

Degree in Nursing

Teaching: GENERAL PATHOLOGY AND PHYSIOPATHOLOGY

SSD: MED/05, MED/04, MED/07

CFU: 6

Coordinator's name: Daniele Armenia

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Module: GENERAL PATHOLOGY - PHYSIOPATHOLOGY

SSD Course: MED/04

Credits: 3

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Module: CLINICAL PATHOLOGY, IMMUNOLOGY, IMMUNOEMATHOLOGY

SSD Course: MED/05

Credits :2

Professor's name: Giovanni BARILLARI

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Module: MICROBIOLOGY AND CLINICAL MICROBIOLOGY

SSD Course: MED/07

Credits: 1

Professor's name: Daniele Armenia

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PREREQUISITES

Although there are no preparatory courses, basic knowledge of biology, histology, biochemistry, anatomy, physiology, and immunology is required.

In order to understand the topics covered, students must have attended the courses taught in the first semester.

LEARNING OBJECTIVES

Aim of the teaching is to provide students with knowledge on :

- Elucidate the mechanisms and origins of human diseases emphasizing systemic processes based on molecular and cellular pathologic events.
- Assess the physiologic principles which govern the function of the main body systems and the alterations induced by structural and functional abnormalities.
- knowledge on the rational or methodologies of Laboratory Medicine analyses which are supportive for nursing.
- knowledge of the structure of different microorganisms, microbial pathogenicity, interactions between micro-organism and host, causes and mechanisms of onset of the main microbial aetiology diseases.
- knowledge on microbiological diagnostics will be essential for the identification of bacteria, viruses, fungi and protozoa.

These objectives will be achieved through frontal lectures, seminars and interactive teaching activities, designed to facilitate learning and improve the ability to address and solve the main questions of Clinical Microbiology.

LEARNING OUTCOMES

Knowledge and understanding

At the end of the course, the student will have to:

- recognize and autonomously understand the molecular mechanisms of cell damage, cell response (cellular stress, necrosis, apoptosis) and organism response to the damage (inflammation), the molecular basis of neoplastic transformation and the pathogenetic and pathophysiological mechanisms of the most important human diseases.
- The criteria of bacterial and virological classification.
- The architecture of the bacterial, fungal and protozoal cell and the structure of the viral particles.
- The metabolism and bacterial growth: the production of bacterial spores.
- The basics of bacterial and viral genetics: transformation, transduction, bacterial conjugation, viral genetic variability.
- The pathogenic action of bacteria and viruses: transmission routes and stages of the infectious process.
- The process of toxin production and explain the mechanisms of action of exotoxins and endotoxins.
- The general characteristics of viral polymerases e viral genetic variability
- The basics about innate immunity and cell-mediated immunity.
- The characteristics of immune sera and vaccines.
- The general principles for the diagnosis of diseases caused by pathogenic microorganisms
- The basics of microbiological pharmacology: notes on anti-bacterial and antiviral drugs and resistance mechanisms

Applying knowledge and understanding

At the end of the course, the student will be able to use the acquired knowledge for:

- an in-depth study of aspects relating to the specific field in which the student will devote himself to his professional activity. The student must be able to apply his/her knowledge to analyze and understand the alterations of the cellular, immunological and genetic mechanisms underlying the human pathologies and about medical (basic) laboratory diagnostics. As a consequence, students will acquire useful skills to demonstrate a professional approach to the work, and to collaborate with the medical team on resolution of therapeutic problems.

- To use the acquired knowledge for the autonomous deepening of aspects related to the specific field to which the student will devote himself within the professional activity;

Communication skills

At the end of the course, the student must be able to use specific scientific terminology appropriately. The student must be able to communicate information, ideas, problems and

solutions to expert and other interlocutors, in relation to the molecular mechanisms of cellular damage, of neoplastic transformation and to the pathophysiological mechanisms of diseases.

Making judgements

At the end of the course the student must be able to:

- make general assessments related to the topics covered.
- identify and explain the molecular, immunological and pathophysiological mechanisms that lead to a disease.
- autonomy of judgment will be acquired through the analysis of examples of damage and human diseases.
- collect and interpret the results of the laboratory exams which are most frequently prescribed and executed in the clinical practice, judging with sufficient autonomy the data that will be presented to them.
- carry out general assessments of the topics covered.

COURSE SYLLABUS

- Cellular stress. Cellular adaptations of growth and differentiation: hyperplasia, hypertrophy, atrophy, metaplasia. Cell death: necrosis, apoptosis.
- Inflammation: Definition of inflammation. Acute inflammation. Chemical mediators of inflammation. Cells involved in inflammation. Chemotaxis and phagocytosis. Exudation: different types of exudate. Distinctive features between acute and chronic inflammation. Chronic inflammation. Granulomas.
- Tissue renewal and repair. Regeneration, healing, and fibrosis.
- Changes in thermogenesis: The organism's general response to heat and cold. Causes of fever. Course and types of fever. Hypothermia and hyperthermia.
- Oncology: Nomenclature of tumors. Biology of tumor growth: benign and malignant neoplasms. Molecular basis of cancer. Metastasis.
- Hemostasis disorders.
- Hemodynamic disorders. Thrombosis, embolism. Infarction. Shock. Hypertension, atherosclerosis.
- Heart pathophysiology.
- Red blood cell disorders.
- Liver pathophysiology.
- Kidney pathophysiology.
- Endocrine system pathophysiology. General mechanisms of hormonal hypofunction and hyperfunction.
- Complete blood count (CBC), and differential leukocytes or platelet count. Lymphocytes sub-typing. Inflammation biomarkers. Immunological analyses. Blood group systems. Evaluation of hemostatic capabilities. Hemoglobin. Anemia. Bilirubin. Jaundice. Enzymes. Plasma lipids. Urine analysis. Tumor markers.
- Characteristics of the main infection agents. Vital associations: commensalism, mutualism, parasitism. Associated microbial flora. Generalities on infection diseases: infectious ratio, infection and disease, endogenous infection, exogenous infections, opportunistic infections.

- Concept of innate immunity and acquired immunity. Role of the immune response in different infections. Survival of infection agents to immunity mechanisms. Principles of microbiological diagnostics.
- The bacterial cell: structure and essential functions. Gram negative and Gram positive. The bacterial spore. Cultivation of bacteria: growth and development of bacterial populations. Elements of bacterial genetics: mutations and mechanisms of genetic recombination. Principles of pathogenicity and virulence. Bacterial toxins: exotoxins and endotoxins. Mode of action of the main antibacterial drugs. Resistance to chemotherapy and antibiotics. Examples of bacteria of medical interest and associated diseases.
- Nature, methods of study and classification of viruses. Composition and architecture of the viral particle. Cultivation of viruses. Virus-cell relationship: productive infection, transforming infection. Virus-to-host relationships: acute, persistent, latent, slow infections. Pathogenic mechanisms in viral infections. Vaccines and basis of antiviral chemotherapy. Examples of viruses of medical interest and associated diseases.
- Habitat and morphology of fungi (yeasts, mycelial fungi). Fungal cell structure. Examples of fungi of medical interest and associated diseases.
- The protozoa cell: morphology and structure. Main characteristics of Helminths and Arthropods. Examples of parasites of medical interest and associated pathologies.

COURSE STRUCTURE

The module of General pathology and Physiopathology is structured in 42 hours of frontal teaching, divided into lessons of 2 hours according to the academic calendar. During the lessons will be shown slides containing topics of the program that will allow students to achieve the educational objectives.

The module of Clinical Pathology, Immunology and Immunoemathology is conducted for a total of 28 teaching hours. Teaching of the examination programme topics is accompanied by the description of diagnostic instruments and techniques, and by the discussion and interpretation of data related to specific clinical cases.

The module of Microbiology and Clinical Microbiology is structured in 14 hours of frontal teaching, divided into lessons of 2 or 4 hours according to the academic calendar. Frontal teaching includes theoretical lessons and additional seminars on the topics covered.

Students' skills will be verified with a written exam followed by an oral interview.

COURSE GRADE DETERMINATION

The exam of teaching of General Pathology and Physiopathology is comprised of an examination of the modules of GENERAL PATHOLOGY-PHYSIOPATHOLOGY, CLINICAL PATHOLOGY, MICROBIOLOGY AND CLINICAL MICROBIOLOGY, whose marks are an integral part of the Teaching.

The knowledge and ability to understand, the ability to apply knowledge and understanding, the autonomy of judgment and the communication skills of the student will weigh in the final score as follows 30%, 30%, 30% and 10%, respectively.

GENERAL PATHOLOGY AND PHYSIOPATHOLOGY EXAM: The exam consists of an oral test. It will focus on the course contents.

CLINICAL PATHOLOGY EXAM: Oral exam. It will focus on the course contents.

MICROBIOLOGY AND CLINICAL MICROBIOLOGY EXAM: The written test will consist of 30 questions with multiple-choice answers, for each exact answer a point will be assigned. The final score of the written test will be given by the sum of the partial scores assigned to each question answered correctly. To take the oral exam, the student must have scored at least 15 points.

OPTIONAL ACTIVITIES

Students will be received at the end of the lessons. Outside the lesson period, students will be received by appointment to be agreed by e-mail.

In addition to teaching activities, students will be given the opportunity to participate in Seminars, Research Internships, Department Internships and Monographic Courses. The subjects of the activities are not exam subjects.

READING MATERIALS

- Pathology for the Health Professions, 4th Edition, Ivan Damjanov MD PhD. Elsevier.
- Slides and materials delivered by the teacher.
- Textbook: Pathology for the Health Professions, 4th Edition, Ivan Damjanov MD PhD. Elsevier.
 - Joyce LeFever Kee. *Laboratory and Diagnostic Tests with Nursing implications*. (10th Edition). PEARSON Editor
 - Autori: Richard A. Harvey, Pamela C. Champe Bruce D. Fisher