

# Postgraduate Certificate

## Science and Technology of Milk and Derivative Products





## Postgraduate Certificate Science and Technology of Milk and Derivative Products

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

Website: [www.techtute.com/us/nutrition/postgraduate-certificate/science-technology-milk-derivative-products](http://www.techtute.com/us/nutrition/postgraduate-certificate/science-technology-milk-derivative-products)

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# 01

# Introduction

The dairy industry is constantly searching for more efficient processes for the production of its products. This includes the development of more sustainable production techniques, the implementation of cutting-edge milk processing technologies and the creation of new nutritious dairy products. For this reason, it is important to have professionals specialized in this area and with the knowledge that this program will provide to its students, they will become part of the best specialists in this field, since they will have an academic itinerary prepared by experts in this field. This, by means of a 100% online methodology online methodology that will allow them to have more control over their time.





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*The best multimedia content and a curriculum fully adapted to the needs of the market will be key to your growth in the dairy industry”*



With technological and scientific advances and the changing demands of consumers, food safety challenges have increased and responding to them must be an exercise carried out by professionals. For this reason, TECH provides this Postgraduate Certificate that is focused on providing its students with the most important concepts about the handling of dairy foods with technologies and the integration of scientific terms in this process.

In this way, students will not only deepen their knowledge in this particular field, but will also increase their skills to apply everything they have learned in an advanced way. This will be possible, based on a study plan that has been designed from the demands that exist within the milk production market, which includes the chemical formulas of the composition of this food and the reactions that it has when subjected to certain spaces.

In addition, the student will learn in depth about the technologies that allow the proper handling of products derived from milk, in order to implement them in a professional environment and thus ensure their quality. With this, the student will be fully qualified to be part of this industry and provide their knowledge to improve treatment processes.

All this, thanks to the innovative Relearning methodology, which allows students to study from home and have greater time flexibility, because they will have access 24 hours a day to the multimedia resources found in the online campus. In addition, you will be able to strengthen your competencies and increase your ability to solve problems, since you will analyze practical cases that will place you in a real scenario.

This **Postgraduate Certificate in Science and Technology of Milk and Derivative Products** 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 experts in Science and Technology of Milk and Derivative Products
- The graphic, schematic and eminently practical contents of the program provide scientific and practical information on those 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



*A Postgraduate Certificate that gives you the necessary tools to access the best job offers in the sector"*

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*Learning at your own pace and being in full control of your study time are two benefits this program offers”*

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 prestigious reference societies and 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.

*Take advantage of the multimedia resources offered by TECH to achieve interactive and stimulating learning.*

*Access the most up-to-date, high-quality materials to take your career to the next level.*



# 02 Objectives

The main objective of this educational program is to introduce students to the latest developments in the Food Industry, providing them with an in-depth understanding of how science contributes to the preservation of dairy products and the implementation of technologies for their treatment. In this way, students will be prepared to develop effective strategies to reduce the risks of contamination during the production of these foods. All this will be achieved through the study of multimedia content that will strengthen students' skills in this area.







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*Expand your career opportunities by  
gaining expertise in dairy processing”*



## General Objectives

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- Know the influence that chemical engineering has had in recent years in the production and creation of foodstuffs
- Identify the main quality processes to which food products are subjected
- Apply knowledge of food chemistry in dietetics and nutrition
- Recognize the influence of Bromatology and its related aspects in the qualitative and quantitative composition of food
- Analyze new technologies and their contribution to the food production process



*Get ready to be part of a promising future in the dairy industry with this Postgraduate Certificate"*





## Specific Objectives

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- Describe the phases and components of milk from the physical and chemical points of view, inferring their relationship with the technological aptitudes, as well as the most important factors of variation of milk composition
- Identify and describe the operations of obtaining, collecting and transporting milk, and explain how the way they are carried out affects the quality of the raw material that reaches the industry
- Know and understand the operation of the equipment and installations used in the dairy industry for the technological treatment and packaging of milk, and for the production of different dairy products
- Design and plan the sampling of milk and dairy products, and to perform basic compositional, physicochemical and microbiological analysis

03

# Structure and Content

The curriculum of this Postgraduate Certificate has been created by recognized experts in the Food Industry field, with the purpose of offering students a high quality education. In this way, students will be able to acquire specialized knowledge in the application of science in the preservation of milk and its derivatives, as well as the implementation of technologies in the handling process. This will be achieved through the study of multimedia resources and the analysis of case studies, which will allow students to develop excellent professional skills in this field.





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*A curriculum developed by the best experts in this field that will allow you to broaden your knowledge”*



## Module 1. Science and technology of milk and milk products

- 1.1. Introduction to the dairy sector
  - 1.1.1. Milk and dairy products: concepts and definitions. Milk Science and Technology: concept and relationships with other sciences and disciplines
  - 1.1.2. The situation of the dairy sector at the global level
- 1.2. Chemical composition of milk I
  - 1.2.1. General composition of milk. Composition variation factors
  - 1.2.2. Milk minerals. Factors affecting the mineral composition of milk
    - 1.2.2.1. Physical equilibrium between minerals in milk
    - 1.2.2.2. Trace Elements
  - 1.2.3. Milk carbohydrates
    - 1.2.3.1. Lactose properties of technological interest: solubility, crystallization, hydrolysis and the Maillard reaction
    - 1.2.3.2. Technological problems of lactose
    - 1.2.3.3. Effects of other industrial treatments on lactose
  - 1.2.4. Lipid components of milk. Fat emulsion in milk
    - 1.2.4.1. The fat globule: size, composition, lipid nature
    - 1.2.4.2. Effects of industrial treatments on fat emulsion: agitation, homogenization and other treatments
- 1.3. Chemical composition of milk II
  - 1.3.1. Milk lipid rancidity
    - 1.3.1.1. Lipolytic enzymes present in milk: activation and inhibition
  - 1.3.2. Auto-oxidation of milk lipids
    - 1.3.2.1. Sensitivity of milk to lipid autoxidation
    - 1.3.2.2. Intrinsic and extrinsic factors affecting milk fat autooxidation
  - 1.3.3. Other milk fat alterations
  - 1.3.4. Nitrogenous components of milk
    - 1.3.4.1. The casein fraction of milk and its composition
    - 1.3.4.2. Micellar structure and stability
- 1.4. Chemical composition of milk III
  - 1.4.1. Destabilization of micelles: action of proteolytic enzymes, acidification and addition of salts
  - 1.4.2. Whey protein
    - 1.4.2.1. Effects of industrial processing on nitrogenous substances in milk





- 1.4.3. Enzymes of interest in milk
  - 1.4.3.1. Classification: lipases, esterases, phosphatases and proteases
  - 1.4.3.2. Enzymes of specific interest: xanthine oxidase, superoxide dismutase, catalase and lactoperoxidase
- 1.4.4. Milk vitamins
  - 1.4.4.1. Liposoluble Vitamins
  - 1.4.4.2. Hydrosoluble Vitamins
- 1.5. Physical-chemical and microbiological properties of milk
  - 1.5.1. Introduction to essential physicochemical parameters
    - 1.5.1.1. pH and titratable acidity
    - 1.5.1.2. Cryoscopic point
  - 1.5.2. Surface tension and viscosity. Electrical conductivity
  - 1.5.3. Concept and microbiological importance of milk
    - 1.5.3.1. Origin of milk microorganisms
    - 1.5.3.2. Microbial groups of technological interest
    - 1.5.3.3. Microorganisms of technological interest
  - 1.5.4. Effects of industrial treatments: refrigeration, heat treatment, homogenization
- 1.6. General operations in packaged milks
  - 1.6.1. Conditions for milk collection and transport in the industry
    - 1.6.1.1. Receipt and control of milk in the industry: entry control, storage and physical purification
    - 1.6.1.2. Automated milk testing methods
  - 1.6.2. Pasteurization of milk: high and low pasteurization
    - 1.6.2.1. Technological problems associated with pasteurization
    - 1.6.2.2. Operation of a pasteurization plant
  - 1.6.3. Control of pasteurized milk
  - 1.6.4. Sanitized milk packaging
  - 1.6.5. Sterilized milk and UHT milk: definitions
    - 1.6.5.1. Manufacturing problems of sterilized and UHT milk
    - 1.6.5.2. Indirect and direct UHT treatment systems
    - 1.6.5.3. UHT milk controls
- 1.7. Partially dehydrated milk technologies
  - 1.7.1. Evaporated milk: types and manufacturing technology
  - 1.7.2. Condensed milk: types and manufacturing technology
  - 1.7.3. Treatment and authorized addition of raw materials



- 1.7.4. Milk powder: types and manufacturing technology
  - 1.7.4.1. Manufacture of instant milk powder
  - 1.7.4.2. Treatments, authorized additions and raw materials
- 1.8. Cream and butter
  - 1.8.1. Definition and commercial types of cream
    - 1.8.1.1. Cream manufacture: skimming, deacidification, homogenization, deodorization, packaging and storage
    - 1.8.1.2. Treatments, authorized additions and raw materials
  - 1.8.2. Controls in the manufacturing plant
  - 1.8.3. Definition and types of butter
    - 1.8.3.1. Butter production by continuous methods
    - 1.8.3.2. Butter manufacture by discontinuous methods
    - 1.8.3.3. Treatments, authorized additions and raw materials
  - 1.8.4. Controls in the manufacturing plant
- 1.9. Dairy derivatives technology
  - 1.9.1. Definition and classification of cheeses
  - 1.9.2. General cheese making technology
    - 1.9.2.1. Primary processes: Milk selection, pasteurization, coagulation, coagulation, etc.
    - 1.9.2.2. Secondary processes: draining, molding and pressing and salting
  - 1.9.3. Cheese ripening: conditioning factors and biochemistry
  - 1.9.4. Specific cheese making technologies
    - 1.9.4.1. Continuous and centrifugal dewatering methods
    - 1.9.4.2. Authorized additions and authorized raw materials
  - 1.9.5. Microbiological criteria for dairy derivatives
- 1.10. Dairy derivatives technology
  - 1.10.1. Definition and Classification
  - 1.10.2. Milk subjected to acid fermentation: yoghurts
  - 1.10.3. Milk subjected to acid-alcoholic fermentation
  - 1.10.4. Additives and authorized raw materials
  - 1.10.5. Applicable microbiological criteria





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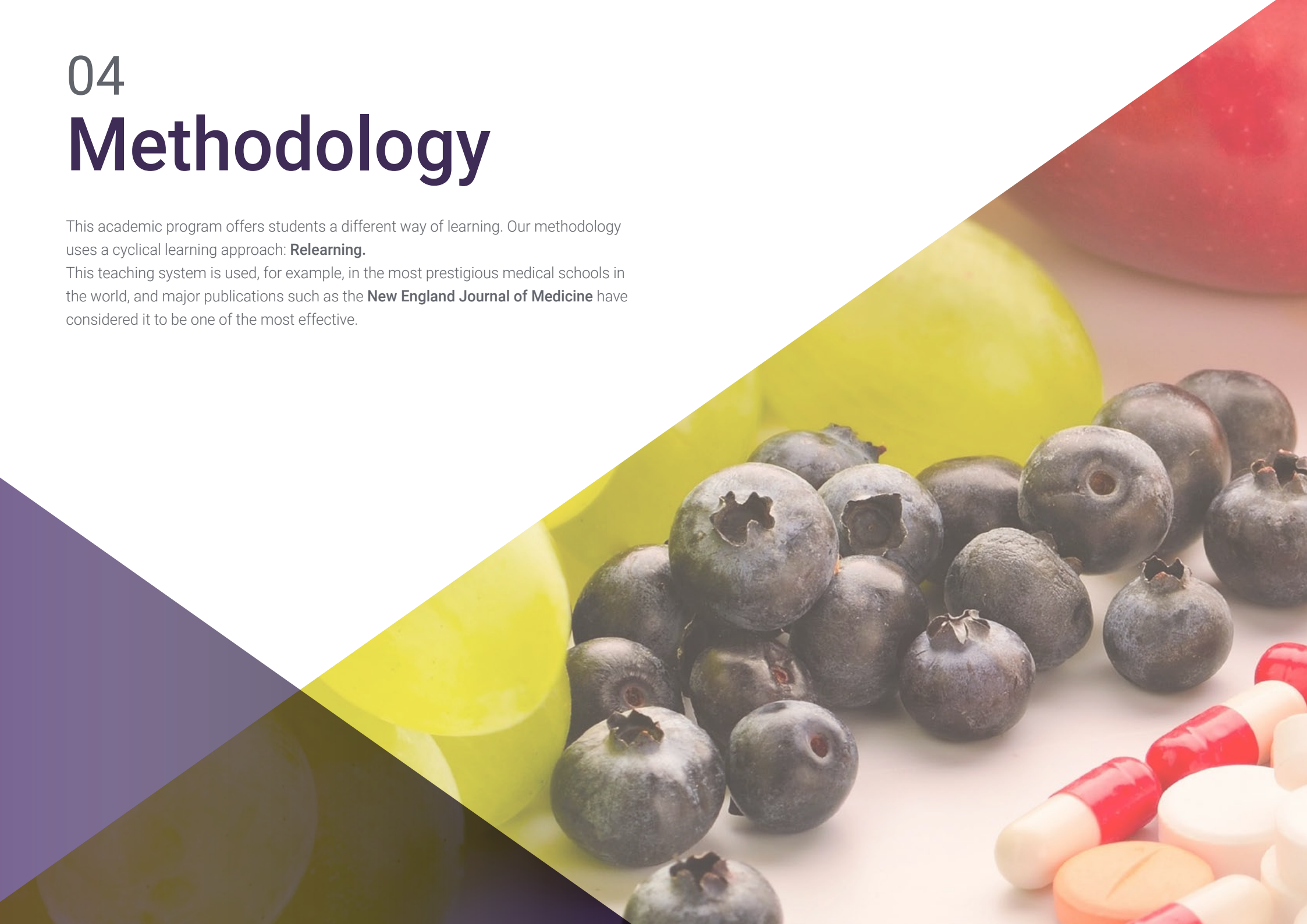
*If your goal is to achieve professional excellence, TECH will help you achieve that goal by providing you with the tools you need to achieve it”*

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.

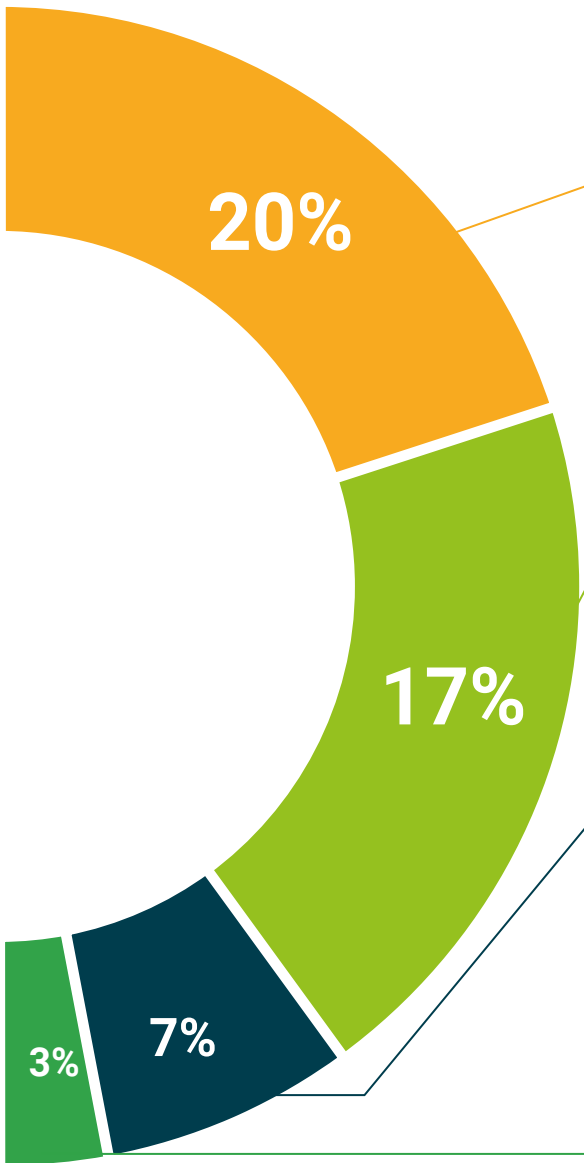
This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



#### 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 Science and Technology of Milk and Derivative Products 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”*



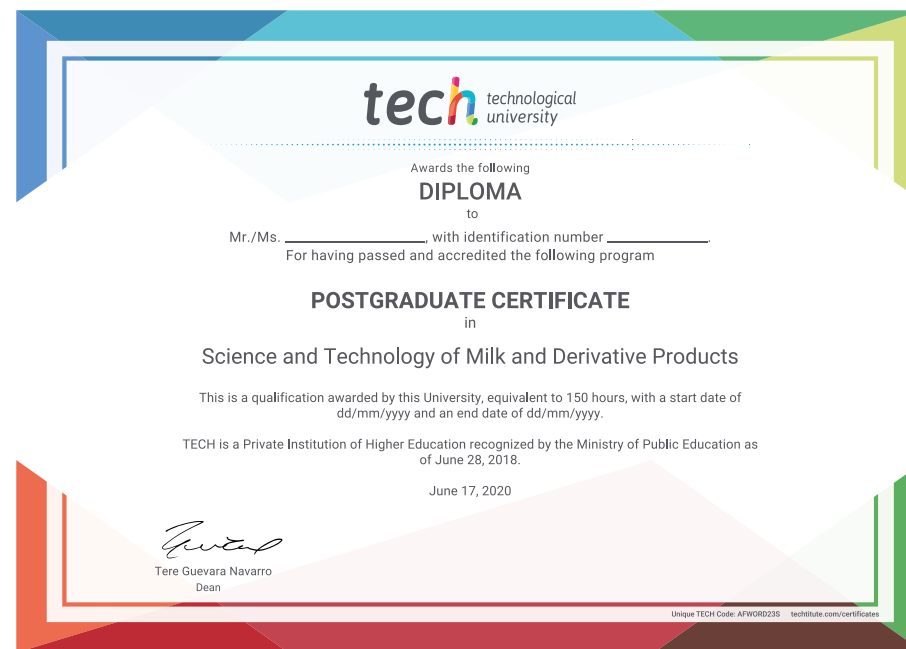
This **Postgraduate Certificate in Science and Technology of Milk and Derivative Products** contains the most complete and up-to-date scientific on the market.

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.

Program: **Postgraduate Certificate in Science and Technology of Milk and Derivative Products**

Official N° 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  
development languages  
virtual classroom



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