

Professional Master's Degree

Comprehensive Risk Analysis and Assessment in Food Industry





Professional Master's Degree

Comprehensive Risk Analysis and Assessment in Food Industry

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

Website: www.techtute.com/us/nutrition/professional-master-degree/master-comprehensive-risk-analysis-assessment-food-industry

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01

Introduction

The food industry has grown in recent years in an increasingly globalized world thanks to new technologies, advances in biology and chemistry, mainly aimed at the creation of food products and their preservation. However, this drive is coupled with the social and cultural factors specific to each country. In this scenario of continuous progress, this program seeks to offer the Nutrition professionals the most updated knowledge on food hygiene, analysis and quality control and food safety. To this end, the graduates have at their disposal the latest didactic tools applied to academic programs, which they can access 24 hours a day from a computer with an Internet connection.





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*Thanks to this Professional Master's Degree
you will be up to date on the latest techniques
used in risk assessment and food safety”*

Improvements in food textures, taste, viscosity, nutrient stability and preservation would not be possible without the progress made in recent years by the food industry. A sector that has grown, not only thanks to consumption, but also to the demands of consumers themselves and to the control and safety measures imposed by the different regulations in force.

In food safety and quality there is a great challenge to avoid food outbreaks that could affect millions of people and spread in different countries due to the large international distribution of products. Faced with this reality, TECH has designed a program taught exclusively online, which will allow the nutrition professional to delve into advances in microbiology, new technologies applied in product development, as well as the main techniques of quality control of products.

A program where you will have a specialized faculty that will introduce you to the latest developments in the industry, viruses, prions and other foodborne biohazards, the development of microorganisms in or new techniques used in risk analysis and safety measures. For this, the professionals have multimedia resources (video summaries, videos in detail) and specialized readings that will lead them in a much more visual and dynamic way to be up to date in Food Safety Analysis and Assessment.

In addition, this university program uses the Relearningmethod, which allows students to advance in a much more natural way during the 12 months of this program, reducing even the long hours of study.

The specialists are thus faced with an excellent opportunity to obtain the most exhaustive and recent information on the Food Industry in a convenient academic format. Students only need an electronic device with an Internet connection (Computer, Tablet or mobile) to access the syllabus of this program. In addition, they have the freedom to distribute the teaching load, making it even easier to reconcile a university program with work and/or personal responsibilities.

This **Professional Master's Degree in Comprehensive Risk Analysis and Assessment in 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 experts in the food industry
- 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



Access to a 100% online program, without classes with timetables, designed for Nutrition professionals who wish to update their knowledge in the Food Industry”

“

With this program you will be able to deepen in the scientific-technical advances of food and its relationship with cultural and technological progress”

Learn more about the mechanisms of food preservation and the prevention of microbial spoilage.

You will be able to get even closer to the progress of the sector thanks to the case studies on food safety provided in this program.

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 professionals 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 professionals must try to solve the different professional practice situations that are presented throughout the academic course. For this purpose, the students will be assisted by an innovative interactive video system created by renowned experts.



02 Objectives

The main goal of this Professional Master's Degree is to ensure that the Nutrition professionals obtain a successful update of their knowledge in the Comprehensive Risk Analysis and Assessment in Food Industry. For this, TECH provides innovative teaching tools that will keep you up to date in microbiology, food hygiene, quality control mechanisms and traceability in the food chain and existing safety management regulations.



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TECH provides you with the most innovative pedagogical tools to keep you up to date in a more dynamic way on risk assessment methods in the Food Industry”



General Objectives

- Acquire basic knowledge on epidemiology and prophylaxis
- Understand and distinguish the physicochemical parameters that affect microbial growth in food
- Identify the differential nature of acellular organisms (viruses, viroids and prions) in terms of their structure and mode of replication, with respect to eukaryotic and prokaryotic cellular models



You will be able to refresh your knowledge on food safety risk assessment and control processes thanks to this TECH program"





Specific Objectives

Module 1. Fundamentals of Microbiology

- ♦ Recognize the levels of organization of prokaryotic and eukaryotic microorganisms, as well as to relate their main structures to their function
- ♦ Understand the basis of microbial pathogenicity and the defense mechanisms of the human body against existing pathogens
- ♦ Point out the main techniques and strategies for the inhibition, destruction or elimination of microbial populations
- ♦ Understand and interrelate the main mechanisms of genetic exchange in microorganisms and their application in food biotechnology

Module 2. General Chemistry

- ♦ 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

Module 3. Microbiology and Food Hygiene

- ♦ Learn the main transformative, pathogenic and beneficial microorganisms in food
- ♦ Know the mechanisms of food preservation and know how to prevent microbial spoilage of food
- ♦ Know how to identify and differentiate the main elements causing foodborne pathologies: microorganisms, toxins, viruses and parasites
- ♦ Learn about the beneficial effects of microorganisms in the field of food
- ♦ Identify and understand the most important elements of a microbiology laboratory
- ♦ Evaluate the beneficial effects of microorganisms in foods
- ♦ Learn and apply techniques for the detection of microorganisms in food

Module 4. Food, technologies and culture

- ♦ Analyze the historical-cultural evolution of the transformation and consumption of foodstuffs or of specific food groups
- ♦ Relate the progress in the scientific-technical knowledge of food with cultural and technological progress
- ♦ Identify factors that influence the choice and acceptability of foods
- ♦ Recognize the role of cultural norms in food customs and regulations, as well as in the role of food in society
- ♦ Differentiate the essential characteristics of foods and branches of the food industry
- ♦ in the context of today's food
- ♦ Analyze trends in food production and consumption

Module 5. Biochemistry and Food Chemistry

- ♦ Know, understand and use the principles of chemical and biochemical reactions of foods in an appropriate professional context
- ♦ Identify and use the principles of food components and their physicochemical, nutritional, functional and sensory properties
- ♦ Acquire skills and abilities in food analysis
- ♦ Ability to identify the problems associated with different foods and their processing, the different technological processes together with the transformations that the products may undergo during these processes

Module 6. Food and Public Health

- ♦ To know the distinguishing fact of human nutrition, interrelationships between nature and culture
- ♦ Acquire a good understanding of individual and social eating behaviors
- ♦ Know the fundamentals and general systems of disease prevention, health promotion and protection, as well as the etiologies and epidemiological factors relating to foodborne diseases
- ♦ Identify health problems associated with the use of food additives
- ♦ Appreciate and recognize the sanitary and preventive importance of cleaning, disinfection, disinsecting and pest control programs in the food chain
- ♦ Classify the main social and economic implications of zoonoses

Module 7. Analysis and Quality Control

- ♦ Recognize food components and their physicochemical, nutritional, functional and sensory properties
- ♦ Acquire and apply skills and abilities in food analysis during professional practice
- ♦ Develop and apply quality control and traceability mechanisms in the food chain
- ♦ Design and develop experimental tests to evaluate food and food processes
- ♦ Understand the bases and principles of the methods used for quality control and food authenticity

Module 8. Food Industry

- ♦ Controlling and optimizing processes and products in the food industry. Manufacturing and preserving foodstuffs
- ♦ Develop new processes and products
- ♦ Understand the industrial processes of food processing and preservation, as well as packaging and storage technologies
- ♦ Discover the transformation and preservation processes particular to the main types of food industries
- ♦ Identify the process and product control and optimization systems applied to the main types of food industries
- ♦ Apply the knowledge of transformation and preservation processes to the development of new processes and products

Module 9. Risk Analysis in the Food Industry

- ♦ Knowing the factors that influence microbial growth in different foods for human consumption
- ♦ Identify, analyze and evaluate the biological, chemical and physical hazards that can occur during all stages of the food chain
- ♦ Identify the main microorganisms and parasites responsible for foodborne diseases
- ♦ Understand and recognize the public health significance of foodborne diseases and the control measures applicable in each case
- ♦ Understand how to apply available web resources to search for information related to food safety management and assessment

Module 10. Quality and Food Safety Management

- ♦ Identify and interpret the requirements of the food safety management standard (UNE EN ISO 22000) for its subsequent application and evaluation in food chain operators
- ♦ Develop, implement, evaluate and maintain appropriate hygiene practices, food safety and risk control systems
- ♦ Participate in the design, organization and management of different food services
- ♦ Collaborate in the implementation of quality systems
- ♦ Evaluate, control and manage aspects of traceability in the food supply chain
- ♦ Contribute towards consumer protection within the framework of food safety and quality

03 Skills

This Professional Master's Degree will favor the expansion of competencies on the part of the nutritionists who take this program, given the advanced and updated information that they will obtain during the 1,500 teaching hours that make up this program. In addition, thanks to the didactic resources, including case studies, the methodology shown in the Comprehensive Risk Analysis and Assessment in the Food Industry can be integrated into daily practice.





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This 100% online Professional Master's Degree enhances your skills in the handling and analysis of microorganisms”



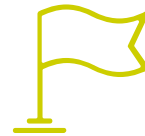
General Skills

- ♦ Understand the mechanisms and parameters for the control of processes and equipment in the food industry
- ♦ Manage and evaluate food safety by identifying hazards, assessing risks and implementing effective control measures along the food chain that can prevent, eliminate or reduce hazards related to food consumption
- ♦ Acquire and handle the appropriate scientific terminology
- ♦ Recognize the different types of microbial metabolism and their nutritional requirements, linking it to their development in different types of foods

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Improve your skills in public health and nutrition thanks to the advanced content provided by this university program”





Specific Skills

- Design and evaluate tools that promote food safety management throughout the food chain to protect public health
- Plan and develop sampling plans for food analysis and to know the procedure to establish food safety objectives
- Identify the concepts of public health and risk prevention related to food consumption habits and food safety
- Collect and interpret relevant data on the biochemical reactions of food to make judgments that include a reflection on its organoleptic quality, shelf life and associated risks that it presents
- Knowing how to convey information, ideas, problems and solutions to both specialized and non-specialized audiences
- Acquire the basic skills to handle and analyze microorganisms, following the guidelines of good laboratory practices

05

Structure and Content

The syllabus of this Professional Master's Degree has been designed to offer in 10 modules the update required by any nutrition professional in the field of Comprehensive Risk Analysis and Assessment in the Food Industry. This way, they can easily delve from any device with an Internet connection in the microbial alterations of food, sampling techniques and sampling or epidemiological factors of diseases transmitted by meat or fish. All this, in addition completed with essential readings and the latest studies that address food safety.



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You will get the latest information on natural foods, organic foods and biological foods from this university program”

Module 1. Fundamentals of Microbiology

- 1.1. Introduction to Microbiology
 - 1.1.1. Concept of Microbiology and Historical Aspects
 - 1.1.2. Prokaryotic Cell Model
 - 1.1.2.1. Morphological
 - 1.1.2.2. Structure and Function
 - 1.1.3. Relevance of Microorganisms in Society
- 1.2. Observation of Microorganisms. Microscopy and Staining
 - 1.2.1. Basic Concepts of Microscopy
 - 1.2.2. Types of Microscopes: Structure and Function
 - 1.2.2.1. Optical Microscope
 - 1.2.2.2. Electronic Microscope
 - 1.2.2.3. Fluorescence Microscope
 - 1.2.3. Types of Staining Most Commonly Used in Microbiology
 - 1.2.3.1. Grams Stain
 - 1.2.3.2. Endospore Staining
 - 1.2.3.3. Acid Fast Bacillus Alcohol Resistant (BAR) staining
- 1.3. Microbial Growth and control
 - 1.3.1. Types of Metabolism in Prokaryotes
 - 1.3.2. Bacterial Growth Curve
 - 1.3.3. Isolation and Conservation Techniques of Microorganisms
 - 1.3.4. Factors Affecting Microbial Growth
 - 1.3.4.1. Bacteriostatic and Bactericidal Agents
 - 1.3.4.2. Environmental Agents
- 1.4. Bacterial Genetics and Taxonomy
 - 1.4.1. Mechanisms of Genetic Exchange
 - 1.4.1.1. Transformation
 - 1.4.1.2. Conjugation
 - 1.4.1.3. Transduction and Bacteriophages
 - 1.4.2. Mutations in the Bacterial Genome
 - 1.4.3. Basic concepts of Systematics and Classification
 - 1.4.4. Bacterial Classification Methods
- 1.5. Pathogenesis of Microorganisms and Microbiota
 - 1.5.1. Microbiota and its Importance
 - 1.5.2. Mechanisms of Pathogenesis
 - 1.5.2.1. Virulence Factors: Capsule and Lipopolysaccharide
 - 1.5.2.2. Routes of Dissemination of Microorganisms
 - 1.5.3. Toxi-infections and food poisoning
 - 1.5.4. Microbial Foodborne Diseases
- 1.6. Virus
 - 1.6.1. General Characteristics: Structure and Composition
 - 1.6.2. Classification of viruses
 - 1.6.3. Life Cycles in Viruses and Crops
 - 1.6.4. Mechanisms of Pathogenesis associated with viruses in foodstuffs
 - 1.6.5. Types of Antivirals
- 1.7. Fungi
 - 1.7.1. General Characteristics: Structure and Composition
 - 1.7.2. Classification of Fungi
 - 1.7.2.1. Ascomycetes
 - 1.7.2.2. Deuteromycetes
 - 1.7.2.3. Basidiomycetes
 - 1.7.2.4. Zygomycetes
 - 1.7.3. Mechanisms of Pathogenesis associated with Fungi in foodstuffs
 - 1.7.3.1. Types of Mycotoxins
 - 1.7.4. Types of Antifungals
- 1.8. Microbiological Immunology: Antigens and Antibodies
 - 1.8.1. Background of Immunology
 - 1.8.2. Types of Immunological Response
 - 1.8.2.1. Innate Response
 - 1.8.2.2. Adaptive Response
 - 1.8.2.3. Regulation of the Immune System
 - 1.8.3. Antibodies Structure and Function
 - 1.8.4. Immune System Evasion Methods



- 1.9. Epidemiology and Prophylaxis
 - 1.9.1. Background in Epidemiology
 - 1.9.2. Epidemiological Chain and Concept of Health
 - 1.9.3. Epidemiology and Preventive Measures for Infectious Diseases in Food
 - 1.9.4. Food as a Route of Disease Transmission
- 1.10. Main Microorganisms of Food Interest
 - 1.10.1. Development of Microorganisms in Food
 - 1.10.2. Types of Food Microorganism
 - 1.10.2.1. Altering Microbes
 - 1.10.2.2. Pathogenic Microbes
 - 1.10.2.3. Beneficial Microbes
 - 1.10.3. Foodborne Diseases

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
- 3.2. Introduction to Food Microbiology
 - 3.2.1. Sterilization and Asepsis Methods
 - 3.2.2. Culture Media: Liquid and Solid, Synthetic or Defined, Complex, Differential and Selective
 - 3.2.3. Isolation of Pure Cultures
 - 3.2.4. Microbial Growth in Discontinuous and Continuous Cultures
 - 3.2.5. Influence of Environmental Factors on Growth
 - 3.2.6. Optical Microscopy
 - 3.2.7. Sample Preparation and Staining
 - 3.2.8. Fluorescence Microscope
 - 3.2.9. Transmission and Scanning Electron Microscopy
- 3.3. Microbial Metabolism
 - 3.3.1. Ways of Obtaining Energy
 - 3.3.2. Phototrophic, Chemolithotrophic and Chemorganotrophic microorganisms
 - 3.3.3. Carbohydrate Catabolism
 - 3.3.4. Degradation of Glucose to Pyruvate (Glycolysis, Pentose Phosphate Pathway and Entner-Doudoroff Pathway)
 - 3.3.5. Lipid and Protein Catabolism
 - 3.3.6. Fermentation
 - 3.3.7. Types of Fermentation
 - 3.3.8. Respiratory Metabolism: Aerobic Respiration and Anaerobic Respiration
- 3.4. Microbial Food Alterations
 - 3.4.1. Microbial Ecology of Foods
 - 3.4.2. Sources of Contamination of Vegetable Foods
 - 3.4.3. Fecal Contamination and Cross Contamination
 - 3.4.4. Factors Influencing Microbial Alteration
 - 3.4.5. Microbial Metabolism in Food
 - 3.4.6. Alteration Control and Preservation Methods
- 3.1. Introduction to Food Microbiology
 - 3.1.1. History of Food Microbiology
 - 3.1.2. Microbial Diversity: Archaea and Bacteria
 - 3.1.3. Phylogenetic Relationships Among Living Organisms
 - 3.1.4. Microbial Classification and Nomenclature
 - 3.1.5. Eukaryotic Microorganisms: Algae, Fungi and Protozoa
 - 3.1.6. Virus

Module 3. Microbiology and Food Hygiene

- 3.5. Foodborne Diseases of Microbial Origin
 - 3.5.1. Foodborne Infections: Transmission and Epidemiology
 - 3.5.2. Salmonellosis
 - 3.5.3. Typhoid and Paratyphoid Fever
 - 3.5.4. *Campylobacter* Enteritis
 - 3.5.5. Bacillary Dysentery
 - 3.5.6. Diarrhea Caused by Virulent *E. coli* Strains
 - 3.5.7. Yersiniosis
 - 3.5.8. *Vibrio* Infections
 - 3.6. Diseases Caused by Foodborne Protozoa and Helminths
 - 3.6.1. General Characteristics of Protozoa
 - 3.6.2. Amoebic Dysentery
 - 3.6.3. Giardiasis
 - 3.6.4. Toxoplasmosis
 - 3.6.5. Cryptosporidiosis
 - 3.6.6. Microsporidiosis
 - 3.6.7. Food-borne Helminths: Flatworms and Roundworms
 - 3.7. Viruses, Prions and Other Foodborne Biohazards
 - 3.7.1. General Properties of Viruses
 - 3.7.2. Composition and Structure of the Virion: Capsid and Nucleic Acid
 - 3.7.3. Virus Growth and Cultivation
 - 3.7.4. Virus Life Cycle (Lytic Cycle): Phases of Adsorption, Penetration, Gene Expression and Replication, and Release
 - 3.7.5. Alternatives to the Lytic Cycle: Lysogeny in Bacteriophages, Latent Infections, Persistent Infections and Tumor Transformation in Animal Viruses
 - 3.7.6. Viroids, Virusoids and Prions
 - 3.7.7. Incidence of Foodborne Viruses
 - 3.7.8. Characteristics of Foodborne Viruses
 - 3.7.9. Hepatitis A
 - 3.7.10. Rotavirus
 - 3.7.11. Scombroid Poisoning
 - 3.8. Microbiological Analysis of Food
 - 3.8.1. Sampling and Sampling Techniques
 - 3.8.2. Reference Values
 - 3.8.3. Indicator Microorganisms
 - 3.8.4. Microbiological Counts
 - 3.8.5. Determination of Pathogenic Microorganisms
 - 3.8.6. Rapid Detection Techniques in Food Microbiology
 - 3.8.7. Molecular Techniques: Conventional PCR and real-time PCR
 - 3.8.8. Immunological Techniques
 - 3.9. Beneficial Microorganisms in Food
 - 3.9.1. Food Fermentation: The Role of Microorganisms in the Production of Foodstuffs
 - 3.9.2. Microorganisms as Food Supplements
 - 3.9.3. Natural Preservatives
 - 3.9.4. Biological Systems of Food Conservation
 - 3.9.5. Probiotic Bacteria
 - 3.10. Microbial Cell biological
 - 3.10.1. General Characteristics of Eukaryotic and Prokaryotic Cells
 - 3.10.2. The Prokaryotic Cell: Components Outside the Cell Wall: Glycocalyx and S-layer, Cell Wall, Plasma Membrane
 - 3.10.3. Flagella, Bacterial Mobility and Taxia
 - 3.10.4. Other Surface Structures, Fimbriae and Pili
- Module 4. Food, Technologies and Culture**
- 4.1. Introduction to Food Culture
 - 4.1.1. Food and Nutrition: man as an omnivorous animal
 - 4.1.2. Concept of Culture and Eating Behavior
 - 4.1.3. Human Nutrition in Different Types of Societies
 - 4.1.4. Concept of Dietary Adaptation: Examples of Dietary Adaptation
 - 4.2. Factors that Influence Feeding
 - 4.2.1. Ideological Meaning of Food
 - 4.2.2. Diet and Gender
 - 4.2.3. Patterns of Eating in Different Cultures: Production, Consumption and Behavior

- 4.3. Religion and Food
 - 4.3.1. Permitted and Prohibited Foods
 - 4.3.2. Relationship Between Food and Religious Rituals
 - 4.3.3. Food Practices and Behaviors Related to Religion
- 4.4. Historical Bases of Food
 - 4.4.1. Main Changes in the Human Diet in Different Stages of History
 - 4.4.2. Prehistory
 - 4.4.3. The Ancient Age
 - 4.4.4. Middle Ages
 - 4.4.5. Repercussion of the Discovery of America in the European Food and the New World
 - 4.4.6. Modern Age
- 4.5. Scientific Advances and Food
 - 4.5.1. The Industrial Revolution
 - 4.5.2. Impact of Scientific Discoveries and Technological Development in Food
- 4.6. Contemporary Feeding I
 - 4.6.1. Socio-economic and Demographic Factors that Condition the Current Diet
 - 4.6.2. Food and Immigration
 - 4.6.3. Man and Abundance in the World, Myths and Realities
- 4.7. Contemporary Feeding II
 - 4.7.1. New Trends in Feeding
 - 4.7.2. Rise of Mass Catering and Fast Food
 - 4.7.3. Interest in Diet and Health
- 4.8. Food Acceptability
 - 4.8.1. Physiological and Psychological conditions
 - 4.8.2. Concept of Food Quality
 - 4.8.3. Evaluation of Food Acceptability
- 4.9. Communication Techniques
 - 4.9.1. Food Marketing
 - 4.9.2. Marketing Elements
 - 4.9.3. Food Advertising Resources
 - 4.9.4. Influence of Advertising on Eating Behavior

- 4.10. Socio-cultural Factors of Feeding
 - 4.10.1. Social relations
 - 4.10.2. Expression of Feelings, Prestige and Power
 - 4.10.3. Social Groups in the Neolithic and Paleolithic Periods

Module 5. Biochemistry and Food Chemistry

- 5.1. Importance of water in foods
 - 5.1.1. Molecular structure and physicochemical properties
 - 5.1.1.2. Concept of water activity
 - 5.1.2. Methods for determining water activity
 - 5.1.3. Sorption isotherms
 - 5.1.4. Molecular mobility of water
 - 5.1.5. State diagrams: phase transition in foodstuffs
 - 5.1.6. Technological importance of water in industrial processes
- 5.2. Functional properties of carbohydrates
 - 5.2.1. Characteristics of carbohydrates in foods
 - 5.2.2. Functional properties of mono- and oligosaccharides
 - 5.2.3. Structure and properties of polysaccharides
 - 5.2.3.1. Formation and stability of starch gels
 - 5.2.3.2. Factors influencing the formation of starch gels
- 5.3. Structural polysaccharides and their functions in foodstuffs
 - 5.3.1. Pectins Cellulose and other cell wall components
 - 5.3.2. Polysaccharides from marine algae
- 5.4. Non-enzymatic and enzymatic browning
 - 5.4.1. General characteristics of non-enzymatic browning
 - 5.4.2. Non-enzymatic browning reactions
 - 5.4.3. Caramelization and Maillard's reaction
 - 5.4.4. Mechanisms and control of non-enzymatic browning
 - 5.4.5. Enzymatic browning reactions and measures to control it
- 5.5. Carbohydrates in fruits and vegetables
 - 5.5.1. Metabolism of fruits and vegetables
 - 5.5.2. Biochemical reactions of carbohydrates in fruits and vegetables
 - 5.5.3. Control of post-harvest conditions: post-harvest treatment

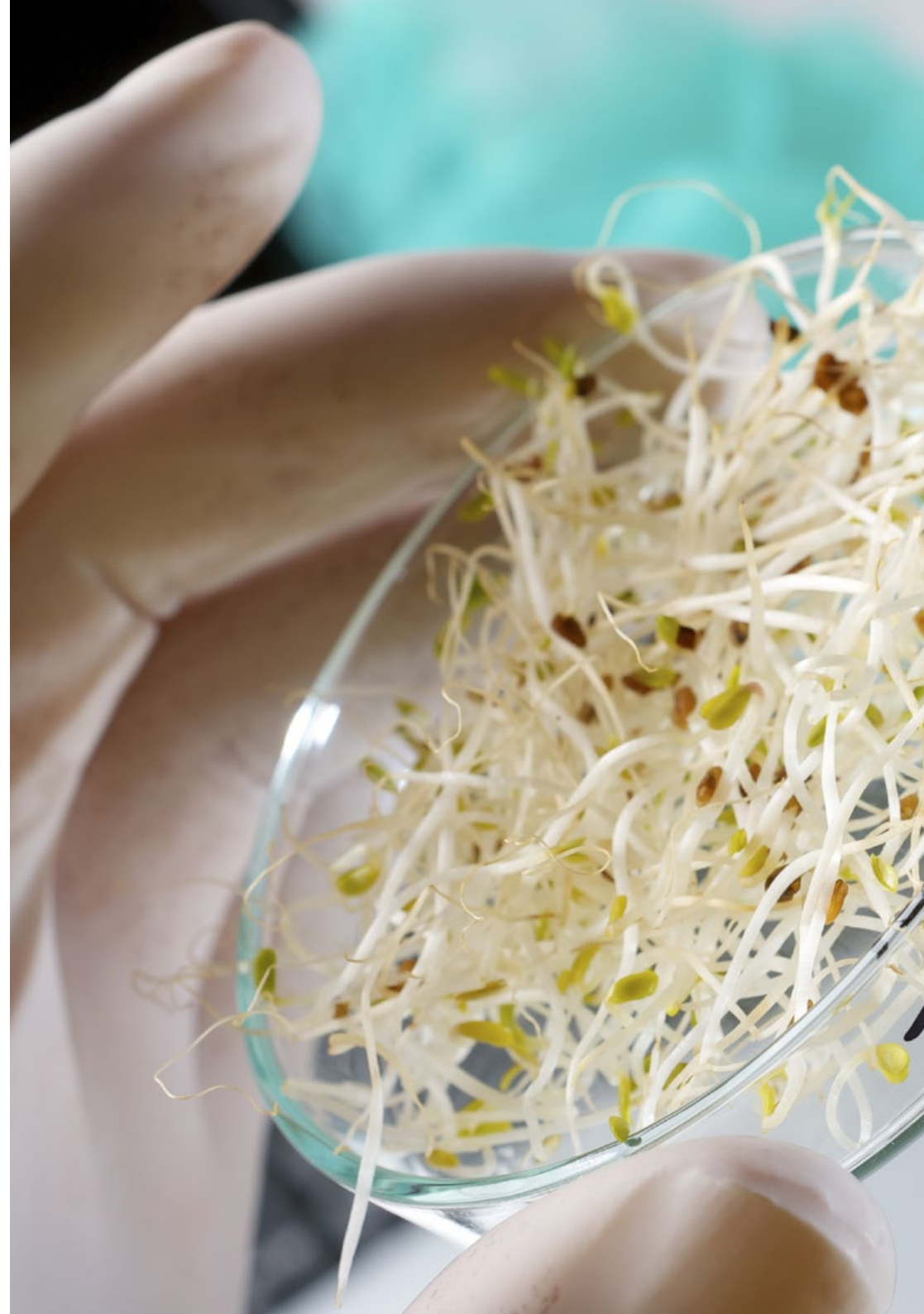
- 5.6. Functional properties of lipids
 - 5.6.1. Characteristics of food lipids
 - 5.6.2. Functional properties of lipids: formation of crystals and melting
 - 5.6.3. Formation and breaking of emulsions
 - 5.6.4. Functions of emulsifiers and HLB value
- 5.7. Lipid modifications in foods
 - 5.7.1. Main lipid modification reactions
 - 5.7.1.1. Lipolysis
 - 5.7.1.2. Autooxidation
 - 5.7.1.3. Enzymatic rancidity
 - 5.7.1.4. Chemical modifications of frying
 - 5.7.2. Physico-chemical treatments of lipid modification
 - 5.7.2.1. Hydrogenation
 - 5.7.2.2. Transesterification
 - 5.7.2.3. Fractionation
- 5.8. Functional properties of proteins and enzymes in food
 - 5.8.1. Amino acid characteristics and protein structure in foodstuffs
 - 5.8.2. Types of bonds in proteins. Functional properties
 - 5.8.3. Effect of treatments on protein systems in breads, meats and milk
 - 5.8.4. Types of food enzymes and applications
 - 5.8.5. Immobilized enzymes and their use in the food industry
- 5.9. Pigments present in food
 - 5.9.1. General characteristics on food
 - 5.9.2. Chemistry and biochemistry of myoglobin and hemoglobin
 - 5.9.3. Effect of storage processing on meat color
 - 5.9.4. Effect of processing on chlorophylls
 - 5.9.5. Structure of carotenoids and anthocyanins
 - 5.9.6. Color modifications in anthocyanins and chemical reactions involving them
 - 5.9.7. Flavonoids

- 5.10. General aspects of food additives
 - 5.10.1. General concept of food additive
 - 5.10.2. Criteria for the use of additives. Labeling of additives
 - 5.10.3. Shelf-life extending additives
 - 5.10.3.1. Preservatives: sulfites and derivatives, nitrites, organic acids and derivatives, and antibiotics
 - 5.10.4. Antioxidants and their characteristics
 - 5.10.5. Additives that improve texture: Thickeners, gelling agents and stabilizers. Anti-caking agents. Flour treatment agents

Module 6. Food and Public Health

- 6.1. Human Nutrition and Historical Evolution
 - 6.1.1. The Natural Element and the Cultural Element Biological Evolution, Tool Handling and Tool Making
 - 6.1.2. The Use of Fire, Hunter-Gatherer Profiles Meat or Vegetarian
 - 6.1.3. Biological, Genetic, Chemical and Mechanical Technologies Involved in Food Processing and Preservation
 - 6.1.4. Food in Roman Times
 - 6.1.5. Influence of the Discovery of America
 - 6.1.6. Food in Developed Countries
 - 6.1.6.1. Food Distribution Chains and Networks
 - 6.1.6.2. The Global Trade "Network" and Small Businesses
- 6.2. Socio-Cultural Significance of Food
 - 6.2.1. Food and Social Communication Social Relationships and Individual Relationships
 - 6.2.2. Emotional Influence of Foods Parties and Celebrations
 - 6.2.3. Relationships Between Diets and Religious Precepts Food and Christianity, Hinduism, Buddhism, Judaism, Islam
 - 6.2.4. Natural Foods, Ecological Foods, and Organic Foods
 - 6.2.5. Typology of Diets: The Standard Diet, Slimming Diets, Curative Diets, Magical Diets and Absurd Diets
 - 6.2.6. Food Reality and Food Perception Protocol for Family and Institutional Meals

- 6.3. Communication and Eating Behavior
 - 6.3.1. Written Media: Specialist Magazines Informative Magazines and Professional Journals
 - 6.3.2. Audiovisual Media: Radio, Television, Internet; Packaging; Advertising
 - 6.3.3. Eating Behavior: Motivation and Intake
 - 6.3.4. Food Labeling and Consumption: Development of Likes and Dislikes
 - 6.3.5. Sources of Variation in Food Preferences and Attitudes
- 6.4. Concept of Health and Diseases and Epidemiology
 - 6.4.1. Health Promotion and Disease Prevention
 - 6.4.2. Laws of Public Health
 - 6.4.3. Food Characteristics Food as a Vehicle for Disease
 - 6.4.4. Epidemiological Methods: Descriptive, Analytical, Experimental, Predictive
- 6.5. Sanitary, Social and Economic Significance of Zoonosis
 - 6.5.1. Zoonosis Classification
 - 6.5.2. Factors
 - 6.5.3. Assessment Criteria
 - 6.5.4. Action Plans:
- 6.6. Epidemiology and Prevention of Diseases Transmitted by Meat and Meat By-Products and Fish and Fish By-Products
 - 6.6.1. Introduction. Epidemiological Factors of Meat-Borne Diseases
 - 6.6.2. Consumption-based Diseases
 - 6.6.3. Preventive Measures for Diseases Transmitted by Meat Products
 - 6.6.4. Introduction. Epidemiological Factors of Fish Borne Diseases
 - 6.6.5. Consumption-based Diseases
 - 6.6.6. Prevention
- 6.7. Epidemiology and Prevention of Diseases Transmitted by Milk and Milk By-Products
 - 6.7.1. Introduction. Epidemiological Factors of Meat-Borne Diseases
 - 6.7.2. Consumption-based Diseases
 - 6.7.3. Preventive Measures for Diseases Transmitted by Dairy Products
- 6.8. Epidemiology and Prevention of Diseases Transmitted by Bread, Pastries, Confectionery and Cakes
 - 6.8.1. Introduction. Epidemiological Factors
 - 6.8.2. Consumption-based Diseases
 - 6.8.3. Prevention



- 6.9. Epidemiology and Prevention of Diseases Transmitted by Preserved and Semi-Preserved Foods, and by Edible Vegetables and Mushrooms
 - 6.9.1. Introduction. Epidemiological Aspects of Preserved and Semi-Preserved Foods
 - 6.9.2. Diseases Caused by Consumption of Canned and Semi-Canned Foods
 - 6.9.3. Sanitary Prevention of Diseases Transmitted by Preserved and Semi-Preserved Foods
 - 6.9.4. Introduction. Epidemiological Aspects of Vegetables and Mushrooms
 - 6.9.5. Diseases Caused by Consumption of Vegetables and Mushrooms
 - 6.9.6. Sanitary Prevention of Diseases Transmitted by Vegetables and Mushrooms
- 6.10. Health Problems Arising from the Use of Additives, Source of Food Poisoning
 - 6.10.1. Naturally Occurring Toxins in Food
 - 6.10.2. Toxins Due to Incorrect Handling
 - 6.10.3. Use of Food Additives

Module 7. Analysis and Quality Control

- 7.1. Introduction to food analysis and control
 - 7.1.1. Food quality. Concept of quality and its evaluation
 - 7.1.2. Main food quality attributes
 - 7.1.3. Quality Standards
 - 7.1.4. Alterations in food quality
 - 7.1.4.1. Physical alterations
 - 7.1.4.2. Chemical alterations
 - 7.1.4.3. Biological alterations
 - 7.1.5. Fraud and adulteration
- 7.2. Food quality control techniques I
 - 7.2.1. Food quality control. Concept. Traceability in quality control
 - 7.2.2. Quality management, control and assurance systems
 - 7.2.3. Statistical Methods Applied to Quality Control
 - 7.2.4. Acceptance control at reception. Statistical Process Control

- 7.3. Techniques in quality control II
 - 7.3.1. Charts for quality control by variables and attributes
 - 7.3.2. Quality assurance of final product
 - 7.3.3. Bases and principles of the methods used for quality control and food authenticity
 - 7.3.4. Molecular biology and immunology techniques
 - 7.3.5. Compositional analysis. Sensory Analysis of Foods
- 7.4. Food quality assessment I
 - 7.4.1. Water content of foods. Importance of water in foods
 - 7.4.1.1. Analytical methods for water content determination
 - 7.4.1.2. Concept of water activity and its importance in foods
 - 7.4.1.3. Analytical methods for the determination of water activity
 - 7.4.2. Carbohydrate content of foods. Carbohydrates in foods
 - 7.4.2.1. Importance of carbohydrates in foods
 - 7.4.2.2. Analytical methods for the determination of carbohydrates
 - 7.4.3. Content of nitrogen compounds in foods. Nitrogen compounds in foods
 - 7.4.3.1. Importance of nitrogen compounds in foods
 - 7.4.3.2. Analytical methods for the determination of nitrogen compounds
 - 7.4.4. Content of lipid compounds in foods. Lipid compounds in foods
 - 7.4.4.1. Importance of nitrogen compounds in foods
 - 7.4.4.2. Analytical methods for the determination of lipid compounds
- 7.5. Food quality assessment II
 - 7.5.1. Vitamin content of foods. Vitamins in foods
 - 7.5.1.1. Importance of vitamins in foods
 - 7.5.1.2. Analytical methods for the determination of Vitamins
 - 7.5.2. Mineral content of foods. Minerals in foods
 - 7.5.2.1. Importance of minerals in foods
 - 7.5.2.2. Analytical methods for the determination of minerals
 - 7.5.3. Content of other food components
 - 7.5.3.1. Phytochemicals in foods
 - 7.5.3.2. Analytical methods for the determination of Phytochemicals
 - 7.5.4. Food additives Additives in the food industry
 - 7.5.4.1. Importance of additives
 - 7.5.4.2. Analytical methods for the determination of additives

- 7.6. Evaluation of the quality of meats and meat by-products
 - 7.6.1. Determination of pH and CRA of fresh meat. PSE or DFD meats
 - 7.6.2. Determination of collagen in meat products
 - 7.6.3. Determination of starch in cooked meat products
- 7.7. Evaluation of the quality of fish, seafood and by-products
 - 7.7.1. Determination of the degree of freshness of fish and shellfish
 - 7.7.1.1. Determination of color, flavor and texture
 - 7.7.1.2. Determination of Anisakis in fish
 - 7.7.1.2.1. Determination of fish species
- 7.8. Evaluation of the quality of milk and milk derivatives
 - 7.8.1. Total solids
 - 7.8.2. Alcohol stability
 - 7.8.3. Butter quality: Fat refractive index
- 7.9. Evaluation of the quality of cereals, legumes and by-products
 - 7.9.1. Determination of the presence of transgenic corn
 - 7.9.2. Determination of the presence of common wheat in semolina
 - 7.9.3. Quality control in legumes
- 7.10. Quality assessment of fruits, vegetables and by-products
 - 7.10.1. Control of fruit and vegetable categorization
 - 7.10.2. Quality control of canned fruits and vegetables
 - 7.10.3. Quality control of frozen fruits and vegetables

Module 8. Food Industry

- 8.1. Cereals and by-products I
 - 8.1.1. Cereals: production and consumption
 - 8.1.1.1. Classification of cereals
 - 8.1.1.2. Current state of research and industrial situation
 - 8.1.2. Basic concepts of cereal grains
 - 8.1.2.1. Methods and equipment for the characterization of flours and bread doughs
 - 8.1.2.2. Rheological properties during kneading, fermentation and baking
 - 8.1.3. Cereal-derived products: Ingredients, additives and adjuvants. Classification and effects

- 8.2. Cereals and by-products II
 - 8.2.1. Baking process: Stages, changes produced and equipment used
 - 8.2.2. Instrumental, sensory and nutritional characterization of cereal-derived products
 - 8.2.3. Application of cold in bakery. Frozen pre-baked breads. Process and product quality
 - 8.2.4. Gluten-free products derived from cereals. Formulation, process and quality characteristics
 - 8.2.5. Pasta products. Ingredients and process. Types of pasta
 - 8.2.6. Innovation in bakery products. Trends in Product Design
- 8.3. Milk and Dairy Products. Eggs and egg products I
 - 8.3.1. Hygienic-sanitary quality of milk
 - 8.3.1.1. Origin and levels of contamination. Initial and contaminating microbiota
 - 8.3.1.2. Presence of chemical contaminants: residues and contaminants
 - 8.3.1.3. Influence of hygiene in the milk production and marketing chain
 - 8.3.2. Milk production. Milk synthesis
 - 8.3.2.1. Factors influencing the composition of milk: extrinsic and intrinsic factors
 - 8.3.2.2. Milking: good process practices
 - 8.3.3. Pre-treatment of milk at the farm: filtration, refrigeration and alternative methods of preservation
 - 8.3.4. Treatments in the dairy industry: clarification and bacto-fugation, skimming, standardization, homogenization, deaeration. Pasteurization. Definition. Procedures, treatment temperatures and limiting factors
 - 8.3.4.1. Types of pasteurizers. Packaging Quality Control Sterilization. Definition
 - 8.3.4.2. Methods: conventional, UHT, other systems. Packaging Quality control Manufacturing defects
 - 8.3.4.3. Types of pasteurized and sterilized milk. Selection of milk. Milkshakes and flavored milks. Mixing process. Enriched milks. Enrichment process
 - 8.3.4.4. Evaporated milk. Condensed milk
 - 8.3.5. Preservation and packaging systems
 - 8.3.6. Quality control of powdered milk
 - 8.3.7. Milk packaging systems and quality control
- 8.4. Milk and Dairy Products. Eggs and egg products I
 - 8.4.1. Dairy Products. Creams and Butter
 - 8.4.2. Manufacturing process. Continuous manufacturing methods. Packaging and preservation. Manufacturing defects and alterations
 - 8.4.3. Fermented Milks: Yoghurt Preparatory treatments of milk. Processes and systems of elaboration
 - 8.4.3.1. Types of yoghurt. Problems in the elaboration. Quality Control
 - 8.4.3.2. BIO products and other acidophilic milks
 - 8.4.4. Cheese-making technology: milk preparatory treatments
 - 8.4.4.1. Obtaining the curd: syneresis. Pressing. Salting
 - 8.4.4.2. Water activity in cheese. Control and conservation of brine
 - 8.4.4.3. Cheese ripening: agents involved. Factors that determine ripening. Effects of contaminating biota
 - 8.4.4.4. Toxicological problems of cheese
 - 8.4.5. Additives and antifungal treatments
 - 8.4.6. Ice cream. Features. Types of ice cream. Processes of elaboration
 - 8.4.7. Eggs and egg products
 - 8.4.7.1. Fresh egg: treatment of fresh egg as raw material for the elaboration of egg derivatives
 - 8.4.7.2. Egg products: Liquid, frozen and dehydrated
- 8.5. Vegetable Products I
 - 8.5.1. Post-harvest physiology and technology. Introduction
 - 8.5.2. Fruit and vegetable production, the need for postharvest preservation
 - 8.5.3. Respiration: respiratory metabolism and its influence on postharvest preservation and deterioration of vegetables
 - 8.5.4. Ethylene: synthesis and metabolism. Implication of ethylene in the regulation of fruit ripening
 - 8.5.5. Fruit ripening: The ripening process, generalities and its control
 - 8.5.5.1. Climacteric and non-climacteric ripening
 - 8.5.5.2. Compositional changes: physiological and biochemical changes during ripening and preservation of fruits and vegetables
- 8.6. Vegetable Products II
 - 8.6.1. Refrigerated preservation. Temperature control in the preservation of fruits and vegetables
 - 8.6.1.1. Technological methods and applications
 - 8.6.1.2. Cold damage and its control
 - 8.6.2. Transpiration: control of water loss in fruit and vegetable preservation
 - 8.6.2.1. Physical Principles. Control systems
 - 8.6.3. Postharvest pathology: main deteriorations and rots during fruit and vegetable preservation. Control systems and methods

- 8.4.1. Fresh-cut products
 - 8.4.1.1. Physiology of vegetable products: handling and preservation technologies
- 8.7. Vegetable Products III
 - 8.7.1. Processing of canned vegetables: General description of a characteristic canning line for vegetables
 - 8.7.1.1. Examples of the main types of canned vegetables and legumes
 - 8.7.1.2. New products of vegetable origin: cold soups
 - 8.7.1.4. General description of a typical fruit packaging line
 - 8.7.2. Juice and nectar processing: juice extraction and juice processing
 - 8.7.2.1. Aseptic processing, storage and packaging systems
 - 8.7.2.2. Examples of lines for obtaining the main types of juices
 - 8.7.2.3. Obtaining and preservation of semi-finished products: cremogenated products
 - 8.7.3. Production of jams, marmalades, jams and jellies: production and packaging process
 - 8.7.3.1. Examples of characteristic processing lines
 - 8.7.3.2. Additives used for the manufacture of jams and marmalades
- 8.8. Alcoholic beverages and oils
 - 8.8.1. Alcoholic beverages: Wine. Manufacturing process
 - 8.8.1.1. Beer: brewing process. Types
 - 8.8.1.2. Spirits and liqueurs: Elaboration processes and types
 - 8.8.2. Oils and fats: Introduction
 - 8.8.2.1. Olive oil: Olive oil extraction system
 - 8.8.2.2. Oilseed oils. Extraction
 - 8.8.3. Animal fats: Refining of fats and oils
- 8.9. Meat and meat by-products
 - 8.9.1. Meat industry: Production and consumption
 - 8.9.2. Classification and functional properties of muscle proteins: Myofibrillar, sarcoplasmic and stromal proteins
 - 8.9.2.1. Conversion of muscle to meat: porcine stress syndrome
 - 8.9.3. Maturation of meat. Factors affecting the quality of meat for direct consumption and industrialization
 - 8.9.4. Curing chemistry: ingredients, additives and curing coadjuvants
 - 8.9.4.1. Industrial curing processes: dry and wet curing processes
 - 8.9.4.2. Nitrite alternatives





- 8.9.5. Raw and raw marinated meat products: fundamentals and problems of their preservation. Characteristics of raw materials
 - 8.9.5.1. Types of Products. Manufacturing operations
 - 8.9.5.2. Alterations and defects
- 8.9.6. Cooked sausages and hams: basic principles of the preparation of meat emulsions. Characteristics and selection of raw materials
 - 8.9.6.1. Technological manufacturing operations. Industrial systems
 - 8.9.6.2. Alterations and defects
- 8.10. Seafood
 - 8.10.1. Seafood Characteristics of technological interest
 - 8.10.2. Main industrial fishing and shellfishing gears
 - 8.10.2.1. Unit operations of fish technology
 - 8.10.2.2. Cold preservation of fish
 - 8.10.3. Salting, pickling, drying and smoking: technological aspects of fish manufacturing
 - 8.10.3.1. Characteristics of the final product. Performance
 - 8.10.4. Marketing

Module 9. Risk Analysis in the Food Industry

- 9.1. Food Safety and Risk Analysis (RA) Principles
 - 9.1.1. Concept of Food Safety. Historical Background
 - 9.1.1.1. First problems encountered in food safety
 - 9.1.1.2. Food crises
 - 9.1.2. Evolution of food safety
 - 9.1.2.1. Food safety in the food industry
 - 9.1.3. Hazard analysis (HA)
 - 9.1.3.1. Definition of hazard and origin of food hazards
 - 9.1.3.2. Hazards of biotic origin
 - 9.1.3.3. Most important sources of food contamination
 - 9.1.3.4. Bacteria and bacterial toxins
 - 9.1.3.5. Food zoonoses. Surveillance of food zoonoses and notifiable food diseases
 - 9.1.4. Emerging, re-emerging and new foodborne diseases: microbial adaptation and anthropogenic factors
 - 9.1.5. Prevention and Control: Barrier Theory and Food Preservation

- 9.2. Hazards of biotic origin in the food industry I: foodborne zoonoses of epidemiological surveillance
 - 9.2.1. General Characteristics: health importance, prevalence, epidemiology, and control measures
 - 9.2.1.1. Brucellosis
 - 9.2.1.2. Tuberculosis
 - 9.2.1.3. Listeria
 - 9.2.1.4. Q fever
 - 9.2.2. Gram-negative bacilli spore products: health importance, prevalence and epidemiology
 - 9.2.2.1. Bacillus
 - 9.2.2.2. Clostridium
 - 9.2.3. Non-sporulating large negative bacilli: health importance, prevalence and epidemiology
 - 9.2.3.1. Campylobacteriosis
 - 9.2.3.2. Salmonellosis
 - 9.2.3.3. Shigellosis
 - 9.2.3.4. *E. coli*
 - 9.2.3.5. *Yersinia*
 - 9.2.3.6. *Vibrio*
- 9.3. Hazards of biotic origin in the food industry II: viruses and prions and parasites
 - 9.3.1. Viruses and prions: general characteristics, health importance, prevalence, control and mitigation measures
 - 9.3.1.1. Norovirus
 - 9.3.1.2. Rotavirus
 - 9.3.1.3. Hepatitis A
 - 9.3.1.4. Hepatitis E
 - 9.3.1.5. Coronavirus
 - 9.3.1.6. Transmissible Spongiform Encephalopathy
 - 9.3.2. Parasites: general characteristics, sanitary importance, prevalence and control and mitigation measures
 - 9.3.2.1. Protozoa: toxoplasma, Giardia and Cripstosporidium
 - 9.3.2.2. Nematodes: Trichinella, Anisakis, Diphylobotrium
 - 9.3.2.3. Trematodes: Taenia, Fasciola, Paragonimus, Clonorchis
- 9.4. Hazards of abiotic origin in the food industry I
 - 9.4.1. Risk assessment of chemical agents in food
 - 9.4.1.1. Health-based guideline values
 - 9.4.1.2. Safety/uncertainty and chemical-specific adjustment factors
 - 9.4.1.3. NOEL/NOAEL, LOEL/LOAEL, no-effect level of exposure
 - 9.4.1.4. Acute reference dose
 - 9.4.2. Naturally occurring compounds in food
 - 9.4.2.1. Toxic products of plant origin
 - 9.4.2.2. Toxic products of animal origin
 - 9.4.2.3. Allergens
 - 9.4.2.4. Control and mitigation measures
 - 9.4.3. Compounds generated during food processing
 - 9.4.3.1. Contaminants originating during food production processes: acrylamides
 - 9.4.3.2. Compounds generated during storage: biogenic amines
 - 9.4.3.3. Exposure assessment
- 9.5. Hazards of abiotic origin in the food industry II
 - 9.5.1. Environmental contaminants and residues from primary production
 - 9.5.1.1. Heavy Metals
 - 9.5.1.2. Persistent organic compounds (POPs)
 - 9.5.1.3. Pesticides
 - 9.5.1.4. Veterinary Drugs
 - 9.5.1.5. Exposure assessment
 - 9.5.2. Control and mitigation measures
 - 9.5.3. Contaminants added during food production processes
 - 9.5.3.1. Food additives
 - 9.5.3.2. Processing aids
 - 9.5.3.3. Materials in Contact with Food
 - 9.5.4. Control and mitigation measures
- 9.6. Sampling Plans and Establishment of Microbiological Criteria in the Food Industry
 - 9.6.1. Basic Sampling Requirements
 - 9.6.2. Sampling Plan and Sampling Errors
 - 9.6.3. Sample preservation, transport and storage
 - 9.6.3.1. Manual of sampling and recording in the laboratory
 - 9.6.4. Examples of application to risk analysis in the food industry

- 9.7. Food industry safety management systems
 - 9.7.1. Introduction to safety management
 - 9.7.2. Prerequisite Plans
 - 9.7.2.1. Prerequisite Concept and Characteristics
 - 9.7.2.2. Water Monitoring Plan
 - 9.7.2.3. Supplier Monitoring Plan
 - 9.7.2.4. Facility and equipment cleaning and disinfection plan
 - 9.7.2.5. Pests Monitoring Plan
 - 9.7.2.6. Training and control plan for handlers and personal hygiene
 - 9.7.2.7. Equipment Maintenance Plan
 - 9.7.2.8. Traceability Plan
 - 9.7.3. A.P.P.C.C.C. implementation
 - 9.7.3.1. Preliminary activities
 - 9.7.3.2. Principles of the A.P.P.C.C. plan
- 9.8. “Food Defense” as a food industry protection measure
 - 9.8.1. Justification of “Food Defense” plans in the food industry
 - 9.8.2. Differences and similarities between food defense and food safety
 - 9.8.3. Elaboration and implementation of a *Food Defense* Plan
 - 9.8.4. Food crisis management in the industry
- 9.9. Risk Assessment and Estimation of Food Safety Objectives
 - 9.9.1. Introduction to Risk Assessment
 - 9.9.2. Tolerable level of consumer protection
 - 9.9.3. Establishment of food safety objectives
 - 9.9.4. Relationship between FSO and quantitative risk assessment
 - 9.9.5. Establishment of an FSO based on quantitative risk assessment
- 9.10. New concepts in food safety management: adequate level of protection and food safety objective
 - 9.10.1. Introduction to food safety management
 - 9.10.2. Appropriated Level of Protection (ALOP)
 - 9.10.3. Food Safety Objective (FSO) and related concepts (Performance Objectives PO)
 - 9.10.4. Relationship between ALOP and FSO

Module 10. Quality and Food Safety Management

- 10.1. Food Safety and Consumer Protection
 - 10.1.1. Definition and Basic Concepts
 - 10.1.2. Quality and Food Safety Evolution
 - 10.1.3. Situation in Developing and Developed Countries
 - 10.1.4. Key Food Safety Agencies and Authorities: Structures and Functions
 - 10.1.5. Food Fraud and Food Hoaxes: The Role of the Media
- 10.2. Facilities, Premises and Equipment
 - 10.2.1. Site Selection: Design and Construction and Materials
 - 10.2.2. Premises, Facilities and Equipment Maintenance Plan
- 10.3. Cleaning and Disinfection Plan (L + D)
 - 10.3.1. Dirt Components
 - 10.3.2. Detergents and Disinfectants: Composition and Functions
 - 10.3.3. Cleaning and Disinfection Stages
 - 10.3.4. Cleaning and Disinfection Programming
- 10.4. Pest Control
 - 10.4.1. Pest Control and Disinsection (Plan D + D)
 - 10.4.2. Pests Associated with the Food Chain
 - 10.4.3. Preventive Measures for Pest Control
 - 10.4.3.1. Traps and Snares for Mammals and Ground Insects
 - 10.4.3.2. Traps and Snares for Flying Insects
- 10.5. Traceability Plan and Good Manipulation Practices (GMP)
 - 10.5.1. Structure of a Traceability Plan
 - 10.5.2. GMP Associated with Food Processing
 - 10.5.2.1. Food Handlers
 - 10.5.2.2. Requirements to be Met
 - 10.5.2.3. Hygiene Training Plans

- 10.6. Elements in the Management of Food Safety
 - 10.6.1. Water as an Essential Element in the Food Chain
 - 10.6.2. Biological and Chemical Agents Associated with Water
 - 10.6.3. Quantifiable Elements of Quality, Safety and Use of Water
 - 10.6.4. Approval of Suppliers
 - 10.6.4.1. Supplier Monitoring Plan
 - 10.6.5. Food Labeling
 - 10.6.5.1. Consumer Information and Allergen Labeling
 - 10.6.5.2. Labeling of Genetically Modified Organisms
- 10.7. Food Crisis and Associated Policies
 - 10.7.1. Triggering Factors of a Food Crisis
 - 10.7.2. Scope, Management and Response to the Food Security Crisis
 - 10.7.3. Alert Communication Systems
 - 10.7.4. Policies and Strategies for Improving Food Quality and Safety
- 10.8. Design of the Hazard Analysis Critical Control Point (HACCP) Plan
 - 10.8.1. General Guidelines to be Followed for its Implementation: Underlying Principles and Prerequisite Program
 - 10.8.2. Management Commitment
 - 10.8.3. Configuration of HACCP Resources
 - 10.8.4. Description of the Product and Identification of its Intended Use
 - 10.8.5. Flow Diagrams
- 10.9. Development of the HACCP Plan
 - 10.9.1. Defining Critical Control Points (CCPs)
 - 10.9.2. The Seven Basic Principles of the HACCP Plan
 - 10.9.2.1. Requirements Identification and Analysis
 - 10.9.2.2. Establishment of Control Measures for Identified Hazards
 - 10.9.2.3. Determination of Critical Control Points (CCP)
 - 10.9.2.4. Defining Critical Control Points (CCPs)
 - 10.9.2.5. Establishment of Critical Limits
 - 10.9.2.6. Determination of Corrective Actions
 - 10.9.2.7. HACCP System Checks

- 10.10. ISO 22000
 - 10.10.1. ISO 22000 Principles
 - 10.10.2. Purpose and Field of Application
 - 10.10.3. Market Situation and Position in Relation to Other Applicable Standards in the Food Chain
 - 10.10.4. Application Requirements
 - 10.10.5. Food Safety Management Policy



A program designed to bring you up to date on food safety management and its application in compliance with current standards”

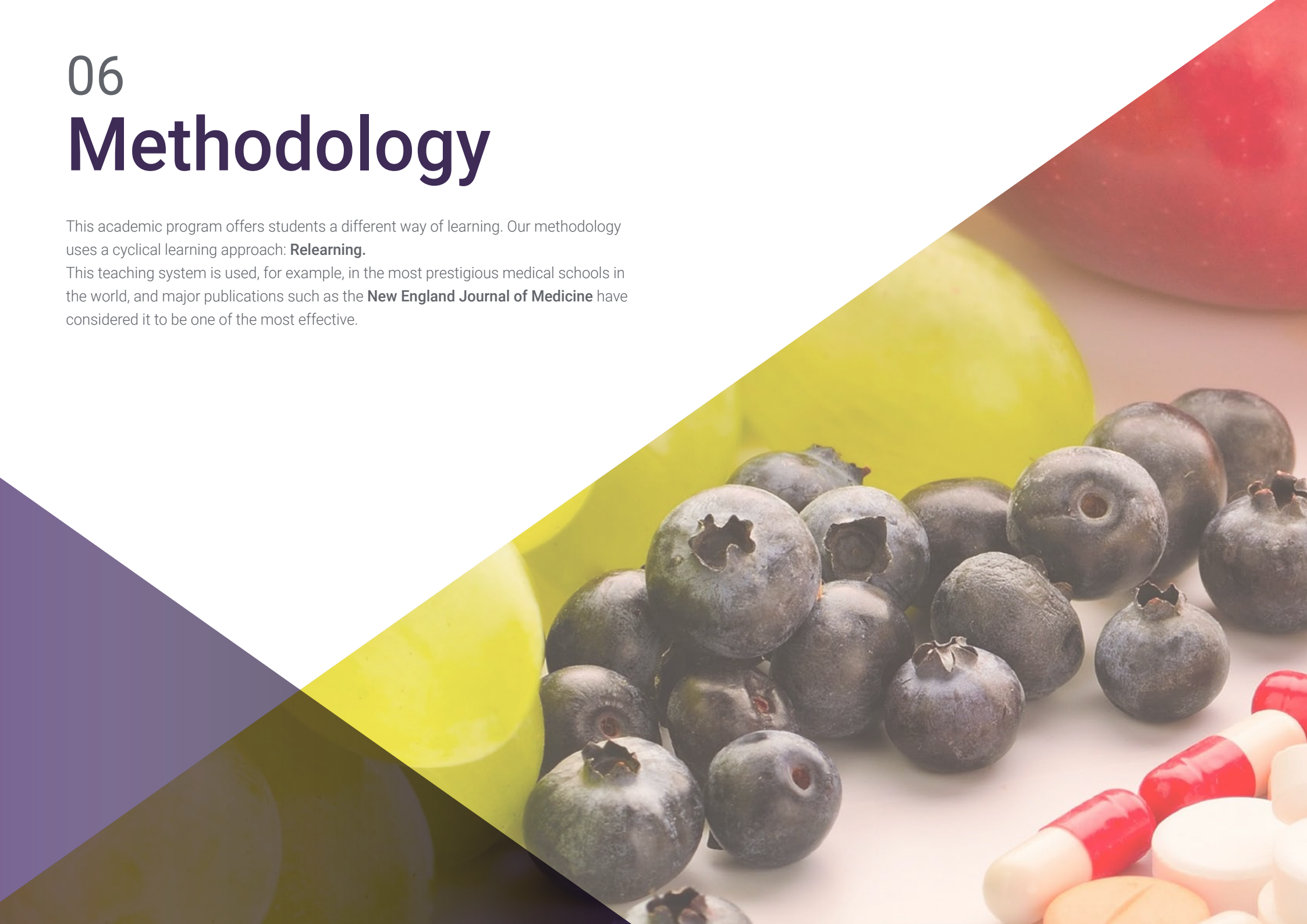


06

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

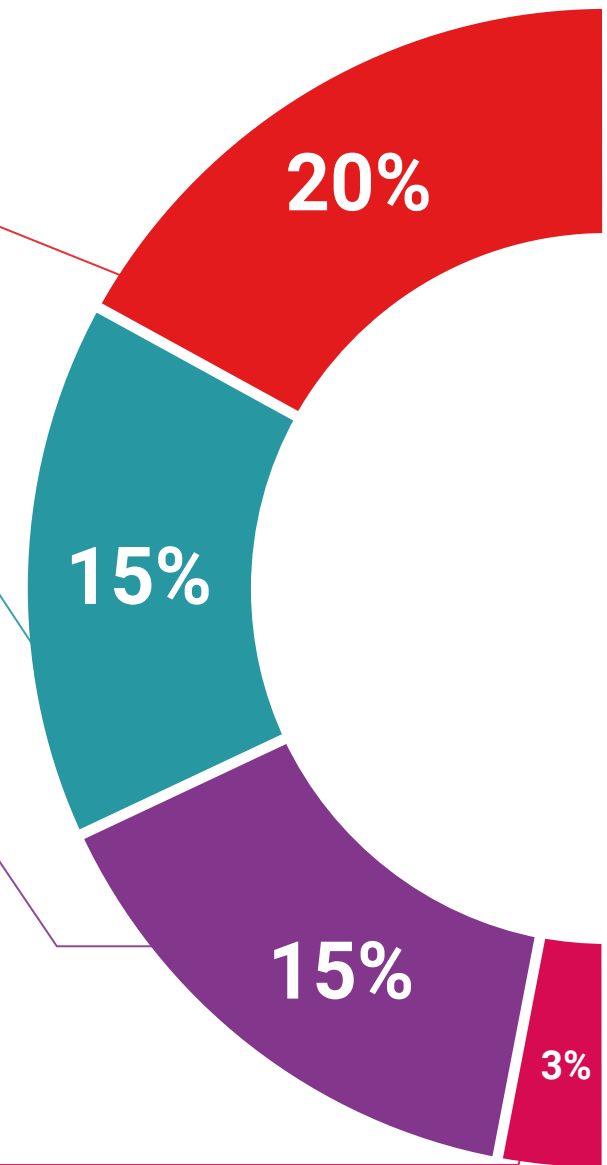
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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.



07

Certificate

The Professional Master's Degree in Comprehensive Risk Analysis and Assessment in Food Industry guarantees students, in addition to the most rigorous and up-to-date education, access to a Professional Master's Degree diploma issued by TECH Technological University.



The image features two black graduation caps (mortarboards) against a bright blue sky with light, wispy clouds. The caps are positioned diagonally, with one in the foreground and another slightly behind it. The bottom right corner of the image is overlaid with a white and purple geometric shape.

“

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

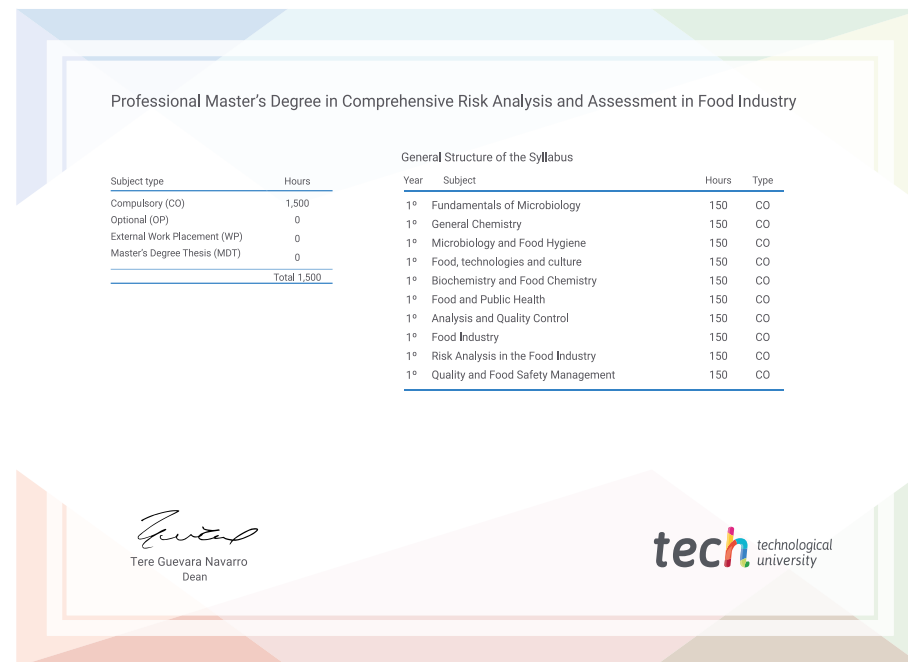
This **Professional Master's Degree in Comprehensive Risk Analysis and Assessment in Food Industry** contains the most complete and up-to-date scientific on the market.

After the student has passed the assessments, they will receive their corresponding **Professional Master's Degree** issued by **TECH Technological University** via tracked delivery*.

The diploma issued by **TECH Technological University** will reflect the qualification obtained in the Professional Master's Degree, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Professional Master's Degree in Comprehensive Risk Analysis and Assessment in Food Industry**

Official N° of Hours: **1,500 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

Professional Master's Degree

Comprehensive Risk
Analysis and Assessment
in Food Industry

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

Professional Master's Degree

Comprehensive Risk Analysis and Assessment in Food Industry