

Postgraduate Certificate

Chemical Fundamentals in the Food Industry





Postgraduate Certificate Chemical Fundamentals in the Food Industry

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

Website: www.techtute.com/us/nutrition/postgraduate-certificate/chemical-fundamentals-food-industry

Index

01

Introduction

p. 4

02

Objectives

p. 8

03

Structure and Content

p. 12

04

Methodology

p. 18

05

Certificate

p. 26

01

Introduction

The food industry is a key sector in the global economy and is essential for feeding the population. However, first there is the safety and quality of the products, and this is where chemistry plays a fundamental role, as they have a direct influence on the health of consumers. For this reason, TECH has designed a degree with the objective of training professionals in the Chemical Fundamentals that underpin production, quality control and food safety in this sector. The program focuses on understanding the basic concepts of chemistry and their application in the food industry. In addition, it is created to be 100% online, with a Relearning methodology that promotes autonomous learning and flexibility.



“

Discover how life works: Learn about the metabolic organization of living things, differentiating the different types of pathways and enzymes in this degree focused on Chemical Fundamentals in the Food Industry”

Chemistry is a discipline that plays a fundamental role in the food industry. In view of this and in order to deepen in the chemical fundamentals that underlie the production of food. TECH presents the Postgraduate Certificate Program in Chemical Fundamentals in the Food Industry. This program is divided into a module with various topics. From them, students will have the opportunity to learn about amino acids and proteins, carbohydrates and proteoglycans, nucleotides, nucleic acids and DNA replication, transcription and translation, regulation of gene expression, enzymes and enzyme kinetics, and introduction to intermediary metabolism.

During the degree, students will also become familiar with the principles and techniques of biochemistry and learn how these principles are applied to food production. Also TECH and its excellent teachers in the area will teach the professional to apply chemical analysis techniques, such as chromatography and electrophoresis, to determine the presence of proteins and nucleic acids in food.

The knowledge acquired in this Postgraduate Certificate in Chemical Fundamentals in the Food Industry will be of great value to those who wish to work in the food industry, as it will allow them to understand how food is produced and how their production processes can be improved. In addition, the skills acquired in this program will also be useful for those who wish to pursue advanced studies in the field of biochemistry and food chemistry. In short, this 100% online degree provides a solid foundation in the chemical fundamentals underlying food production and is an excellent choice for those looking to develop their career in the Food Industry.

This **Postgraduate Certificate in Chemical Fundamentals in the Food Industry** contains the most complete and up-to-date scientific program on the market.

The most important features include:

- ◆ The development of case studies presented by nutrition experts focused on Chemical Fundamentals in the Food Industry
- ◆ 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 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



Learn the secrets of enzymes: Discover the Michaelis-Menten model and the meaning of the kinetic parameters of an enzyme: K_m , V_{max} and number of spare parts in this Postgraduate Certificate

“

Teachers have academic training and professional backgrounds that enable them to teach effectively and practically, fostering meaningful learning for you”

This degree uses the Relearning method, which focuses on the reinforcement of the student's previous knowledge and the application of new concepts in real life situations.

It delves into the regulatory mechanisms affecting enzymatic reactions, the classification and importance of carbohydrates and the flow of genetic information in living organisms.

The program's teaching staff includes professionals from 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

The Postgraduate Certificate program in Chemical Fundamentals in the Food Industry aims to provide students with a solid training in the fundamental principles of chemistry and their application in the food industry. The program seeks to provide students with a detailed understanding of the chemical composition of foods and the processes that occur during food production, processing and storage. In addition, it is intended to develop students' practical and theoretical skills necessary to operate in a chemistry laboratory, interpret the results and understand the chemical phenomena and processes that interact with the environment. All this will enable students to apply their knowledge to improve the quality of food products and ensure food safety in the industry.





“

Graduates of this degree will learn the elemental and molecular composition of living matter, the Michaelis-Menten model and the meaning of the kinetic parameters of an enzyme”



General Objectives

- ◆ Know and identify the structure of the main biomolecules
- ◆ Analyze and distinguish the different structures present in proteins

“

By completing this Postgraduate Certificate in Chemical Fundamentals in the Food Industry, you will be able to acquire practical and theoretical skills, including the ability to interpret laboratory results”





Specific Objectives

- ◆ Describe the elemental and molecular composition of living matter
- ◆ Know the Michaelis-Menten model and the meaning of the kinetic parameters of an enzyme: K_m , V_{max} and spare part number
- ◆ Describe the regulatory mechanisms affecting enzymatic reactions and gain an in-depth knowledge of allosteric effector and covalent modulation
- ◆ Define, classify and establish the importance of carbohydrates and monosaccharide families, and name the major monosaccharides
- ◆ Know the flow of genetic information in living organisms and the processes by which it develops
- ◆ Know the characteristics of the DNA replication process
- ◆ Understand the metabolic organization of living organisms, differentiating the different types of pathways and enzymes
- ◆ Explain in an understandable way basic chemical phenomena and processes that interact with the environment
- ◆ Describe the structure, physicochemical properties and reactivity of elements and compounds involved in biogeochemical cycles
- ◆ Operate basic instrumentation in a chemistry laboratory
- ◆ Have the ability to interpret the results in the practical environment of chemistry

03

Structure and Content

This program has a structure that focuses on providing graduates with theoretical and practical knowledge of the basic principles of biochemistry and its application in the food industry. The program is designed to be 100% online, using the Relearning pedagogical methodology, which is based on autonomous, reflective and flexible learning. The content of the Postgraduate Certificate includes a comprehensive module covering the structure and stereochemistry of amino acids and proteins, carbohydrates and proteoglycans, nucleotides, nucleic acids and DNA replication, transcription and translation, regulation of gene expression, enzymes and enzyme kinetics, introduction to intermediary metabolism, glycolysis and gluconeogenesis. All this, through a combination of audiovisual resources, readings, exercises and practical activities.





“

In this Postgraduate Certificate program, students will have access to a variety of multimedia resources, such as videos, downloadables, online case studies and other didactic materials, which will facilitate their learning process”

Module 1. Fundamentals of Biochemicals

1.1 Amino Acids and Proteins

- 1.1.1. Structure and Composition of Amino Acids
- 1.1.2. Classification of Amino Acids
- 1.1.3. Peptide bonding
- 1.1.4. Protein Stability
- 1.1.5. Protein secondary structure: alpha helices and beta folded sheet
- 1.1.6. Tertiary protein structure: fibrous and globular proteins
- 1.1.7. Quaternary structure
- 1.1.8. Techniques for Gain Protein
- 1.1.9. Lowry's method
- 1.1.10. Molecular exclusion chromatography

1.2. Carbohydrates and proteoglycans

- 1.2.1. Structure and Composition of monosaccharides
- 1.2.2. Glycosidic bonding and monosaccharide cyclization
- 1.2.3. Classification of monosaccharides
- 1.2.3. Biologically important disaccharides
- 1.2.4. Polysaccharides
- 1.2.5. Reserve polysaccharides
- 1.2.6. Structural polysaccharides
- 1.2.7. Proteoglycans and glycosaminoglycans
- 1.2.8. Metabolic pathologies associated with monosaccharides

1.3. Nucleotides, nucleic acids and DNA replication

- 1.3.1. Nucleosides and nucleotides: structural classification
- 1.3.2. Physicochemical properties of nucleic acids
- 1.3.3. General characteristics of DNA replication
- 1.3.4. Nucleic acid study techniques
 - 1.3.4.1. Polymerase Chain Reaction (PCR)
 - 1.3.4.2. Electrophoresis
 - 1.3.4.3. Hybridization Techniques



- 1.4. Transcription and Translation
 - 1.4.1. General characteristics of transcription
 - 1.4.1.1. RNA Polymerase and initiation promoters and consensus sequences
 - 1.4.1.2. Elongation and termination
 - 1.4.1.3. Lactose operon
 - 1.4.2. RNA splicing and maturation
 - 1.4.3. Types of RNA
 - 1.4.4. General characteristics of the translation
 - 1.4.4.1. Phases of translation
 - 1.4.4.2. Structure of ribosomes
 - 1.4.5. Characteristics of the genetic code
- 1.5. Regulation of Gene Expression. Genes and chromosomes
 - 1.5.1. Structure of the eukaryotic genome
 - 1.5.2. Post-transcriptional modification of the most frequent transcripts
 - 1.5.2.1. Transcriptional regulatory and transcriptional operator sequences
 - 1.5.3. Regulation of transcription rate in eukaryotes
 - 1.5.4. Epigenetic modification of the genome
- 1.6. Enzymes and enzyme kinetics
 - 1.6.1. Biochemical classification of enzymes
 - 1.6.2.1. Enzyme macrogroups
 - 1.6.2. Enzyme kinetics
 - 1.6.2.1. Michaelian kinetics
 - 1.6.2.2. Sigmoid kinetics
 - 1.6.3. Regulation of enzyme activity
 - 1.6.4. Control of enzyme inhibition
 - 1.6.4.1. Competitive and non-competitive inhibitors
 - 1.6.4.2. Irreversible inhibitors
- 1.7. Introduction to intermediary metabolism
 - 1.7.1. Metabolic pathways and metabolic flux
 - 1.7.2. Catabolism and anabolism
 - 1.7.3. General mechanisms of metabolic pathway regulation
 - 1.7.4. Molecular energy charge and ATP cycle
- 1.8. Glycolysis and gluconeogenesis
 - 1.8.1. Enzymatic stages and glycolytic energy balance
 - 1.8.2. Regulation of glycolysis: the pivotal role of phosphofructokinase
 - 1.8.3. Gluconeogenic substrates and anaplerotic reactions
 - 1.8.4. Stages and regulation of gluconeogenesis
 - 1.8.5. Coordinated regulation of glycolysis and gluconeogenesis
 - 1.8.5.1. Hormonal regulation
 - 1.8.5.2. Allosteric regulation
- 1.9. Tricarboxylic acid cycle
 - 1.9.1. Pyruvate Dehydrogenase Complex
 - 1.9.1.1. Stages of the NADH cycle and NADH production
 - 1.9.1.2. PDH Regulation
 - 1.9.2. Stages of the Krebs Cycle
 - 1.9.3. Energy balance and regulation of the Krebs Cycle
 - 1.9.4. Pathologies associated with mitochondrial defects
- 1.10. Mitochondrial Respiratory Chain and Oxidative Phosphorylation
 - 1.10.1. Stages of the mitochondrial respiratory chain
 - 1.10.2. Sequential reactions of the mitochondrial transport chain
 - 1.10.3. Uncoupling agents in the transport chain
 - 1.10.4. ATP synthase complex
 - 1.10.4.1. Mitchell's chemosmotic coupling
 - 1.10.4.2. Structure of ATP synthase
 - 1.10.4.3. ATP Synthase Inhibitors

Module 2. General Chemistry

- 2.1. Matter Structure and Chemical Bonding
 - 2.1.1. Matter
 - 2.1.2. The Atom
 - 2.1.3. Types of Chemical Bonds
- 2.2. Gases, Liquids and Solutions
 - 2.2.1. Gases
 - 2.2.2. liquids
 - 2.2.3. Types of Solutions
- 2.3. Thermodynamics
 - 2.3.1. Introduction to Thermodynamics
 - 2.3.2. First Principle of Thermodynamics
 - 2.3.3. Second Principle of Thermodynamics
- 2.4. Acid-Base
 - 2.4.1. Concepts of Acidity and Basicity
 - 2.4.2. pH
 - 2.4.3. pOH
- 2.5. Solubility and Precipitation
 - 2.5.1. Solubility Equilibrium
 - 2.5.2. Floccules
 - 2.5.3. Colloids
- 2.6. Oxidation-Reduction Reactions
 - 2.6.1. Redox Potential
 - 2.6.2. Introduction to Batteries
 - 2.6.3. Electrolytic Tank
- 2.7. Carbon Chemistry
 - 2.7.1. Introduction
 - 2.7.2. Carbon Cycle
 - 2.7.3. Organic Formulation



- 2.8. Energy and Environment
 - 2.8.1. Battery Continuation
 - 2.8.2. Carnot Cycle
 - 2.8.3. Diesel Cycle
- 2.9. Atmospheric Chemistry
 - 2.9.1. Main Atmospheric Pollutants
 - 2.9.2. Acid Rain
 - 2.9.3. Transboundary Pollution
- 2.10. Soil and Water Chemistry
 - 2.10.1. Introduction
 - 2.10.2. Water Chemistry
 - 2.10.3. Soil Chemistry

“

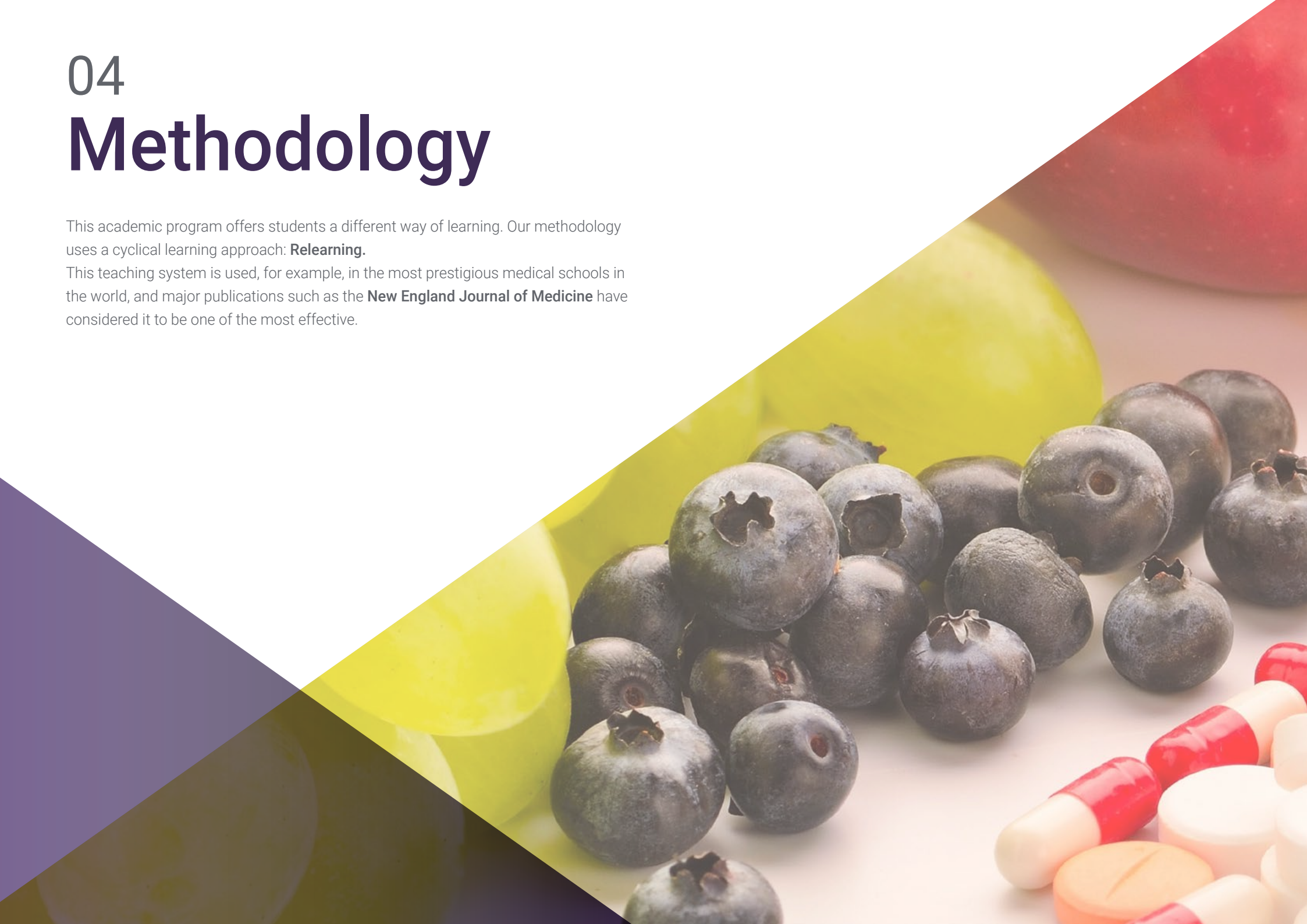
Upon completion of this Postgraduate Certificate program, students will have the skills and knowledge necessary to perform in the food industry in various fields, such as food research and quality”

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.





“

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

In a given situation, what should a professional do? 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, nutritionists can 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 of professional nutritional 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. Nutritionists who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity through exercises to evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the nutritionist to better integrate knowledge into clinical practice.
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 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.

The nutritionist will learn through real cases and by solving 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 online university (Columbia University).

With this methodology, more than 45,000 nutritionists have been trained with unprecedented success in all clinical specialties regardless of the surgical load. 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.

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.



Nutrition Techniques and Procedures on Video

TECH brings students closer to the latest techniques, the latest educational advances and to the forefront of current nutritional counselling techniques and procedures. 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 educational system for presenting multimedia content 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 their goals.



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.



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.



05

Certificate

The Postgraduate Certificate in Chemical Fundamentals in the Food Industry guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.



The image features two black graduation caps (mortarboards) against a bright blue sky with light, wispy clouds. One cap is in the foreground on the left, and another is slightly behind it on the right. The caps are tilted upwards. The bottom right corner of the image is overlaid with a white diagonal shape that contains text.

“

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

This **Postgraduate Certificate in Chemical Fundamentals in the Food Industry** contains the most complete and up-to-date scientific 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 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.

Title: **Postgraduate Certificate in Chemical Fundamentals in the Food Industry**

Official N° of Hours: **300 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

online training

development languages

virtual classroom

tech technological
university

Postgraduate Certificate Chemical Fundamentals in the Food Industry

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

Postgraduate Certificate Chemical Fundamentals in the Food Industry