



Syllabus Master's Degree Course in Medicine and Surgery ***a.y. 2026 - 2027***

DISEASE ONSET 1

Second year, first semester (13 academic credits [CFU])

Teachers

Subject	Academic credits (CFU)	Lecturer
General pathology and immunology	7	FAGONE Paolo Fabrizio
Microbiology	3	BONGIORNO Dafne
Principles of anatomopathology	3	SALVATORELLI Lucia

Learning outcomes

Subject	Learning outcomes
General pathology and immunology	Knowledge and understanding By the end of the module, students are expected to: • Acquire knowledge on the immune system as a fundamental defence mechanism of the human body, describing the main components and functions of innate and adaptive immunity and the roles of the cells and molecules involved in immune responses. • Understand how alterations in immune responses and their regulatory mechanisms can cause disease, explaining the main pathogenic mechanisms of hypersensitivity reactions, autoimmune diseases, and primary and secondary immunodeficiencies. Applying knowledge and understanding By the end of the module, students are expected to: • Be able to relate the normal structure and function of the immune system to the changes occurring under pathological conditions, applying knowledge of innate and adaptive immunity to understand the mechanisms underlying immune responses and their regulation. • Be able to integrate immunological knowledge with fundamental pathogenetic and pathophysiological mechanisms to explain how alterations in immune responses and immune regulation contribute to the development of hypersensitivity reactions, autoimmune diseases, and immunodeficiencies.

Microbiology	Knowledge and understanding By the end of the module, students are expected to: • Acquire knowledge on the cellular and molecular basis of microbial pathogenicity, including the essential biological characteristics of bacteria, viruses, fungi, and parasites of medical interest and their virulence mechanisms. • Understand the interactions between microorganisms and the host, including the mechanisms of infection, the development of pathological lesions, and the host defence mechanisms against infectious agents. • Understand the fundamental principles of microbiological diagnosis, antimicrobial susceptibility testing, and infection prevention and control. Applying knowledge and understanding By the end of the module, students are expected to: • Be able to relate the biological characteristics of microorganisms and parasites to their interactions with the host, explaining the mechanisms underlying colonisation, infection, and the development of infectious diseases. • Be able to integrate microbiological and immunological knowledge to explain the pathogenesis of infectious diseases and the role of host defence mechanisms in determining their development and outcome. • Apply fundamental microbiological knowledge to identify appropriate diagnostic approaches, interpret antimicrobial susceptibility testing results, and select appropriate measures for infection prevention and control.
Principles of anatomopathology	Knowledge and understanding By the end of the module, students are expected to: • Acquire knowledge on the methods of histopathological and cytopathological investigation, including the collection, fixation, processing, conservation, and preparation of biological samples for diagnostic examination. • Acquire basic knowledge on the morphological, immunophenotypic, and molecular alterations associated with pathological processes, with particular reference to cellular injury, necrosis, apoptosis, inflammation, immune-mediated diseases, and neoplasia. • Understand the role of the pathologist in the clinical diagnostic process and decision-making, including the contribution of histopathological, cytopathological, immunohistochemical, and molecular investigations to diagnosis, prognostic assessment, and treatment selection. Applying knowledge and understanding By the end of the module, students are expected to: • Be able to relate normal tissue structure to the morphological alterations occurring in pathological conditions, correlating histopathological findings with the underlying pathogenetic and pathophysiological mechanisms. • Be able to integrate morphological, immunophenotypic, and molecular findings to understand the pathogenesis of disease

	and the contribution of anatomopathological investigations to diagnostic assessment. • Apply knowledge of histopathological and cytopathological methods to understand their diagnostic indications and limitations.
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Prerequisites

Subject	Prerequisites
General pathology and immunology	Basic notions of Biology, Genetics, Biochemistry and Molecular Biology.
Microbiology	
Principles of anatomopathology	

Course contents

Subject	Course contents
General pathology and immunology	• General Characteristics of Immune Responses. The Concepts of Antigen and Antibody. • The Primary and Secondary Response to an Antigen. • Cells Involved in Innate and Adaptive Immune Responses. Antigen-Presenting Cells (APC). Macrophages. Natural Killer Cells. T And B Lymphocytes. • The Complement System • The Major Histocompatibility Complex. Class I And II MHC. • Cytokines and Cytokine Receptors. • T Lymphocyte Receptor (TCR) And B Lymphocyte Receptor (BCR). • Activation and Polarization of T Lymphocytes. • Immunological Memory • Immune Tolerance. Mechanisms of Central and Peripheral Tolerance. • Hypersensitivity. Definition of Allergy, Atopy, Anaphylaxis. Classification of Hypersensitivities. • Autoimmunity. Definition and Pathogenic Mechanisms of Autoimmunity. Examples of Major Organ-Specific and Systemic Autoimmune Diseases (Multiple Sclerosis, Rheumatoid Arthritis, Type I Diabetes, Systemic Lupus Erythematosus). • Primary And Secondary Immunodeficiencies. Supplementary activities • Guided study and critical review of the scientific literature and clinical practice guidelines. • Thematic seminars for in-depth exploration of selected topics. • Theoretical and practical sessions.
Microbiology	• Bacteria, virus and fungi of medical interest: Morphological characteristics, structure and function of the main structural components; biofilms, notions of biochemistry, physiology and microbial genetics; organization of viral particles • Pathogenesis of bacterial, viral and fungi infections: the infectious process, from adhesion to the expression of virulence, eradication, pathogenic mechanisms, toxins

	• Host-parasite relationship: extra and intracellular pathogens, host responses • Infection control: a) Sterilization, disinfection, anti-sepsis; b) antimicrobials, hints of action and resistance mechanisms; antibiogram and efficacy measures. Supplementary activities • Guided study and critical review of the scientific literature and clinical practice guidelines. • Thematic seminars for in-depth exploration of selected topics. • Theoretical and practical sessions.
Principles of anatomopathology	• Introduction to anatomopathology • Method of fixation of biological material using formalin. • Phases of preparation of a histological slide: sampling, processing, paraffin embedding, cutting, staining. • Intraoperative/extemporaneous examination: methods of execution, indications, examples of applicability. • Incisional and excisional biopsy; endoscopic biopsy. • Diagnostic cytology: exfoliative, needle aspiration, by apposition: applications. • Immunohistochemistry. • Molecular biology to predict prognosis and treatment • Necrosis and apoptosis • Inflammation Supplementary activities • Guided study and critical review of the scientific literature and clinical practice guidelines. • Thematic seminars for in-depth exploration of selected topics. • Theoretical and practical sessions.

Assessment methods

Subject	Assessment methods
General pathology and immunology	The final assessment of acquired knowledge is conducted by an oral examination. The grade is expressed on a scale of thirty, up to a maximum of 30/30 cum laude (with honors). The final grade is determined by the weighted average of the scores obtained in the course subjects. The oral examination consists of an interview during which questions will cover at least three different topics from the course curriculum. The assessments aim to evaluate: i) the level of knowledge in the disciplines; ii) the ability to apply this knowledge to solve specific problems related to the disciplines (autonomous problem-solving); iii) clarity of expression; iv) proficiency in medical-scientific language. The assessment of learning can also be conducted remotely if the conditions necessitate it. For the assignment of the final grade, the following parameters will be considered: • Score 29-30 with honors: The student demonstrates an in-depth knowledge of the topics, promptly and correctly integrates and critically analyzes presented situations, independently solving even highly complex problems. They possess excellent
Microbiology	
Principles of anatomopathology	

	communication skills and command medical-scientific language proficiently. • Score 26-28: The student has a good understanding of the topics, can integrate and critically and logically analyze presented situations, can fairly independently solve complex problems, and presents topics clearly using appropriate medical-scientific language. • Score 22-25: The student has a fair understanding of the topics, although it may be limited to the main areas. They can integrate and critically analyze presented situations, although not always in a linear fashion, and present topics clearly with moderate language proficiency. • Score 18-21: The student has minimal knowledge of the topics, possesses modest ability to integrate and critically analyze presented situations, and presents topics sufficiently clearly, although their language proficiency may be underdeveloped. • Exam not passed: The student lacks the minimum required knowledge of the core content of the course. Their ability to use specific language is minimal or nonexistent, and they are unable to independently apply acquired knowledge.
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Examples of common questions and/or exercises

Subject	Examples of common questions and/or exercises
General pathology and immunology	• Explain the signaling pathways of the main cytokines • Describe the central and peripheral immune tolerance • Differences between type II and III hypersensitivity reactions
Microbiology	The Microbiology test is aimed at assessing the level of knowledge regarding the provisions of the specific training objectives, the ability to know how to apply the basic knowledge acquired to the clinic (microbiological implications) and for the resolution of specific problems concerning the relationships between the pathogen and the host The test takes place through an oral exam. The oral exam consists of an interview in which 2-3 questions will be asked which concern at least n. 3 different topics of the program (bacteriology, virology and mycology). The test allows to verify: i) the level of knowledge about the main human pathogenic microorganisms; ii) the ability to apply this knowledge to define virulence and pathogenic power in human infections, as well as the main methods of controlling the infection itself; iii) clarity of presentation; iv) the property of medical-scientific language.
Principles of anatomopathology	• Explain the differences between necrosis and apoptosis • Types of histological and cytological examination. • Immunohistochemical profile of mesenchymal neoplasm • Describe the applications of excisional biopsy

Reference texts

Subject	Textbooks
General pathology and immunology	• Janeway, Immunobiology, 10th edition, Norton & Company (2022) Additional educational material (slides, videos, handouts, etc.) will be distributed or indicated during the lessons.

Microbiology	The most recent edition of one of these texts chosen by the student: TEXT 1: Medical Microbiology - Murray - EDRA Edition TEXT 2: Medical Microbiology - Sherris - EMSI Edition TEXT 3: Principles of medical microbiology - Antonelli G., Clementi M., Pozzi G., Rossolini G.M. - Ambrosiana Publishing House https://onlinelibrary.wiley.com/doi/book/10.1002/9780470688618 Any additional educational material (slides, videos, handouts, etc.) will be distributed or indicated during the lessons.
Principles of anatomopathology	• Pranab Dey, Basic and Advanced Laboratory Techniques in Histopathology and Cytology, Latest edition, Springer (2022) • Robbins and Kumar, Basic Pathology, 11th edition, Elsevier (2022) Any additional educational material (slides, videos, handouts, etc.) will be distributed or indicated during the lessons. Any additional educational material (slides, videos, handouts, etc.) will be distributed or indicated during the lessons.

Course format

Subject	Course format
General pathology and immunology	The teaching will primarily be conducted through in-person lectures with a blend of theory and practical exercises. In the event that teaching is delivered in a blended or remote mode, necessary adjustments may be introduced compared to what has been previously stated, in order to adhere to the planned program as outlined in the Syllabus.
Microbiology	
Principles of anatomopathology	

Attendance

Subject	Attendance
General pathology and immunology	Mandatory attendance.
Microbiology	
Principles of anatomopathology	

Course schedule

Subject	Course schedule
General pathology and immunology	• Introduction to Immunology (Janeway chapter 1) • Innate immunity (Janeway chapters 2-3) • Adaptive immunity (Janeway chapters 4-11) • Allergy (Janeway chapter 14) • Autoimmunity (Janeway chapter 15) • Immunodeficiencies (Janeway chapter 13)
Microbiology	The general part of one of the texts above described can be used. In particular for the Murray: Part I: chapters 6-10 Part II: chapters 11-16 Part III: chapters 35-39 Part IV: chapters 57-61

	Part V: chapters 67-71
Principles of anatomopathology	• Method of fixation of biological material using formalin (Pranab Dey, chapter 1). • Phases of preparation of a histological slide: sampling, processing, paraffin embedding, cutting, staining (Pranab Dey, chapter 2,3,5,7). • Intraoperative/extemporaneous examination: methods of execution, indications, examples of applicability (Pranab Dey, chapter 6) • Diagnostic cytology: exfoliative, needle aspiration, by apposition: applications (Pranab Dey, chapter 13-15). • Immunohistochemistry (Pranab Dey, chapter 16). • Molecular biology to predict prognosis and treatment (Pranab Dey, chapter 17-21) • Necrosis and apoptosis (Robbins and Kumar, chapter 1) • Inflammation (Robbins and Kumar, chapter 2)