UNICAMILLUS

Degree in Medicine and Surgery

Integrated course: **SYSTEMATIC PATHOLOGY I**

Number of CFU: **11 ECTS**

SDS: **MEDS-07/A, MEDS-07/B, MEDS-13/A, MEDS-13/B, MEDS-13/C**

Reference Professor: **Prof. Weltert Luca Paolo**

Module: **Respiratory System Diseases MEDS-07/A 2 ECTS**

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Module: Chest Surgery MEDS-13/A 2 ECTS

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Module: Vascular Surgery MEDS-13/B 2 ECTS

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Module: Heart Surgery MEDS-13/C 2 ECTS

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Module: Cardiovascular System Diseases MEDS-07/B 3 ECTS

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PREREQUISITES

No specific prerequisites are required; however, it is considered to be fundamental for Cardiac Surgery the knowledge of Human Anatomy, Histology, Microbiology, Human Physiology, and General Pathology.

LEARNING OBJECTIVES

The learning objectives of the Integrated Course are:

- To acquire adequate knowledge regarding the epidemiology, etiology, pathogenesis, diagnosis, prognosis, and treatment of cardiovascular and respiratory diseases.
- To acquire knowledge of heart diseases, which are known to be the leading cause of premature death. In particular, the course will address:
    - Acute and chronic ischemic heart disease
    - Valvular heart diseases

- Heart failure
- Cardiomyopathies, myocarditis, and pericarditis
- Cardiac imaging techniques (echocardiography, CT, and magnetic resonance imaging)
- Age-related heart diseases

In addition, four seminar events of 3 hours each are planned on the following topics:

1. Genetics and cardiovascular prevention
2. Electrocardiography and arrhythmology
3. Cardiac arrest and cardiopulmonary resuscitation
4. Congenital heart diseases

- All cardiovascular diseases, whether ischemic or of different etiologies, are responsible for reduced quality of life, decreased physical capacity, disability, and ultimately death. Understanding the pathology and learning how to achieve a timely diagnosis will help identify the most appropriate treatment, preventing the progressive worsening of the disease and its symptoms.
- The course will also provide knowledge of diseases related to the extreme consequences of the main pathology associated with aging, namely atherosclerosis, which plays a central role in the training of modern healthcare professionals. It should be considered that the average age of the population is progressively increasing, together with the growing "pandemic" of diabetes, which represents one of the most severe determinants of atherosclerosis. Knowledge and therefore prevention and treatment of peripheral vascular diseases can contribute to increasing life expectancy (for example, by preventing the rupture of aortic aneurysms) and improving quality of life by avoiding disability (for example, by preventing cerebrovascular events and lower limb loss due to gangrene). In recent years, there has been a constant increase in the demand for training in angiology from general practitioners, as well as a growing demand for large-scale diagnostic examinations such as Doppler ultrasound and for vascular specialists.

The course is completed by the necessary acquisition of knowledge of the main diagnostic and/or therapeutic techniques most commonly performed in clinical practice.

EXPECTED LEARNING OUTCOMES

Knowledge and understanding:

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

- Know and discriminate between the main cardiovascular, vascular, respiratory and pulmonary symptoms, defining their severity and importance
- Propose a symptom-based diagnostic flow chart of cardiovascular, respiratory immunoallergic, lymphatic and respiratory system pathologies, in order to reach a diagnostic hypothesis; this diagnostic hypothesis must be corroborated by clinical and pathophysiological elements
- Assign a specific overall therapeutic course for each proposed and recognised clinical picture
- Know the basics of the main diseases of the cardiovascular, vascular, respiratory and pulmonary systems
- Know the clinical presentation, diagnostic procedure and differential diagnosis of the main

cardiovascular diseases

- To know the principles of medical and surgical therapy of the main diseases of the cardiovascular, vascular, respiratory and pulmonary system
- To know the clinical presentation, diagnostic procedure and differential diagnosis modalities of the main cardiovascular, respiratory immunoallergic, lymphatic system and respiratory system diseases
- Know the main surgical procedures of the venous and lymphatic system
- Know the devices commonly used in patients

Applying knowledge and understanding:
The general objective of the integrated teaching of Systematic Pathology I is the development of analytical methodological skills. For each individual module of the teaching students will have to know the principles of evidence-based medicine, relate them to each specific clinical situation and be able to also identify clinical situations characterized by atypical presentations, proposing an appropriate diagnostic and therapeutic procedure for each of them. Students are also expected to develop their learning skills, integrating information from textbooks with evidence from scientific publications, in order to consolidate and expand their acquired knowledge independently.

Communication skills:
The course promotes communication skills in order to improve the individual's ability to argue with effectiveness and precision of expression. These skills will be achieved specifically through Professor-student interactions in the context of different scenarios. Students are expected to learn an adequate technical-scientific language by also acquiring universally accepted diagnostic and prognostic scores; furthermore, they are expected to develop communication skills with the patient starting from the collection of the anamnesis up to the communication of the diagnosis and its prognosis and therapy.

Making judgements:

At the end of the lectures, the student will have learnt the fundamental elements relating to the most important pathologies of the individual modules of the integrated course and will be able to carry out a logical procedure to critically analyse the information received from the patient in order to make a differential diagnosis even with the rarest pathologies. The student will have developed the ability to integrate the acquired scientific knowledge by applying it to specific clinical situations, in order to formulate an appropriate assessment to guide diagnostic and therapeutic decision-making.

COURSE SYLLABUS

Cardiovascular System Diseases (MED/11)
Acquisition of knowledge about heart disease, known to be the leading cause of premature death. Specifically, the course will cover:
1. Acute and chronic ischemic heart disease
2. Valvular heart disease
3. Heart failure
4. Cardiomyopathies, myocarditis, and pericarditis

5. Cardiac imaging techniques (echocardiography, CT, MRI)
6. Aging-related heart disease

Four three-hour seminars are also planned on:

1. Genetics and Cardiovascular Prevention
2. Electrocardiography and Arrhythmology
3. Cardiac arrest and cardiopulmonary resuscitation
4. Congenital heart disease

All cardiovascular diseases, whether ischemic or of various etiologies, are responsible for reduced quality of life, reduced physical capacity, disability, and ultimately death. Understanding the pathology and learning how to reach a timely diagnosis will help achieve the best form of treatment, avoiding the progressive worsening of the pathology and symptoms;

Respiratory system (MED/10)

- Introduction to pathologies of the respiratory system. Special anatomy and physiology of the respiratory system, clinical semeiotics of the main symptoms and signs of respiratory diseases: cough, dyspnoea, haemophyte and chest pain, rales, wheezing, cyanosis, digital hippocratism. Other non-specific symptoms and signs associated with respiratory disease
- Techniques and basic principles of interpretation of laboratory tests and respiratory physio-pathology, respiratory function tests, arterial blood gas analysis and oximetry; walk test; polygraphic monitoring during sleep, clinical semiotics of the main symptoms and signs of respiratory diseases: cough, dyspnoea, haemophyte and chest pain, rales, wheezing, cyanosis, digital hippocratism. Other non-specific symptoms and signs associated with respiratory dis- ease
- Respiratory infectious diseases: community acquired (CAP) and nosocomial (HAP)

pneumonia, pneumonia in the immunocompromised host, aspiration pneumonia (ad ingestis), lung abscess. Definition, Epidemiology, Main Pathogens, Risk Factors, Pathophysiology, Patho- logical Anatomy, Clinical and Instrumental Diagnosis, Natural History, Complications and Therapy

- Pulmonary tuberculosis. Definition, epidemiology, risk factors, pathophysiology, pathological anatomy, clinical and instrumental diagnosis, natural history, complications and therapy
- Lung Cancer: definition, epidemiology, risk factors, pathophysiology, pathological anatomy, clinical and instrumental diagnosis, natural history, complications and therapy
- Acute and chronic respiratory failure. Definition, epidemiology, risk factors, pathophysiology, pathological anatomy, clinical and instrumental diagnosis, natural history, complications and therapy. Oxygen therapy and non-invasive mechanical ventilation: basic principles, indica- tions, side effects.
- Pulmonary embolism, pulmonary arterial hypertension and other pathologies of the pulmonary circulation: definition, epidemiology, risk factors, pathophysiology, pathological anat- omy, clinical and instrumental diagnosis, natural history, complications and therapy
- Diffuse infiltrative lung diseases: idiopathic pulmonary fibrosis, sarcoidosis and other pulmo- nary interstitial diseases; definition, epidemiology, risk factors, pathophysiology, pathological anatomy, clinical and instrumental diagnosis, natural history, complications therapy;
- Bronchial asthma and respiratory immunoallergic diseases: definition, epidemiology, risk fac- tors, pathophysiology, pathological anatomy, clinical and instrumental diagnosis, natural his-

tory, complications and therapy

- Chronic obstructive pulmonary disease (COPD): definition, epidemiology, risk factors, pathophysiology, pathological anatomy, clinical and instrumental diagnosis, natural history, complications and therapy
- Pleural Pathology: pleurisy and pleural effusions; pneumothorax; mesothelioma. Definition, epidemiology, risk factors, pathophysiology, pathological anatomy, clinical and instrumental diagnosis, natural history, complications and therapy. Thoracentesis and management of pleurostomy.
- Bronchiectasis. Definition, epidemiology, risk factors, pathophysiology, pathological anatomy, clinical and instrumental diagnosis, natural history, complications and therapy.
- Obstructive sleep apnea syndrome (OSAS). Definition, epidemiology, risk factors, pathophysiology, pathological anatomy, clinical and instrumental diagnosis, natural history, complications and therapy.

Vascular Surgery (MED/22)
Atherosclerosis and principles of Hemodynamics.

- Clinical semiotics and instrumental diagnosis of vascular apparatus and pathologies
- Peripheral vascular disease.
- Acute limb ischemia.
- Cerebrovascular insufficiency.
- Celiac-mesenteric insufficiency, acute and chronic.
- Renovascular hypertension.
- Aortic aneurysms.
- Peripheral aneurysms
- Aortic dissections.
- Vascular trauma.
- Diseases of the venous system.
- Diseases of the lymphatic system.
- Thoracic outlet syndrome.
- Vasospastic diseases.

Chest Surgery (MED/21)

- Basics of surgical anatomy of chest
- Fundamentals of diagnosis and imaging examinations in thoracic surgery Preoperative physiological evaluation
- Chest wall diseases:
    - Pectus deformities
    - Thoracic outlet syndrome
    - chest wall tumors
- Pleura:
    - Pneumothorax,
    - Chylothorax,
    - Empyema,
    - Pleural effusion,

    - Solitary fibrous tumors,
    - Malignant pleural mesothelioma
- Trachea:
    - tracheobronchial injuries,
    - stenosis and fistulae,
    - Tracheal tumors
- Mediastinum:
    - Myasthenia gravis,
    - Thymic tumors,
    - Mediastinal germ cell tumors,
    - Lymphomas, and other hematologic diseases
- Lung:
    - Surgery for emphysema,
    - Lung abscess,
    - Lung cancer screening,
    - Solitary pulmonary nodule,
    - Staging lung cancer,
    - Lung cancer,
    - Superior sulcus tumors,
    - Carcinoid tumors,
- Metastatic tumors of the lung Esophagus:
    - Benign tumors,
    - esophageal malignancies,
    - Staging,
    - Indications to surgery,
    - Esophageal functional diseases,
    - Differential diagnosis,
    - Decision making process and Indication to surgery of functional diseases of foregut

Heart Surgery (MED/23)

- Ischemic heart diseases. Surgical therapies. Rationale and methodology

Valvular disease:

- Main causes of valve diseases
- Congenital, Rheumatic disease,
- Ischemic disease,
- Endocarditis,
- Degenerative Aortic stenosis
- Ethiology,
- Physiopathology
- Diagnosis: Symptoms, Semeiotic, Ecg changes, Echocardiogram, Catheterism Therapy: Medical, Valvuloplasty, TAVI, Surgical
- Aortic insufficiency: Ethiology, Physiopathology. Diagnosis: Symptoms, Semeiotic, Ecg changes, Echocardiogram, Catheterism Therapy: Medical, TAVI, Surgical
- Mitral stenosis: Ethiology, Physiopathology. Diagnosis: Symptoms, Semeiotic, Ecg changes, Echocardiogram, Catheterism Therapy: Medical, Valvuloplasty, TAMI, Surgical
- Mitral insufficiency: Ethiology, Physiopathology. Diagnosis: Symptoms, Physical

examination, Ecg changes, Echocardiogram, Catheterism Therapy: Medical, Percutaneous Interventional , Surgical Tricuspid insufficiency: Ethiology, Physiopathology. Diagnosis: Symptoms, Semeiotic, Ecg changes, Echocardiogram, Catheterism Therapy: Medical, Percutaneous Interventional , Surgical

- Tricuspid stenosis and pulmonary disease Ethiology, Physiopathology. Diagnosis Symptoms, Semeiotic, Lab. Tests, Ecg changes, Echocardiogram, Catheterism. Therapy: Medical, Percutaneous Interventional , Surgical Infective endocarditis.
- Ethiology, Physiopathology. Diagnosis Symptoms, Semeiotic, Lab. Tests, Ecg changes, Echocardiogram, Catheterism. Therapy: Medical, Percutaneous Interventional , Surgical
- Congenital disease

Atrial septum defect (physiopathology, diagnosis and treatment) Ventricular septum defect (physiopathology, diagnosis and treatment) Tetralogy of Fallot (physiopathology, diagnosis and treatment) Aortic coarctation (physiopathology, diagnosis and treatment) Pulmonary atresia (physiopathology, diagnosis and treatment)
Trasposizione dei grossi vasi (physiopathology, diagnosis and treatment)

INTERNSHIP OBJECTIVES

CARDIOLOGY

- History of heart disease patient;
- Interpretation of laboratory tests for cardiovascular diseases;
- Practice in cardiovascular semiotics (general objective examination with particular attention on cardiac listening);
- ECG reading with the ability to recognise brady and tachyarrhythmic diseases and ischemic changes (chronic ischemia and acute coronary syndromes);
- Elementary interpretation of echocardiography: cardiac contractility and valvular disease;
- Elementary interpretation of coronary angiography;
- Formulation of a cardiological diagnosis and setting up the corresponding therapy.

RESPIRATORY DISEASES

- Clinical approach to the respiratory patient: medical history and physical examination;
- Execution and interpretation of arterial blood gas analysis;
- Execution and interpretation of pulmonary function tests: simple spirometry, global spirometry, alveolar-capillary diffusion test, walking test;
- Interpretation of chest imaging: chest x-ray, chest CT (HRCT, contrast-enhanced CT), PET/CT, lung scintigraphy;
- Indication and foundations of interventional pulmonology: video-fibrobronchoscopy, EBUS, interventional pulmonology;
- Thoracic oncology;
- Evaluation and clinical management of acute and chronic respiratory patients;
- Outpatient visits for the diagnosis and treatment of respiratory diseases;

HEART SURGERY

- Assist with the patient's cardiovascular history at the time of hospitalization (Previous diseases. History of the pathology for which hospitalization is being made. Symptoms and signs of the disease. Diagnostic examinations carried out);
- Visit to the patient's bed. Palpation, auscultation, pressure and frequency control, verification of laboratory tests;
- Visit the intensive care unit. Monitoring of vital signs, pressure, frequency, saturation, diuresis and control of hemogasanalytic parameters;
- Visit to the operating department and understanding of the principles of extracorporeal circulation;
- Attend coronary bypass surgery, heart valve repair, and aortic aneurysm resections.

CHEST SURGERY

- Assist and learn to make the recent and remote medical history of patients with respiratory/thoracic pathology;
- Assist and learn to carry out the objective examination of patients affected with respiratory/thoracic pathology, with particular attention to percussion and auscultation of the chest;
- Learn how to communicate with cancer patients and their family members, paying attention to how to communicate and request information about this particular patient setting;
- Assist and helping operators in the preparation of endoscopic examinations (Fibrobronchoscopy, EBUS, EUS) and during the execution of thoracentesis;
- Assist in the operating theatre to the surgical interventions of Lung Resection, Pulmonary Lobectomy, Tymectomy, Apicectomy for Pneumothorax, Pleurodesis, Mediastinal biopsies and removal of Mediastinal Masses, both with the Thoracotomy and Thoracoscopy and Robotics technique.

COURSE STRUCTURE

The course consists of 110 academic hours (20 hours of Respiratory System Diseases, 30 hours of Cardiovascular System Diseases, 20 hours of Chest Surgery, 20 hours of Vascular Surgery, 20 hours of Heart Surgery), during which the main topics concerning the cardiovascular, vascular and respiratory system diseases will be addressed with the support of multimedia material through an interactive mode with the students, who are required to attend class.

COURSE GRADE DETERMINATION

The examination consists of two parts: a written test and an oral test. The written test consists of multiple-choice questions, with one correct answer, on topics covered in the lectures. The student answers 60 questions on the five teaching subjects (each correct answer is awarded a mark of 1).

To take the oral test, the student must have obtained a minimum score of 36/60 on quizzes covering all five subjects. The tests are multiple-choice with only one correct answer. The written examination constitutes a barrier or selection test; it is in the oral test that the student is given the opportunity to demonstrate his or her preparation by discussing the course topics, reasoning on issues relating to the subjects and demonstrating that he or she has acquired the ability to express himself or herself in an appropriate scientific language. The final assessment will be based primarily

on the outcome of the oral examination.

Hence, the whole examination will be evaluated as it follows:
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 a technical language.
18-20: Barely sufficient knowledge and understanding of the topics, with obvious imperfections; Barely sufficient ability of analysis, synthesis, and autonomy of judgment; poor ability to use a 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; Fair 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 a technical language.

30-30 e lode: 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 a technical language.

READING MATERIALS

- *Hurst's.* The Heart, 14 edizione.

- *ESC* Textbook of Cardiovascular Medicine.

- *Harrison's Principles of Internal Medicine*, 20e J. Larry Jameson, Anthony S. Fauci, Dennis L. Kasper, Stephen L. Hauser, Dan L. Longo, Joseph Loscalzo;

- *Handbook of Patient Care* in Vascular Diseases (6th edition, by Rasmussen/Clouse/ Tonnessen, WoltersKluwer (Lippincott Williams & Wilkins Handbook;

- *Vascular surgery - Why, When, How*, *Minerva Medica Edizioni*

- *Vascular Surgery, a clinical guide to decision making, Elsevier*

- *Pocket Manual of General Thoracic Surgery*. Amin Madani, Lorenzo Ferri, Andrew Seely (Eds). 2015 Edition. Springer. ISBN-13: 978-3319174969, ISBN-10: 3319174967;

- *Cardiac Surgery*, Kirklin /Barrat-Boyes. Ed Churchill, Livingstone;

- Libby, P., Bonow, R., Mann, D., Tomaselli, G. F., Bhatt, D. L., & Solomon, S. D. (2024, March).

- Malattie del cuore di Braunwald. Edra.