

Master's Degree Course in Sciences of Human Nutrition

Integrated Course: Hygiene, Quality, and Food Safety

SSD: MED/42, AGR/16

Number of CFU: 11

Course Coordinator: Prof. Maria Rosaria Gualano

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Teaching Module: Food Hygiene

SSD: MED/42

Number of CFU: 5

Teacher:

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Teacher:

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Teaching Module: Microbiological Quality and Food Safety

SSD: AGR/16

Number of CFU: 6

Teacher: Prof. Mauro Destino E-mail: mauroelio.destino@unicamillus.org

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PREREQUISITES

Although there are no prerequisites, basic concepts of microbiology and statistics for the Food Hygiene module and of microbiology, biochemistry, and general biology for the Microbiological Quality and Food Safety module are necessary.

LEARNING OBJECTIVES

The overall objectives of the integrated course involve achieving a set of knowledge related to food hygiene (to be differentiated from what is defined as nutrition hygiene) and the main concepts related to food safety. It is also important for students to gain knowledge about the epidemiological scenario and its evolutionary trends in history, which have led to changes in our lifestyles and the development of diseases, such as to influence human nutrition that stands as a fundamental determinant of people's health.

LEARNING OBJECTIVES

Food Hygiene Module

The main objectives include knowledge of the general principles of food hygiene and nutrition. These objectives include knowledge of specific foodborne diseases: infections, intoxications, and toxicoinfections; the main bacterial, viral, and parasitic pathologies; the main issues of environmental hygiene, the epidemiology of the main pathologies related to nutrition, and food preservation techniques.

Furthermore, students will learn about the organization and functioning of health systems, also through international comparisons and the application of epidemiological tools, and about the ongoing epidemiological and nutritional transitions. Knowledge on the main guidelines in the nutritional field will also be developed.

LEARNING OBJECTIVES

Microbiological Quality and Food Safety

The course aims to provide students with knowledge about the main qualitative characteristics of food from both a nutritional and a safety and health benefits perspective.

Moreover, particular emphasis will be placed on the different meanings between the concept of microbiological contamination and the effects of microbiological development in food, in terms of transmission of foodborne diseases and food alteration or in terms of useful food transformation.

The teaching will be structured as an educational path that will guide the student to acquire the basic scientific knowledge to understand microbial metabolism and to critically address the microbiological issues specific to the food sector, not only related to food safety but also to the use of microorganisms in its transformation.

EXPECTED LEARNING OUTCOMES

Knowledge and understanding capability

At the end of this course, the student should be able to:

- know the main elements of food hygiene
- describe the main ways of preventing bacterial infections related to food
- describe the main ways of preventing viral infections related to food
- describe the main ways of preventing parasitic infections related to food
- know the epidemiological elements of the main pathologies linked to nutrition
- know and describe the main non-communicable diseases and their risk factors
- know and describe the relationship between infectious diseases and nutrition
- know and describe the main infectious diseases related to malnutrition
- know and describe the main methods of food preservation and their applications
- know the main elements of nutrition hygiene
- know the organization of health systems
- know and approach data on ongoing epidemiological and nutritional transitions
- make international comparisons on health determinants
- know the main nutritional guidelines

Ability to apply knowledge and understanding

At the end of the course, the student will be able to:

- Use the acquired knowledge for the autonomous deepening of aspects related to the specific field to which the student will dedicate themselves within the professional activity;

Communication skills

At the end of the course, the student should be able to:

- Speak appropriately with respect to the scientific terminology related to food hygiene

Autonomy of judgment

At the end of the course, the student should be able to:

- make evaluations related to the topics discussed.

Food Hygiene Module

By the end of this course, students will be able to use the knowledge they have gained on food hygiene for the independent deepening of aspects related to the specific field they will dedicate themselves to in their professional activity. Moreover, they will be able to recognize the main epidemiological trends of diseases associated with nutrition as a determinant of health.

Food Quality and Microbiological Safety Module

At the conclusion of this course, students will be able to apply in a professional context the knowledge learned about: nutritional principles and food composition, main causes of food degradation, microorganisms and their role in foods, quality and its variations, management and control of microbiological quality, self-monitoring and risk management. Specifically, by the end of the educational journey, students will be able to identify the main pathogens, spoilage agents, and quality indicators in food products. Additionally, students will be competent in applying the acquired knowledge to prevent, control, or utilize the presence of microorganisms in the production and distribution process of food.

COURSE SYLLABUS

Food Hygiene - Prof. Gualano

- Introduction to the course on Food Hygiene and Nutrition themes: healthcare in Italy and worldwide
 - Health system organization 1
 - Health system organization 2
 - Health system organization 3
 - Quality and value in healthcare
 - The evolution of the concept of health
- Demographic aspects connected to health
 - Demographic transition and epidemiological factors 1
 - Demographic transition and epidemiological factors 2
 - Epidemiological transition and health determinants

- Food transition, concepts, and international comparisons
- Triple burden of malnutrition
- Italian Survey: OKKIO ALLA SALUTE
- Gaining health - adult population obesity surveillance
- Guidelines for healthy eating 1
- Guidelines for healthy eating 2

Food Hygiene - Prof. Piscitelli

- Precaution Principles and dimensions of Prevention
 - Epidemiology of Infectious Diseases
 - Epidemiology of the main non-communicable diseases linked to nutrition and their risk factors: hypertension, diabetes, cancers
 - Critical points in the food chain
- Foodborne intoxications
 - Bacterial food infections: minor and major salmonellas, Staphylococcus aureus, Bacillus cereus, Foodborne botulism, Clostridium perfringens, Campylobacteriosis, Listeriosis, Cholera, Shigellosis, Escherichia coli.
 - Food preservation methods for the prevention of biological and chemical risk
 - Microbial proliferation in foods
 - Moisture and water activity
 - HACCP and other health compliance procedures
 - Food additives and toxicological evaluations of pesticides
- Environmental hygiene: pollution, chemical contaminants, and foods

Microbiological Quality and Safety of Foods Prof. Destino

- Qualitative characteristics of foods and the presence of secondary metabolites of interest as active biocompounds for maintaining human health.
- Foods and the human intestinal microbiota: concepts of regulation and alteration of the intestinal microbial flora and development of pathologies
- The microbiological quality of foods and microbial food contaminations.
- Growth phases of microorganisms and factors regulating microbial development: a) Water activity, pH, structures and nutrients, antimicrobials. b) Temperature, humidity, packaging atmosphere, preservatives, treatments. c) Interactions between microbial populations and biofilm formation. d) Microorganisms' resistance forms.
- Microbial food spoilage: spoilage microorganisms and the different types of spoilage.
- Microorganisms causing foodborne diseases. The analysis of microbiological risk in foods: a) Hazard identification and characterization, and b) Exposure assessment and control measures for the main microbial pathogens responsible for foodborne diseases.
- Controlling microorganisms in foods. Main process strategies for controlling microorganisms in foods: physical treatments, reducing water activity, lowering pH.
- Definition and principles of the HACCP (Hazard Analysis and Critical Control Points) preventive control system for food safety, with real-case exercises.

COURSE STRUCTURE

5 CFU (Prof. Maria Rosaria Gualano, Prof. Prisco Piscitelli)
30 hours of teaching sessions delivered in 120 video lessons*
5 hours of interactive teaching sessions to address student questions.

6 CFU (Prof. Mauro Destino)

36 hours of frontal lecture

The teaching will be carried out through frontal lectures in the classroom with the aid of slides that will represent teaching material, in addition to the recommended texts. The lessons will also include the discussion of real-case examples. During the lessons, the appropriate use of technical language will be reiterated, and the links between the various parts of the course will be highlighted. The course includes exercise lessons concerning the principles and understanding of analytical methods used in relation to food management and self-control systems. The content of the exercise lessons, conducted in the classroom, will be an integral part of the final evaluation.

* Each video lesson is about 15 minutes long.

COURSE GRADE DETERMINATION

Written test

The preparation of the students will be verified with a written exam consisting of multiple-choice questions. The student will have to answer questions in such a way as to demonstrate the acquisition of the knowledge and skills described in the educational objectives. Grading on a thirty-point scale.

OPTIONAL ACTIVITIES

In addition to the teaching activities provided, students will be able to take advantage of meetings with the teachers (in-person or online) by appointment by writing via email. Furthermore, students will be given the opportunity to participate in Seminars.

READING MATERIALS AND BIBLIOGRAPHY

Slides and teaching material provided by the teacher

Textbooks:

Giovanni Antonio Farris, Marco Gobetti, Erasmo Neviani, Massimo Vincenzini "Microbiology of food products" (2012) Casa Editrice Ambrosiana. ISBN: 978-88-08-18246

"Food Microbiology: Principles into Practice" Osman Erkmen and T.Faruk Bozoglu Eds. (2016) John Wiley & Sons, Ltd; Print ISBN: 9781119237761 |Online ISBN: 9781119237860

James J. Jay, Martin J. Loessner, David A. Golden "Food Microbiology" (2009) Springer Verlag. ISBN: 8847007852.