energy and Fluid Systems Analysis

Structure and Content

This Postgraduate Certificate consists of a specific module through which the student will be able to delve into aspects such as linear static analysis and geometric preparation when developing a mechanical component. At the same time, students will delve into the different materials used in this sector, connectors and meshes. On the other hand, it will address the post-production process and the control of faults such as vibrations. In this educational journey, the graduates will be supported by the disruptive *Relearning* methodology and the use of practical and real case studies, implemented by TECH.

An exhaustive syllabus with the latest scientific evidence, complementary readings and a variety of multimedia resources"

Module 1. Structural Calculation of Mechatronic Systems and Components

1.1. Finite Element Method

    1.1.1. Finite Element The Method

    1.1.2. Mesh discretization and convergence

    1.1.3. Shape functions. Linear and quadratic elements

    1.1.4. Formulation for members. Stiffness matrix method

    1.1.5. Non-linear problems. Sources of nonlinearity. Iterative methods

1.2. Linear Static Analysis

    1.2.1. Preprocessing: geometry, material, mesh, boundary conditions: forces, pressures, remote loads

    1.2.2. Solution

    1.2.3. Post-processing: stress and strain maps

    1.2.4. Application Examples

1.3. Geometry preparation

    1.3.1. Types of import files

    1.3.2. Geometry preparation and cleaning

    1.3.3. Conversion to surfaces and beams

    1.3.4. Application Examples

1.4. Mesh

    1.4.1. One-dimensional, two-dimensional, three-dimensional elements

    1.4.2. Mesh control parameters: local meshing, mesh growth

    1.4.3. Meshing methodologies: structured meshing, swept meshing

    1.4.4. Mesh quality parameters

    1.4.5. Application Examples

1.5. Material modeling

    1.5.1. Elastic-linear materials

    1.5.2. Elasto-plastic materials. Plasticity criteria

    1.5.3. Hyperelastic materials. Models in isotropic hyperelasticity: Mooney Rivlin, Yeoh, Ogden, Arruda-Boyce

    1.5.4. Application Examples

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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.
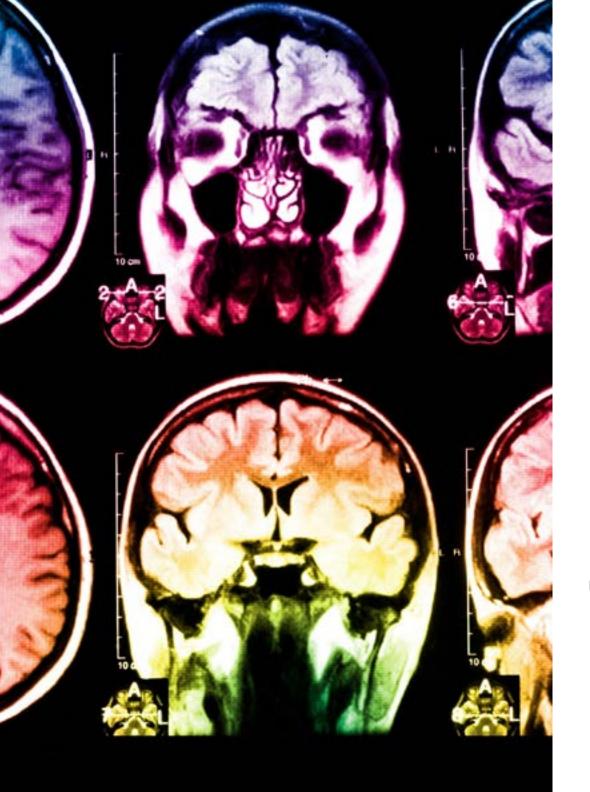
We enhance the Case Study with the best 100% online teaching method: Relearning.

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.

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.

Certificate

The Postgraduate Certificate in Structural Calculation of Mechatronic Systems and Components 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 Structural Calculation of Mechatronic Systems and Components** contains the most complete and up-to-date educational 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 Structural Calculation of Mechatronic Systems and Components**

Official Nº of Hours: **150 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

Structural Calculation of Mechatronic Systems and Components

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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