Degree Course in Nursing

Teaching: GENERAL PATHOLOGY AND PHYSIOPATHOLOGY
SSD Course: med/05, med/04, med/07
CFU: 6
Director: Daniele Armenia
Email: daniele.armenia@unicamillus.org

Module: GENERAL PATHOLOGY - PHYSIOPATHOLOGY
SSD Course: MED/04
Credits: 3
Professor's name: Monica Benvenuto (2CFU), D'Orazi Gabriella (1CFU)
Email: monica.benvenuto@unicamillus.org gabriella.dorazi@unicamillus.org

Module: CLINICAL PATHOLOGY, IMMUNOLOGY, IMMUNOEMATHOLOGY
SSD Course: MED/05
Credits :2
Professor's name: Giovanni BARILLARI
Email: giovanni.barillari@unicamillus.org barillar@uniroma2.it

Module: MICROBIOLOGY AND CLINICAL MICROBIOLOGY
SSD Course: MED/07
Credits: 1
Professor's name: Daniele Armenia
Email: daniele.armenia@unicamillus.com

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.

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- 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.
- Interpret the results of laboratory investigations frequently employed in the medical practice.
- 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

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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

GENERAL PATHOLOGY - - PHYSIOPATHOLOGY

- Aetiology and cellular pathology: health and disease concepts, aetiology and pathogenesis. Diseased caused by chemical physical or biological agents: Molecular mechanisms of pathogenicity.

- Cellular adaptations of growth and differentiation: hyperplasia, hypertrophy, atrophy, metaplasia. Cellular damage: reversible and irreversible. 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. Distinctive features between acute and chronic inflammation. End of inflammation.

- 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.
- Oncology: Nomenclature of tumors. Biology of tumor growth: benign and malignant neoplasms. Molecular basis of cancer. Metastasis.
- - Concept of Hemostasis disorders. Hemodynamic disorders. Thrombosis, embolism. Infarction. Shock. Hypertension, atherosclerosis. Red blood cells disorders.
- - Concept of physiopathology of the liver: causes of acute and chronic inflammations; hepatitis; cirrhosis and ascites formation; liver failure.
- - Concept of kidney physiopathology: causes of acute and chronic inflammations; glomerulonephritis and kidney failure.
- - Concept of lung physiopathology: causes of acute and chronic inflammations; bronchitis, pneumonia, tuberculosis.

CLINICAL PATHOLOGY, IMMUNOLOGY, IMMUNOEMATHOLOGY

- Blood collection, fractionation, and storage
- Complete blood count (CBC)
- The immune response: characteristics and cellular or molecular effectors
- Lymphocytes subtyping
- Use of antibodies in diagnostics
- Immunopathologies and their diagnosis
- Immunohematology and blood groups
- Inflammation biomarkers
- Evaluation of haemostatic capabilities
- Haemoglobin and anaemias
- Bilirubin and jaundice
- Clinical enzymology
- Plasma lipids
- Urine analysis
- Tumour markers.

MICROBIOLOGY AND CLINICAL MICROBIOLOGY

- 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.

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- 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 Immunohematology 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 oral examination of the modules of GENERAL PATHOLOGY-PHYSIOPATHOLOGY, CLINICAL PATHOLOGY, MICROBIOLOGY AND CLINICAL MICROBIOLOGY, whose mark is an integral part of the Teaching.

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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.

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

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