

Postgraduate Certificate Structural Analysis





Postgraduate Certificate Structural Analysis

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

Website: www.techtitute.com/us/engineering/postgraduate-certificate/structural-analysis

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01

Introduction

Advances in construction materials and structural analysis methodologies have enabled the design and construction of much safer and less costly infrastructure. The relevance of both aspects is a determining factor in the work of the Civil Engineering professional, who finds a very broad area of work in this field. For this reason, TECH has created this intensive 6-week program, where the graduate will gain solid knowledge about force systems, action, traction, and mathematical calculations around equilibrium and stress diagrams. All of this, in an advanced syllabus, made up of avant-garde didactic material, accessible at any time of the day from an electronic device with Internet connection.





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Increase the value of your Civil Engineering projects through the learning you will acquire in this 100% online university qualification"

The various studies on the analysis of structures have made it possible to prevent the collapse of bridges and buildings, avoiding endangering the lives of citizens and reducing economic costs from the time of their design. The relevance of this work in both the initial testing and preconstruction phases further enhances the critical work of professional civil engineers.

In this sense, it is essential that they have a solid knowledge base in this field in order to be able to efficiently promote any project in which they are immersed. Further facilitate this work, TECH has created this Postgraduate Certificate in Structural Analysis exclusively online.

This is an intensive program that will lead students to delve in a theoretical and practical way into force equivalence systems, analytical statics, traction, torsion, and mathematical methods used to determine structural safety. It will also include didactic material based on video summaries, videos in detail, complementary readings, and case study simulations.

It is an unparalleled academic opportunity that provides flexibility for those seeking learning that is compatible with their daily responsibilities. Students only need a digital device with Internet connection to be able to view the content of this program, which is at the forefront at any time of the day.

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

- ◆ The development of case studies presented by Course in Civil Engineering
- ◆ The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- ◆ Practical exercises where self-assessment can be used to improve learning
- ◆ Its special emphasis on innovative methodologies
- ◆ Theoretical lessons, questions to the course, discussion forums on controversial issues and individual reflection papers.
- ◆ Content that is accessible from any fixed or portable device with an Internet connection



Stand out in the Civil Engineering sector through a Postgraduate Certificate that provides you with the most current knowledge in Structural Analysis"

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This degree provides you with the necessary procedures to be able to solve problems derived from the flexibility of the structures”

Obtain a specialization in Structural Analysis through a flexible program and with the most advanced didactic material.

An academic option that gives you the freedom of being able to choose your study time by not having classes with restricted schedules.

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

Its multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide an immersive education programmed to learn in real situations.

The design of this program focuses on Problem-Based Learning, by means of which the professional must try to solve the different professional practice situations that are presented throughout the academic course. This will be done with the help of an innovative system of interactive videos made by renowned experts.



02

Objectives

Structural Analysis is undoubtedly an area of great relevance in the design, construction, or remodeling of an infrastructure. Therefore, in this Postgraduate Certificate, students will obtain solid knowledge in this field through an exhaustive syllabus and with a theoretical-practical approach, which will allow them to integrate this learning into the projects in which they are immersed. In addition, thanks to the case studies, you will be able to incorporate the techniques and methodologies used in your initiatives and, in this way, avoid possible errors that generate incalculable losses for companies in the sector.





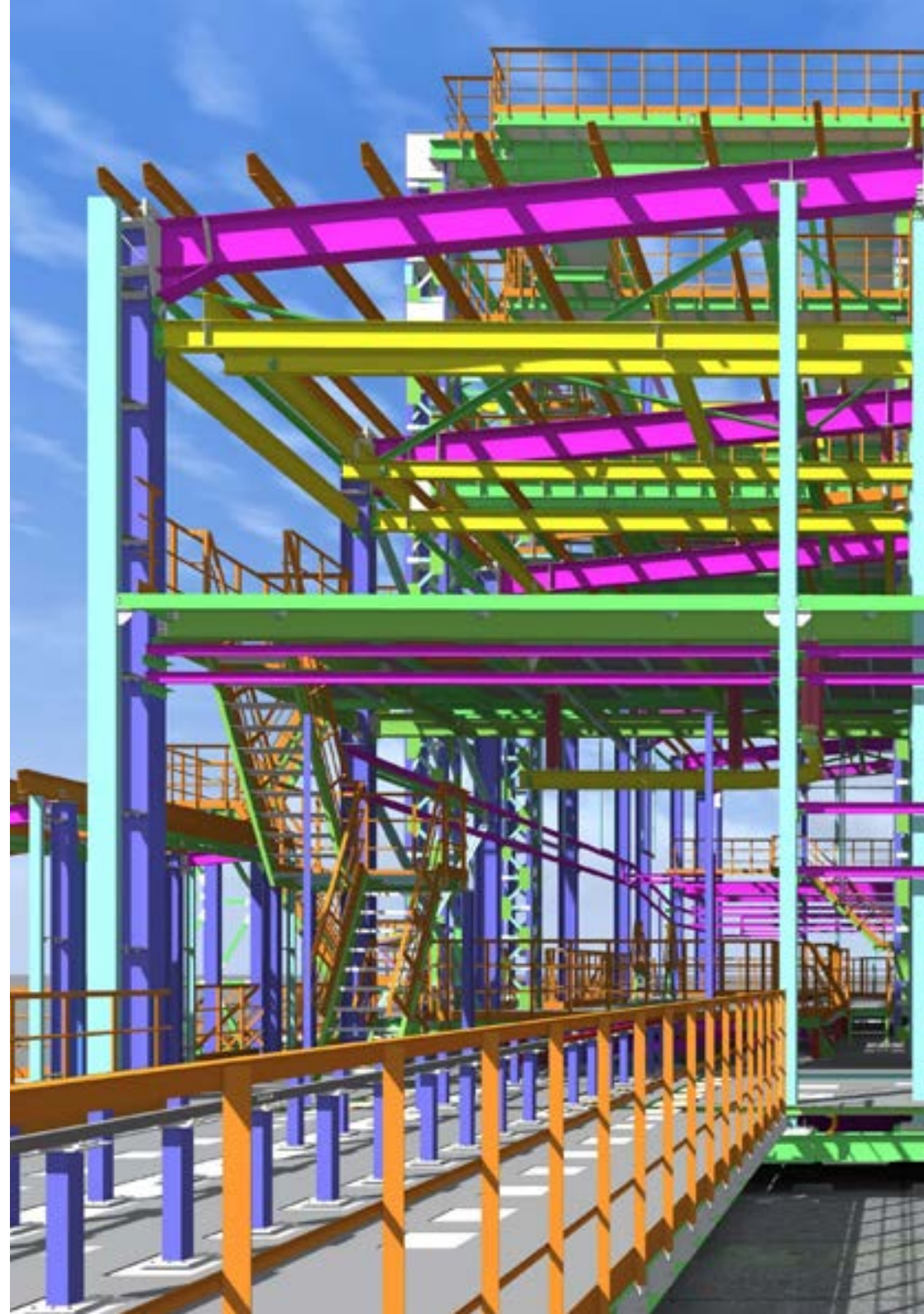
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Delves from a theoretical-practical perspective into the calculation of forces and reactions of great utility in Civil Engineering”



General Objectives

- ◆ Autonomous learning of new knowledge and techniques suitable for Civil Engineering
- ◆ To know in detail the nature, characteristics, and performance of the new construction materials that have been investigated in recent years
- ◆ Understand and use the language of engineering and the terminology of Civil Engineering
- ◆ Delve in a scientific and technical way in the activity of the profession of Public Works Technical Engineer with knowledge of the functions of consultancy, analysis, design, calculation, project, construction, maintenance, conservation, and operation





Specific Objectives

- ◆ Analyze and understand how the characteristics of structures influence their behavior
- ◆ Apply knowledge of the resistant performance of structures in order to evaluate them according to existing standards and using analytical and numerical calculation methods
- ◆ Define the basic stresses in structural sections: Axial and shear forces, bending moments, and torsional moments
- ◆ Calculate stress diagrams

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Incorporate into your daily practice the most effective methodology to know the basic requirements for a building to have a safe structure”

03

Structure and Content

Thanks to the *Relearning* methodology, the engineer will go through the agenda of this Postgraduate Certificate in a more natural way, reducing the long hours of study with the continuous reiteration of key concepts. In this way, students will achieve intensive and effective learning in only 6 weeks of the relevant role of structural analysis in the construction or remodeling of buildings. All of this is complemented by innovative educational material, accessible 24 hours a day from any digital device with an Internet connection.





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Enroll now in this 100% online Postgraduate Certificate that provides you with the most advanced syllabus on Structural Analysis”

Module 1. Structural Analysis

- 1.1. Introduction to Structures
 - 1.1.1. Definition and Classification of Structures
 - 1.1.2. Design process and practical and ideal structures
 - 1.1.3. Equivalent systems of forces
 - 1.1.4. Centers of Gravity. Distributed loads
 - 1.1.5. Moments of inertia. Products of inertia. Inertia matrix. Main axes
 - 1.1.6. Equilibrium and stability
 - 1.1.7. Analytical Statics
- 1.2. Actions
 - 1.2.1. Introduction
 - 1.2.2. Permanent actions
 - 1.2.3. Variable actions
 - 1.2.4. Accidental actions
- 1.3. Tension, compression and shear
 - 1.3.1. Normal strain and linear deformation
 - 1.3.2. Mechanical Properties of Materials
 - 1.3.3. Linear elasticity, Hooke's law, and Poisson's ratio
 - 1.3.4. Tangential strain and angular deformation
- 1.4. Equilibrium equations and stress diagrams
 - 1.4.1. Calculation of forces and reactions
 - 1.4.2. Equilibrium equations
 - 1.4.3. Compatibility equations
 - 1.4.4. Stress diagram
- 1.5. Axially loaded elements
 - 1.5.1. Length changes in axially loaded elements
 - 1.5.2. Length changes in non-uniform bars
 - 1.5.3. Hyperstatic elements
 - 1.5.4. Thermal effects, misalignments and previous deformations





- 1.6. Torsion
 - 1.6.1. Torsional deformations in circular bars
 - 1.6.2. Non-uniform torsion
 - 1.6.3. Strain and deformation in pure shear
 - 1.6.4. Relation between the modulus of elasticity E and G
 - 1.6.5. Hyperstatic torsion
 - 1.6.6. Thin wall tubing
- 1.7. Bending moment and shear stress
 - 1.7.1. Beam types, loads, and reactions
 - 1.7.2. Bending moments and shear forces
 - 1.7.3. Relations between loads, bending moments, and shear forces
 - 1.7.4. Bending moment and shear forces diagrams
- 1.8. Analysis of structures in flexibility (force method)
 - 1.8.1. Dynamic classification
 - 1.8.2. Principle of superposition
 - 1.8.3. Definition of flexibility
 - 1.8.4. Compatibility equations
 - 1.8.5. General solution procedure
- 1.9. Structural safety. Limit state method
 - 1.9.1. Basic requirements
 - 1.9.2. Causes of unsafety. Probability of collapse
 - 1.9.3. Ultimate Limit States
 - 1.9.4. Serviceability Limit States of deformation
 - 1.9.5. Vibration and cracking serviceability limit states
- 1.10. Structural stiffness analysis (displacement method)
 - 1.10.1. Fundamentals
 - 1.10.2. Stiffness matrix
 - 1.10.3. Nodal forces
 - 1.10.4. Displacement calculation

04

Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.





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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"

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.

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At TECH, you will experience a learning methodology that is shaking the foundations of traditional universities around the world"



You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.



The student will learn to solve complex situations in real business environments through collaborative activities and real cases.

A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

“ *Our program prepares you to face new challenges in uncertain environments and achieve success in your career”*

The case method is the most widely used learning system in the best faculties in the world. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question that you are presented with in the case method, an action-oriented learning method. Throughout the program, the studies will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

Relearning Methodology

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

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

In 2019, we obtained the best learning results of all online universities in the world.

At TECH, you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only one in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.



In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

This methodology has trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, and financial markets and instruments. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

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

From the latest scientific evidence in the field of neuroscience, not only do we know how to organize information, ideas, images and memories, but we know that the place and context where we have learned something is fundamental for us to be able to remember it and store it in the hippocampus, to retain it in our long-term memory.

In this way, and in what is called neurocognitive context-dependent e-learning, the different elements in our program are connected to the context where the individual carries out their professional activity.



This program offers the best educational material, prepared with professionals in mind:



Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

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



Practising Skills and Abilities

They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





Case Studies

Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best specialists in the world.



Interactive Summaries

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

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.



05

Certificate

The Postgraduate Certificate in Nombre del Porgrama guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.



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Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork"

This **Postgraduate Certificate in Structures Analysis** contains the most complete and up-to-date program in 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 diploma 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.

Program: **Postgraduate Certificate in Structures Analysis**

Official No. of Hours: **150 h.**



*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

future

health confidence people

education information tutors

guarantee accreditation teaching

institutions technology learning

community commitment

personalized service innovation

knowledge present quality

development languages

virtual classroom

tech technological
university

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