BSc in Physiotherapy

INTEGRADED COURSE TITLE: **GENERAL PATHOLOGY AND MICROBIOLOGY**
NUMBER OF ECTS CREDITS: 3
SSD: MEDS-03/A- MEDS-02/A
MODULE CONVENOR: PROF.SSA GABRIELLA D'ORAZI
E-MAIL: gabriella.dorazi@unicamillus.org

MODULE: Microbiology and Clinical Microbiology
NUMBER OF ECTS CREDITS: 2
SSD: MEDS-03/A
PROFESSOR: Bouba Yagai e-mail: bouba.yagai@unicamillus.org
Reception Time: by appointment

MODULE: General Pathology
NUMBER OF ECTS CREDITS: 1
SSD: MEDS-02/A
PROFESSOR: Gabriella D'Orazi e-mail: gabriella.dorazi@unicamillus.org
Reception Time: by appointment

PREREQUISITES

Even though no prior exams passed are necessary to follow the course, in order to understand the course, the student should have basic knowledge of biology, histology, biochemistry, anatomy and physiology. In order to understand the topics covered, students should have attended the courses taught in the first semester.

LEARNING OBJECTIVES

The course is inserted within the GENERAL OBJECTIVES of the Degree Course in Physiotherapy aimed at providing knowledge about the causes and the pathogenesis during the onset of diseases.
The General Pathology class will describe the molecular and cellular mechanisms at the basis of the diseases; the cellular response to injury (i.e., inflammatory process and immunity); the molecular mechanisms of tumor development and progression.
The Microbiology and Clinical Microbiology class will describe the structure of different microorganisms, microbial pathogenicity, interactions between micro-organism and host, causes and mechanisms of onset of the main microbial aetiology diseases. In addition, general knowledge on microbiological diagnostics will be essential for the identification of bacteria, viruses, fungi and protozoa.
Finally, the student will have the skills to address and solve the main questions of Clinical Microbiology and general Pathology and will acquire the functional methodological tools for an autonomous update.

LEARNING OUTCOMES

The learning outcomes are in line with the Processo di Bologna 2005/36/CE within the Dublin descriptors as follow:
To know:

- 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 main pathogens associated with infection of orthopedic/physiotherapeutic interest
- The basics of microbiological pharmacology: notes on anti-bacterial and antiviral drugs and resistance mechanisms
- The molecular and cellular mechanisms that induce changes in the homeostatic process
- The response to cellular injury
- The mechanisms of tumor development and progression
-

Applying knowledge and understanding

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

- 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

- To apply the acquired knowledge to analyse and comprehend the pathogenesis of the diseases.

Communication skills

- At the end of the course, the student will be able to communicate the scientific topics using specific scientific terminology in an appropriate manner.

Making judgments

At the end of the course, the student will be able to:
Carry out general assessments of the explained topics

- Use the acquired knowledge to explain the mechanisms at the basis of the onset of the diseases
- Use the acquired knowledge to identify bacteria, virus and fungi

Learning skills

The student will have acquired skills and learning methods suitable for deepening and improving their knowledge and skills in the subjects covered by integrated teaching, also through consultation of scientific literature.

COURSE SYLLABUS

Syllabus Microbiology and Clinical Microbiology

Characteristics of infectious agents. Vital associations: commensalism, mutualism, parasitism. Associated microbial flora. Generalities on infection diseases: infectious ratio, infection and disease, endogenous infection, exogenous infections, opportunistic infections.

IMMUNOLOGY - 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.
BATTERIOLOGY - 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 orthopedic/physiotherapeutic interest and associated pathologies.

VIROLOGY -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.
MYCOLOGY -Habitat and morphology of fungi (yeasts, mycelial fungi). Fungal cell structure. Examples of fungi of medical interest and associated diseases.

PARASITOLOGY - The protozoa cell: morphology and structure. Main characteristics of Helminths and Arthropods. Examples of parasites of medical interest and associated pathologies.

Syllabus General Pathology

- Aetiology and cellular pathology: health and disease concepts, aetiology and pathogenesis. Cellular adaptation: Hypertrophy, Ipotrophy, metaplasia, dysplasia, anaplasia. Extrinsic and intrinsic causes of diseases. Biological, chemical, phycisal agents of diseases. Reversible and irreversible cellular damage. Cell death: necrosis and apoptoisis

- Inflammatory-reparative response: cells in the acute inflammation; vascular modification during acute inflammation; cellular events and phagocytosis, chemical mediators; vascular changes and exudates formation. Chronic and granulomatous inflammation; differences between acute and chronic inflammation. Inflammatory diseases. Systemic consequences of inflammation: acute phase proteins, Fever, septic shock. Reparative response: tissue repair and regeneration; wound healing and fibrosis.

- Tumoral transformation. Chemical, physical and biological carcinogenesis. Molecular basis of tumoral transformation: oncogenes and tumor suppressor genes. Tumor classification: benign and malignant tumors. Mechanisms of tumor progression and metastatization.

COURSE STRUCTURE

The Integrated Course is structured in 30 hours of frontal teaching (20 for Microbiology class and 10 for General pathology class), divided into lessons of 2 or 4 hours according to the academic calendar. Frontal teaching includes theoretical lessons with the projections of PowerPoint slides with integrated video, when possible, and additional seminars on the explained topics. The Course will have the teachers' support during the classes and the meetings. The specific learning objectives will be introduced at the beginning of each class an summarized at the end.

COURSE GRADE DETERMINATION

Students' skills will be verified with a written exam. The written test will consist of 30-60 questions (15-30 per each module) with multiple-choice answers to answer in 45-90 minutes, for each exact answer 0.5 points will be assigned. Students who answer correctly to at least 18 questions per module will pass the exam. The final score of the written test will be given by the sum of the partial scores assigned to each question correctly answered. The mark of the written test can be improved by an oral interview. During the oral test, the Examination Committee will assess the student's ability to apply the knowledge and will ensure that the skills are adequate to support and manage problems of pathological/microbiological nature in physiotherapy field. The following will also be assessed: making judgements, communication skills and learning skills as indicated in the Dublin descriptors.
For the definition of the mark of the oral test the following criteria will be adopted:
Unsuitable: Poor or lacking knowledge and understanding of the topics; limited capacity for analysis and synthesis, frequent generalizations of the required contents; inability to use technical language.
18-20: Just enough knowledge and understanding of topics, with obvious imperfections; just sufficient capacity for analysis, synthesis and independent judgement; poor ability to use technical language.
21-23: Sufficient knowledge and understanding of topics; sufficient capacity for analysis and synthesis with the ability to logically and coherently argue the required contents; sufficient ability to use technical language.
24-26: Fair knowledge and understanding of the topics; discrete capacity for analysis and synthesis with the ability to rigorously argue the required contents; Good ability to use technical language.

27-29: Good knowledge and understanding of required content; good capacity for analysis and synthesis 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 contents with an excellent capacity for analysis and synthesis with the ability to argue the required contents in a rigorous, innovative and original way; Excellent ability to use technical language.

OPTIONAL ACTIVITIES

Other than the class teaching the students will have the opportunity to attend seminars, and research internship that will not be included in the final exam. The teachers will suggest website to achieve the learning objectives.

READING MATERIALS

Microbiology and Clinical Microbiology texbook
Richard A. Harvey, Pamela C. Champe Bruce D. Fisher Le basi della Microbiologia.

Damjanov, I., Perry, A. M., & Perry, K. (2021). Pathology for the Health Professions-E-Book. Elsevier Health Sciences

General Patology texbook
Damjanov, I., Perry, A. M., & Perry, K. (2021). Pathology for the Health Professions-E-Book. Elsevier Health Sciences

Slides and materials delivered by the teachers and/or uploaded in the University Webapp

The students will be received following an appointment with Prof: Gabriella D'Orazi at gabriella.dorazi@unicamillus.org