UNICAMILLUS

Master's Degree in Dentistry and Dental Prosthetics 2023/2024

Teaching: General Pathology
Scientific Disciplinary Sector: MED/04
Responsible Professor: Cristina Capuano; e-mail: cristina.capuano@unicamillus.org
Number of University Educational Credits (CFU): 8
Professors:

- Prof.ssa Federica Wolf (4 CFU), e-mail: federica.wolf@unicamillus.org
- Prof.ssa Cristina Capuano (3 CFU) e-mail: cristina.capuano@unicamillus.org
- Prof.ssa Alessandra Rufini (1 CFU); e-mail**:** alessandra.rufini@unicamillus.org

PREREQUISITES
Basic knowledge of Physics, Biochemistry, Biology, Genetics, Molecular Biology, and Physiology is required.

LEARNING OBJECTIVES
The teaching of General Pathology aims to provide the student with the fundamentals for knowledge and understanding of the morphological and functional alterations associated with the diseases.

• General Pathology: will provide the student with the main notions on the causes (etiology) responsible for the different diseases, the mechanisms (pathogenesis) that characterize the main classes of diseases, including tumors, and the functional consequences at the level of the major homeostatic systems (blood, hemostasis, circulation, endocrinology, and metabolism)

• Immunology: will provide the student with the basic notions of the cellular and molecular mechanisms underlying the innate and adaptive immune response and the main immunopathological reactions

LEARNING OUTCOMES
The expected learning outcomes are consistent with the general provisions of the Bologna Process and the specific provisions of Directive 2005/36/EC. They are found within the European Qualifications Framework (Dublin descriptors) as follows:

Knowledge and understanding
At the end of the teaching, the student must be able to :

- Know and explain the main causes of cellular and molecular damage
- Know and explain the major organism response mechanisms to harmful stimuli (innate and adaptive immunity, reparative process)
- Know and explain pathological processes (acute and chronic inflammation, carcinogenesis, degenerative phenomena)
- Know and explain the main pathophysiological alterations

Applying knowledge and understanding
At the end of the teaching, the student should demonstrate the capability to apply the acquired knowledge to identify the different steps of the pathogenetic processes (from cell damage to

pathophysiological consequences) for a better comprehension of odontoiatric diseases and their associated conditions.

Communication skills

At the end of the teaching, the student must be able to communicate the covered topics clearly and unambiguously to both expert and non-expert recipients, by using the scientific and technical terminology as appropriate.

Making Judgements

At the end of the teaching, the student must be able to:

- Independently use the acquired knowledge and skills
  Independently identify the pathological process manifestations applied to the studied diseases and their possible impact on dentistry.

Learning skills

At the end of the teaching, the student must be able to:

- Acquire the appropriate learning methods for studying and updating.
- Improve skills in the field of general pathology by consulting texts, scientific literature, and databases.

COURSE SYLLABUS

General pathology

- INTRODUCTION TO GENERAL PATHOLOGY (Prof. Wolf)

The topics of general pathology: etiology, pathogenesis, pathophysiology. Concepts of health and disease. Definition of disease, illness, and syndrome

- GENERAL ETIOLOGY (Prof. Wolf)

Disease classification based on etiologic agents: congenital and acquired. Pathological effects of physical, chemical, and biological agents. Environmental and genomic pathology.

- CELL PATHOLOGY (Prof. Wolf)

Damage response mechanisms, cell stress, adaptation. Regressive processes, intra/extracellular accumulation, cell death (necrosis and apoptosis)

- INFLAMMATION (Prof. Capuano)

Causes and general features. Acute Inflammation: vascular phenomena, cellular phase, exudate classification, cleanup phase, outcomes of acute inflammatory response. Chronic Inflammation : interstitial and granulomatous. Repair process, scarring, and, fibrosis. Systemic effects of inflammation, fever.

- ONCOLOOGY (Prof. Wolf)

Tumor classification, biological characteristics of tumor cells, metastatization, physical and chemical cancerogenesis. Oncogenes, oncosuppressors, therapeutic approaches

- PATHOPHYSIOLOGY (Prof. Wolf)

Fundamentals of the pathophysiology of blood (anemias and coagulative disorders), circulation (hemostasis, edema, embolia, infarct, shock, hypertension and atherosclerosis), pathophysiology of the liver, endocrine pathophysiology (diabetes).

- PROGRAM RECAP AND QUESTIONS (Prof. Wolf)

Immunology

- INTRODUCTION TO THE IMMUNE SYSTEM (Prof. Capuano)

The immune system in health and disease. General features of innate and adaptive immune response (comparative analysis). Primary and secondary lymphoid organs. Leukocyte circulation and tissue recruitment.

- INNATE IMMUNITY (Prof. Capuano)

Cellular and molecular mechanisms of the innate immune response: pathogen recognition (innate immune receptors), effector cells (morphological and functional features), soluble mediators, inflammatory and antiviral responses

- ANTIGEN PRESENTATION (Prof. Capuano)

Antigen recognition (TCR vs. BCR). Structure and functions of the major histocompatibility complex (MHC I and MHC II) molecules. Antigen Presenting Cells (APC). Protein antigen processing and presentation

- ADAPTIVE IMMUNITY (Prof. Capuano)

T and B cell development and maturation. Generation of antigen-receptor diversity repertoire. Receptor-mediated signaling pathways for lymphocyte activation

- CELL-MEDIATED ADAPTIVE IMMUNITY (Prof. Rufini)

Naive T cell (CD4 vs. CD8) activation. Differentiation and effector functions of CD4 (helper) and CD8 (CTL) T lymphocytes

- HUMORAL ADAPTIVE IMMUNITY (Prof. Rufini)

T-dependent and T-independent B cell activation. Antibody production. Effector mechanisms of humoral immunity

- IMMUNOPATHOLOGY (Prof. Capuano)

The hypersensitivity reactions and Allergy

COURSE STRUCTURE

Teaching comprises 80 hours of lectures with mandatory attendance (67%). According to the academic calendar, lessons (2 or 3 hours) will be structured as follows:

- 50 hours of lectures for the General Pathology
- 30 hours of lectures for the Immunology

Lectures include theoretical lessons on updated program topics and interactive discussions also on clinical focuses. The teaching material will be organized in PowerPoint slides with explanatory and representative images of the covered topics.

COURSE GRADE DETERMINATION

At the end of teaching, the students should take the final oral exam consisting of questions on the program's covered topics. Considering the learning objectives, the examining committee will assess the acquired student's knowledge and judgment ability, by evaluating the ability to argue and reason on the contents. The student's communication skills by using the appropriate scientific terminology will be also evaluated.

For the final grade, the examining committee will take into consideration the oral exam and the active participation of the students during lectures.

The exam will be assessed according to the following criteria:

Not suitable: Poor or lacking knowledge and understanding of the topics; limited capacity for analysis and synthesis, frequent generalizations of the requested contents; inability to use technical language.

18-20: Just enough knowledge and understanding of the topics, with obvious imperfections; just sufficient capacity for analysis, synthesis, and autonomy of judgment; poor ability to use technical language.

21-23: Sufficient knowledge and understanding of the topics; sufficient ability to analyze and synthesize with the ability to reason with logic and coherence the required contents; sufficient ability to use technical language.

24-26: Fair knowledge and understanding of the topics; discrete ability to analyze and synthesize with the ability to rigorously argue the required contents; good ability to use technical language.

27-29: Good knowledge and understanding of the required contents; good ability to analyze and synthesize with the ability to rigorously argue the required contents; good ability to use technical language.

30-30L: Excellent level of knowledge and understanding of the required content with an excellent ability to analyze and synthesize with the ability to argue the required content in a rigorous, innovative and original way; excellent ability to use technical language.

OPTIONAL ACTIVITIES

To further clarify, the Teachers are available to meet the students through appointments taken by e-mail.

READING MATERIALS

- Kumar, Abbas, Aster: Robbins Basic Pathology, X Edition, 2017, Elsevier
- A.K. Abbas, A.H. Lichtman, S. Pillai: Basic Immunology: Functions and Disorders of the Immune System, VI edition, 2019, Elsevier.
- Learning materials and suggested specific readings will be provided by the teacher

COORDINATOR AVAILABILITY

Office hours by appointment, by e-mail:

Prof.ssa Cristina Capuano
e-mail: cristina.capuano@unicamillus.org