

# Postgraduate Certificate

Pressing, Evaporation and  
Heat Transfer Operations  
in the Food Industry





## Postgraduate Certificate

### Pressing, Evaporation and Heat Transfer Operations 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.techtitute.com/us/nutrition/postgraduate-certificate/pressing-evaporation-heat-transfer-operations-food-industry](http://www.techtitute.com/us/nutrition/postgraduate-certificate/pressing-evaporation-heat-transfer-operations-food-industry)

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# 01

# Introduction

The food industry is constantly evolving and increasingly demands high efficiency and quality in its production processes. In this context, TECH has developed a program that will address issues related to separation, distillation, extraction and dehydration, among other industry-related topics. It will also provide the necessary tools for its application in this broad business area. This training is an excellent option for those professionals who wish to specialize in the field of food technology. In addition, the degree is 100% online, with an innovative pedagogical methodology such as Relearning and with flexibility to organize academic resources, which allows an adequate and efficient training for today's professional.







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*At the end of the Postgraduate Certificate program you will have developed the skills to identify and select the most appropriate equipment to achieve food processing objectives, this knowledge will enable you to contribute significantly to the industry”*

Today, the food industry is facing increasingly demanding challenges and requirements. The need to produce high quality foods, with adequate nutritional properties and processed with safe and efficient techniques, has become crucial. In this context, Pressing, Evaporation and Heat Transfer Operations are essential for the production of food products. The proper management of these operations allows obtaining products with specific characteristics, such as texture, flavor, aroma and nutritional value.

The food industry needs professionals trained in the management of Pressing, Evaporation and Heat Transfer Operations to ensure the production of high quality food and to comply with sanitary and food safety regulations. To this end, TECH has developed a Postgraduate Certificate program specialized in these fundamental techniques so that professionals acquire the necessary knowledge in the efficient management of these operations and to be able to apply them in the food industry.

During the program, topics such as the general principles of basic operations, heat transfer, evaporation, distillation and gas clarification will be covered. Dehydration and drying operations, as well as extraction operations. In addition, the design and development of new products and processes will be studied in depth, and the most innovative technologies in the sector will be explored.

The degree will be taught through a theoretical-practical methodology, in which students will have access to state-of-the-art technological tools and resources that will allow them to experience and apply the knowledge acquired in a real working environment. In addition, they will have the guidance and support of a highly qualified teaching team with extensive experience in the food industry and in training professionals in this field.

This **Postgraduate Certificate in Pressing, Evaporation and Heat Transfer Operations 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 Pressing, Evaporation and Heat Transfer Operations 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 self-assessment can be used 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



*You will learn to analyze and propose new technologies that contribute to innovation in the food industry, this skill will allow you to stand out in the labor market and progress in your professional career”*

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*This program has multimedia resources that complement the theoretical and practical training of the students, allowing a better understanding and application of the concepts and techniques learned”*

*The objective of the Postgraduate Certificate is to train professionals capable of applying the knowledge acquired to improve the quality of food products and optimize production processes.*

*Participants will learn about equipment selection and application, process optimization, troubleshooting and implementation of quality control systems.*

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 objective of this degree is to provide students with the skills and knowledge necessary to work in the field of food production and processing. Through this program, we seek to provide participants with solid training in the fundamental principles that govern the transformation stages, as well as in the basic operations of pressing, evaporation and heat transfer. In addition, the aim is to inform students so that they can design and develop new processes and products that meet the needs of the market, evaluating their degree of acceptability and establishing their production costs.





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*By completing the Postgraduate Certificate program you will obtain skills in the design and elaboration of new food processes and products, as well as in the optimization of the operating conditions of the equipment used”*



## General Objectives

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- Acquire the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include reflection on relevant issues in the food industry
- Acquire the ability to design and develop new processes and products to meet market needs in the different aspects involved such as evaluating the degree of acceptability of these products or establishing their production costs
- Understand and know how to describe the functions of the basic operations and the fundamental principles governing the processing steps, as well as their impact on the quality of the processed product
- Relate thermodynamic and kinetic variables to equipment design parameters to optimize operating conditions and their effect on foodstuffs



*With this training you will be able to work in different areas of the food industry, such as research, production, quality control and project management. Don't miss the opportunity and sign up now!"*







## Specific Objectives

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- ♦ Study and interpret reports and administrative files related to a product, in order to be able to give a reasoned answer to the question that arises
- ♦ Ability to know, understand and use the facilities of agri-food industries, their equipment and auxiliary machinery of the agri-food industry
- ♦ Ability to know, understand and use the principles of basic fundamentals and appropriate technological processes for food production, packaging and preservation
- ♦ Identify and understand the operation of the most commonly used equipment in food processing and know how to select the most appropriate equipment to achieve specific processing objectives
- ♦ Operate equipment and develop experimental tests to evaluate food processes and propose improvement activities
- ♦ Analyze and propose new technologies that could contribute to technological innovation in the food industry
- ♦ Recognize the importance of planning, development and control of processes in the food industry to obtain products of the desired quality

# 03

## Structure and Content

The Postgraduate Certificate in Pressing, Evaporation and Heat Transfer Operations in the Food Industry consists of two modules, which the student will be able to develop completely online, using the Relearning pedagogical methodology. Module 1 covers fundamental principles of basic operations, material and energy balances, fluids and their behavior, fluid flow, centrifugation, filtration, pressing, agitation, mixing, emulsification and heat transfer. While Module 2 introduces the student to separation processes, the types of separation processes and their fundamentals, matter transfer coefficients and phase equilibrium.







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*The training obtained will allow you to occupy positions in areas of production, quality, research and development, among other sectors immersed in a booming labor field”*

## Module 1. Basic Operations

- 1.1. General Principles
  - 1.1.1. Fundamental principles governing Basic Operations
  - 1.1.2. Matter and Energy Balances: approach and resolution methods
  - 1.1.3. System concept: continuous and discontinuous processes
  - 1.1.4. Establishment and interpretation of flow chart
- 1.2. Fluids: general principles
  - 1.2.1. Fluid statics: Pressure concept and pressure gauges
  - 1.2.2. Fluid dynamics: Continuity Theorem and Principle of Conservation of Energy
  - 1.2.3. Rheological behavior of fluids: Newton's Law
  - 1.2.4. Fluid types and viscosity gauges
- 1.3. Fluid flow
  - 1.3.1. Introduction to fluid transport
  - 1.3.2. Fluid transport: Types of flow (laminar and turbulent)
  - 1.3.3. Flow resistance in cylindrical pipelines
  - 1.3.4. Flow meters
- 1.4. Centrifugation
  - 1.4.1. Movement of solid particles under the action of a centrifugal field
  - 1.4.2. Separation of immiscible liquids
  - 1.4.3. Types of centrifuges
  - 1.4.4. Centrifugation applications in the Food Industry
- 1.5. Filtration
  - 1.5.1. Filtration theory: Constant pressure filtration, constant flow filtration and compressible cakes
  - 1.5.2. Filtration practice: Filter media and filtration aids
  - 1.5.3. Filtration Equipment
  - 1.5.4. Filtration Applications in the Food Industry
- 1.6. Pressing
  - 1.6.1. Pressing principles
  - 1.6.2. Equipment and operation performance
  - 1.6.3. Pressing applications

- 1.7. Agitation, mixing and emulsification
  - 1.7.1. Types of mixtures
  - 1.7.2. Agitation: General concepts, power required for stirring, similarity criteria and types of stirrers
  - 1.7.3. Mixing: General concepts, mixing of viscous substances, mixing of solids, and types of mixers
  - 1.7.4. Emulsification: General concepts, interfacial tension, emulsion stability and apparatus
  - 1.7.5. Food Industry Applications
- 1.8. Heat Transfer
  - 1.8.1. Heat transfer by conduction: Fourier equation, steady-state conduction and series thermal resistances
  - 1.8.2. Heat transfer by convection: Types of convection, dimensionless modules
  - 1.8.3. Heat transfer by radiation: Kirchhoff's law, Stephan-Boltzmann's law
- 1.9. Evaporation I
  - 1.9.1. Mechanism of heat transfer in evaporators: Heat transfer coefficients and factors influencing the heat transfer coefficient
  - 1.9.2. Factors influencing the boiling point of the solution
  - 1.9.3. Characteristics of the solution to be evaporated
- 1.10. Evaporation II
  - 1.10.1. Evaporator calculation: single-effect evaporators and multi-effect evaporators
  - 1.10.2. Types of evaporators
  - 1.10.3. Evaporation Applications in the Food Industry

## Module 2. Basic Operations

- 2.1. Introduction to of separation Processes
  - 2.1.1. Separation Processes: Features and Agents of
  - 2.1.2. Classification of the Separation Processes. Fundamentals of matter transfer
  - 2.1.3. Matter transfer coefficients. Phase Equilibrium
  - 2.1.4. Distribution coefficients
  - 2.1.5. Separation factor

- 2.2. Distillation operations
  - 2.2.1. Vapor-liquid equilibrium
  - 2.2.2. Distillation and rectification of binary mixtures
  - 2.2.3. Parameters of Influences in the Rectification Process. Equipment
  - 2.2.4. New distillation processes in the food industry
  - 2.2.5. Applications in the Food Industry
- 2.3. Extraction operations
  - 2.3.1. Solubility of solids in fluids. Solid-liquid extraction
  - 2.3.2. Washing. Liquid-liquid extraction
  - 2.3.3. Supercritical Fluid Extraction
  - 2.3.4. Influential parameters in the extraction processes. Equipment
  - 2.3.5. New extraction processes in the food industry
  - 2.3.6. Applications in the Food Industry
- 2.4. Adsorption and ion exchange
  - 2.4.1. Adsorption equilibrium
  - 2.4.2. Adsorption kinetics and stepwise operation
  - 2.4.3. Adsorption columns
  - 2.4.4. Influence parameters and ion exchange processes
  - 2.4.5. Ion exchange resins and associated equipment
  - 2.4.6. Applications in the Food Industry
- 2.5. Dehydration and drying operations
  - 2.5.1. Psychrometrics and water activity
  - 2.5.2. Hot-air drying
  - 2.5.3. Freeze-drying
  - 2.5.4. Parameters influencing these processes and associated equipment
  - 2.5.5. Applications in the Food Industry
- 2.6. Particle formation processes
  - 2.6.1. Crystallization and nucleation
  - 2.6.2. Crystal growth
  - 2.6.3. Parameters influencing these processes and associated equipment
  - 2.6.4. Applications in the Food Industry
- 2.7. Membrane separation processes
  - 2.7.1. Membrane separation fundamentals and classification
  - 2.7.2. Influence parameters of the most common membrane separation operations in the food industry
  - 2.7.3. Characteristics of these operations and associated equipment
  - 2.7.4. Applications in the Food Industry
- 2.8. Distillation and rectification
  - 2.8.1. Introduction. Vapor-liquid equilibrium
  - 2.8.2. Closed or equilibrium distillation and open or differential distillation
  - 2.8.3. Rectification: Calculation of the number of plates required by the McCabe-Thiele method
  - 2.8.4. Rectification equipment (Plate and filling columns)
  - 2.8.5. Food Industry Applications
- 2.9. Leaching
  - 2.9.1. Introduction. Matter transfer in leaching: Extraction rate and factors influencing extraction rate
  - 2.9.2. Calculation of leaching operations
  - 2.9.3. Extraction equipment
  - 2.9.4. Leaching Applications in the Food Industry
- 2.10. Gas clarification
  - 2.10.1. Principles governing gas clarification
  - 2.10.2. Gas clarification equipment



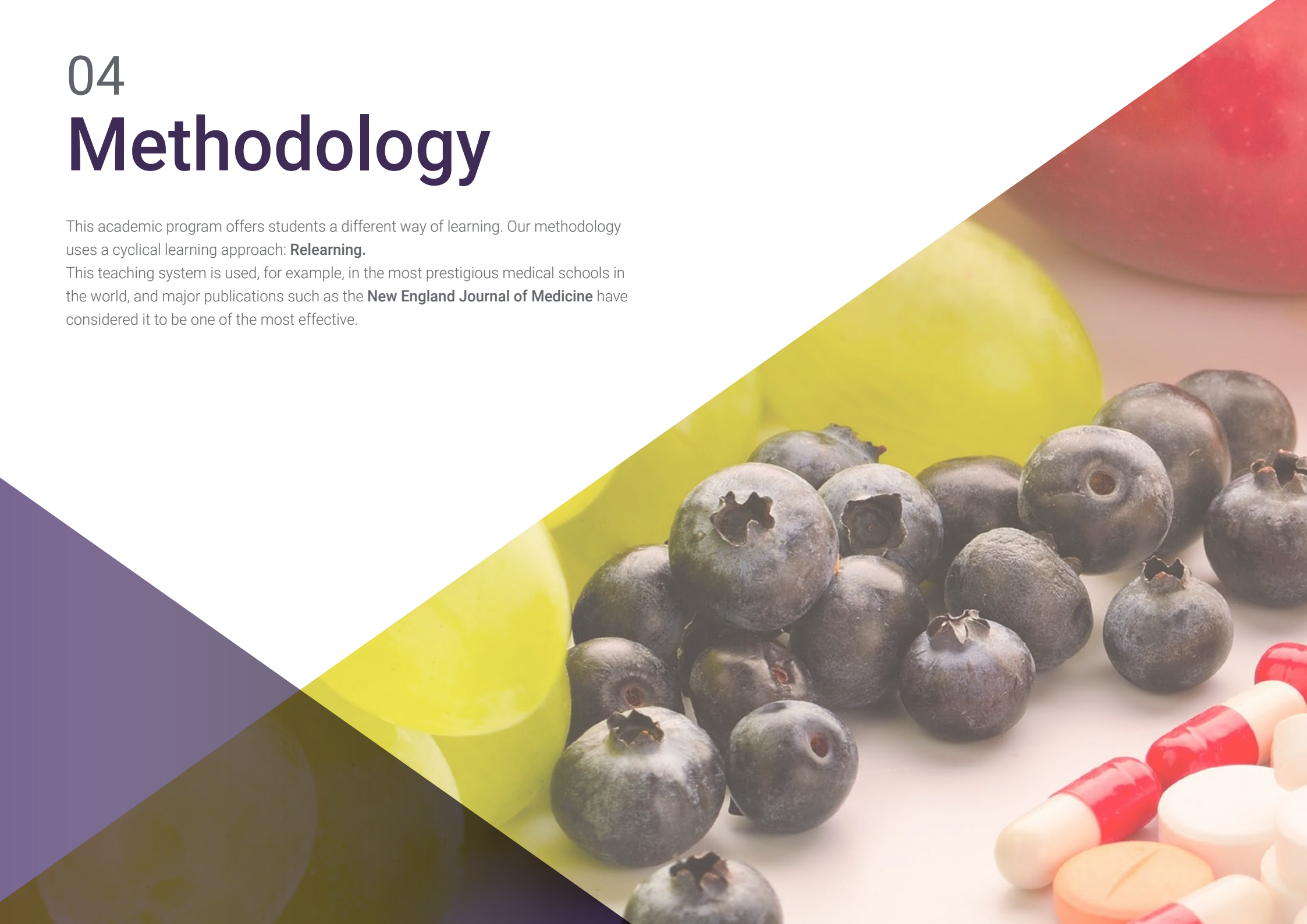
*With this Postgraduate Certificate you will have access to several job opportunities in the food industry, such as food processing companies, analysis laboratories, food packaging and preservation companies”*

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"*

## 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.

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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. 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 Pressing, Evaporation and Heat Transfer Operations 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.





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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 Pressing, Evaporation and Heat Transfer Operations in 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 Pressing, Evaporation and Heat Transfer Operations in 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

**tech** technological  
university

personalized service innovation

knowledge present  
online training

development languages

virtual classroom

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