

Master Degree in Human Nutrition Sciences 2023/2024

Course: Physiology of digestive, uptake and human nutrition process

CFU Number: 6

SSD Course: BIO/09

Course Coordinator: Prof. Saviana Antonella Barbati; email: saviana.barbati@unicamillu.org

Professors:

- Prof. Saviana Antonella Barbati; email: saviana.barbati@unicamillu.org
<https://www.unicamillus.org/personnel/barbati-saviana-antonella-2/>

PREREQUISITES

Physiology examines the functional and regulatory characteristics of the human body. Basic scientific knowledge is essential to better understand the course topics, in particular knowledge of organic chemistry, physics, biology and elementary anatomy are requested.

LEARNING OBJECTIVES

The aim of the lectures is to provide a clear and broad knowledge of all the physiological mechanisms fundamental to bodily functions related to nutrition.

The lectures will provide students' knowledge of the principles governing the functioning of the organs of the digestive system, its dynamic integration with other systems. The endocrine and nervous control mechanisms of food and water homeostasis as well as the energy metabolism will be also covered.

LEARNING OUTCOMES

Knowledge and Understanding

Through the course it will provide all the conceptual and methodological resources to understand the basis of the processes of human physiology. Therefore, at the end of the course the student will have to:

- demonstrate knowledge of basic cellular physiological functions (cell permeability, protein synthesis, homeostasis, transport, etc...)
- knowledge of the main characteristics of nutrients, their metabolism and absorption.
- knowledge of the organization and functioning of the digestive system
- knowledge of the control mechanisms of the nervous system and the hormonal system on the digestive system

Applying Knowledge and Understanding

At the end of the course the students have to have achieved a broad and in-depth knowledge of human physiology which will allow them to understand the mechanisms underlying the maintenance of homeostasis. Furthermore, the student have to be able to apply the knowledge of

the functioning mechanisms of different organs along with the mechanisms underlying the main functions of the physiology of the digestive system, metabolism and absorption of nutrients.

Learning skills

At the end of the course the student must have learned a method of independent study and updating, making reference to multiple texts and/or bibliography.

PROGRAM

INTRODUCTION TO PHYSIOLOGY: Description of physiological mechanisms. Structure-function and interactions in the human body. Concept of homeostasis and homeostatic control systems. Positive and negative feedback loops.

NUTRIENTS. Water, Carbohydrates, Lipids and Proteins.

SENSORY SYSTEMS. Olfactory system: anatomy of the olfactory system, transduction of olfactory information, perception of odors. Gustatory system: the anatomy of the taste buds and taste cells, the perception of gustatory information, the gustatory pathway. Tactile Sensation in Oral Region.

PHYSIOLOGY OF THE DIGESTIVE SYSTEM: Organization of the digestive system and accessory digestive organs. General aspects of digestion. Secretory function of the digestive system. Motility of the digestive system. Digestion and absorption of nutrients. Hepatobiliary function. Importance of the intestinal microbiota.

PHYSIOLOGY OF THE ENDOCRINE AND NERVOUS SYSTEM. Nervous and hormonal control of intestinal function. General principles of endocrinology and functioning of hormones. General picture of endocrine glands and their hormones. Hypothalamic-pituitary system. Regulation of calcium and phosphorus metabolism.

BIOENERGY OF NUTRITION. Energy metabolism. Measurement of energy expenditure and factors determining energy expenditure. Metabolic adaptations. Neuroendocrine control of energy metabolism. Nutrition and oxidative stress.

COURSE STRUCTURE

The course is divided into 36 hours of classroom lectures.

COURSE GRADE DETERMINATION

The students' preparation will be verified with a written exam. The written test will consist of 31 questions with multiple choice answers, one point will be assigned for each correct answer.

Knowledge will be assessed according to the scores indicated below:

- Inadequate: significant gaps and/or inaccuracies in knowledge and understanding subjects; incorrect concepts and/or very limited analysis and synthesis capacity.
- 18-20: just sufficient knowledge and understanding of the topics imperfections; Sufficient analytical, synthetic and independent judgment skills.
- 21-23: knowledge and understanding of the main topics; analysis and synthesis skills correct with a coherent logical argument.



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- 24-26: moderate knowledge and understanding of the topics; good analytical skills e summary with rigorously expressed arguments.
- 27-29: complete knowledge and understanding of the topics; remarkable analytical skills, synthesis. Good independent judgment.
- 30-30L: excellent level of knowledge and understanding of the topics. Remarkable capabilities analysis and synthesis and independent judgment. Arguments expressed in an original way.

OPTIONAL ACTIVITIES

In addition to the online lectures, the student will also have access to the teaching material provided by the teacher to supplement the theoretical lessons.

STUDENT RECEPTION

The course teachers can be reached by appointment via e-mail.

READING MATERIALS

- Debellis; Poli, "Alimentazione, Nutrizione e Salute".
- Stanfield, "Fisiologia", 5ª Edizione