MEDTEC 2022-2023

ORGAN SYSTEM DISEASES 1: BLOOD, HEART AND LUNGS

SYLLABUS

The Organ System Diseases (OSD) 1 course consists of three modules: Blood Diseases, Heart Diseases, and Lung Diseases.

BLOOD DISEASES

Faculty: Matteo Della Porta, Carmelo Carlo-Stella

This course is designed to guide medical students across the essential features of clinical hematology and to achieve an understanding on the current knowledge of the blood disease processes in terms of pathophysiology and the underlying genetic and molecular abnormalities. Including also reminders of the basic sciences and technologies applied to patient diagnosis and managements, this course will focus on practical aspects and clinical cases, in particular with regard to diagnostic aspects, with the goal of facilitating the learning process and the retention of fundamental information in the field of hematology. Routine and specialized hematology tests will be discussed, with an emphasis on performing and interpreting test results and new technologies applied to patient management. Theory will be applied for the evaluation, classification, diagnosis and monitoring of blood diseases.
The course will start introducing the general principles of hematologic evaluation, specimen collection, and basic laboratory procedures, together with the origin and development of blood cell. The following lectures will first deal with the various disorders of erythrocyte production, function, and destruction, anemia, membrane disorders, enzyme deficiencies, hemoglobinopathies and other disorders will be discussed, including laboratory detection methods, analyses, and diagnoses. A comprehensive look at lymphadenopathy, lymphoproliferative disorders and gammopathies will then be addressed, encompassing etiology, laboratory evaluation, diagnostic algorithms and clinical characteristics. Specific lectures will integrate the knowledge of lymphoproliferative disorders with basic concepts of genomics am molecular medicine. Thereafter, a comprehensive evaluation of acute and chronic leukemias (including myeloproliferative disorders, myelodysplastic syndromes, acute myeloid leukemia and acute lymphoblastic leukemias will be addressed. Clinical indications and complications associated to hematopoietic stem cell transplantation will be also discussed

Learning Objectives

<u>Clonal hematopoiesis</u>
- Illustrate de definition of clonal hematopoiesis
- Describe clinical implications of clonal hematopoiesis

<u>Personalized approach to anemia</u>
- Illustrate hematopoiesis and the physiologic basis of red cell production
- Illustrate the definition of anemia and indicate the most frequent causes (anemia classification)
- Describe routine laboratory tests in anemia diagnosis/classification
- Describe clinical presentation (signs and symptoms) and clinical consequences of anemia
- Describe General principles in the treatment of anemia

<u>Personalized approach to the patient with ''cytosis'' (leucocytosis, erythrocytosis, thrombocytosis)</u>
- Indicate the main causes of absolute erythrocytosis, leucocytosis and thrombocytosis
- Suggest a diagnostic pathway for patients with "cytosis"

<u>Personalized approach to the patient with myeloid malignancies (Bone Marrow Failures, Leukemia, Myelodysplastic syndromes, Myeloproliferative neoplasms, Therapy-related myeloid neoplasms):</u>
- Clinical evaluation of Bone Marrow Failures, Leukemias, Myelodysplastic syndromes, Myeloproliferative neoplasms, Therapy-related myeloid neoplasms
- Clinical evaluation of inherited predisposition to hematological malignancies
- Indicate the general criteria on which the classifications of myeloid malignancies are based.
- Describe the different morphologic and clinical features of myeloid malignancies
- Describe the onset framework of myeloid malignancies (considering the medical history, physical examination and alterations in blood tests).
- Suggest a diagnostic pathway to reach the stage of clinical action.
- Illustrate the natural history and indicate the main therapeutic options.
- Indicate the most relevant inherited disorders associated with increased risk of developing myeloid malignancies

<u>Lymphocytosis and Chronic Lymphocytic Leukemia (CLL)</u>
- Definition, causes and pathophysiology
- Diagnostic algorithm for lymphocytosis
- Epidemiology, molecular pathophysiology, and clinical features of CLL
- Risk factors, diagnosis, staging, prognostication: the impact of genomics
- Therapeutic decision-making process, risk-adapted therapy, and disease

monitoring
- Clinical case

Plasma Cell Disorders and Multiple Myeloma (MM)
- Definition, classification
- Epidemiology, molecular pathophysiology, clinical features
- Diagnostic algorithm for plasma cell disorders
- Risk factors, staging, prognostication of MM: the impact of genomics
- Therapeutic decision-making process, risk-adapted therapy, and disease monitoring
- Clinical case

Management of the patient with lymphadenopathy
- Definition, causes and pathophysiology of lymphadenopathy
- Localized and generalized lymphadenopathy
- Diagnostic algorithm for lymphadenopathy
- Clinical case

Classic Hodgkin Lymphoma (cHL)
- Epidemiology, molecular pathology, classification, clinical features
- Risk factors, diagnosis, staging, prognostication
- Therapeutic decision-making algorithms for risk-adapted therapy
- Disease outcome prediction and monitoring: imaging technologies and circulating tumor DNA genotyping
- Clinical case

Non-Hodgkin Lymphoma (NHL)
- Epidemiology, molecular pathology, classification, clinical features
- Risk factors, diagnosis, staging, prognostication
- Therapeutic decision-making algorithms for risk-adapted therapy
- Disease outcome prediction and monitoring: imaging technologies and circulating tumor DNA genotyping
- Clinical case

Immunotherapy for Lymphoid Malignancies
- Cell-based immunotherapy (CAR-T cells; stem cell transplantation)
- Antibody-based immunotherapy (Bi-specific T-cell engagers)

Suggested   websites
http://www.hematology.org/
http://www.leukemia-net.org/content/diagnostics/diagnostics/morphology/
http://www.esh.org/
http://imagebank.hematology.or/
http://teachingcases.hematolog.org/
http://www.hematologylibrary.org/site/webfocus/content/index-toc.xhtml

HEART DISEASES

Faculty: Gianluigi Condorelli, Giulio Stefanini, Marco Francone, Davide Cao, Mauro Chiarito, Antonio Colombo, Efrem Civilini, Antonino Spinelli
Open Faculty: Lucia Torracca, Patrizia Presbitero, Antonio Frontera, Massimo Tritto

Textbooks:
- Pathophysiology of Heart Disease: A Collaborative Project of Medical Students and Faculty- Leonard S. Lilly – Wolters Kluver Ed (recommended)
- Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine, Elsevier
- Harrison's Principles of Internal Medicine, McGraw Hill
- Goldman's Cecil Medicine L. Goldman, A. I. Schafer, Elsevier
- Bates' Guide to Physical Examination and History Taking, Lynn S. Bickley

This module will focus on some relevant aspects of cardiology, including pathophysiology, functional and structural semeiotics, clinics and therapeutic pharmacology of cardiovascular diseases, including broad concepts of cardiovascular surgery and cardiovascular diseases of the young. Moreover, the module will provide an overview on the key role of biotechnological advances for the treatment of cardiovascular diseases.

The cardiovascular disease module is structured in 6 sub-modules, each one focusing on a key area of cardiovascular diseases. These sub-modules will provide a comprehensive overview on the content of the course. Each sub-module will consist in 2 traditional lessons focusing on the pathophysiology, clinical aspects and therapeutic management of cardiovascular diseases, 1 lesson focusing on biotechnologies applied to the management of cardiovascular diseases, and 1 lesson focusing on the presentation of educational clinical cases aiming at providing a pragmatic implementation of the acquired knowledge in a structured clinical management of cardiovascular diseases in clinical practice.

Sub-module 1. Risk factors and cardiovascular prevention.
Lesson 1: Risk factors and epidemiology of cardiac diseases
Lesson 2: Basic semeiotic and tools for patient evaluation in cardiovascular medicine
Lesson 3: Advanced imaging for cardiovascular diagnosis and prevention
Lesson 4: Clinical cases
Learning goals:
- Illustrate the global epidemiology of cardiac disease.
- Define some strategies for the prevention of risk factors.
- Discuss the definition of risk factors and the impact of lifestyle on CV diseases and their prevention.
- Define some strategies for the prevention of risk factors.
- Acquire knowledge on how to perform a comprehensive history taking and a general examination of the patient with cardiovascular disease.

- Acquire knowledge on how to recognize cardiac sounds and correlate them to the underlying pathology.
- Understand the role of diagnostic tools for the clinical management of cardiovascular diseases.
- Illustrate the key imaging techniques for the evaluation of cardiac function and for the assessment of cardiovascular diseases.

Sub-module 2. Heart failure
Lesson 1: Heart failure: Basic mechanism and pathophysiology
Lesson 2: Heart failure: Clinics and therapy
Lesson 3: Left ventricular support devices
Lesson 4: Clinical cases
Learning goals:
- Discuss the epidemiology and prognosis of heart failure with reduced and preserved ejection fraction.
- Describe the definition of heart failure and recognize the different underlying causes and precipitating factors.
- Discuss the pathophysiology of heart failure and systolic and diastolic dysfunction
- Understand the differences between acute from chronic heart failure
- Understand the bases of therapeutic options for acute and chronic heart failure treatment
- Understand the major prognostic components in heart failure.

Sub-module 3. Ischemic heart disease
Lesson 1: Coronary artery disease: Pathophysiology and management
Lesson 2: Coronary artery disease: Acute coronary syndromes and cardiogenic shock
Lesson 3: Coronary artery stents
Lesson 4: Clinical cases
Learning goals:
- Discuss myocardial ischemia: from pathophysiology to clinical presentation.
- Clarify the diagnostic tools for assessing myocardial ischemia.
- Define the basis of therapeutic approaches.
- Illustrate the invasive diagnostic tools for assessing coronary artery disease and myocardial ischemia
- Define the basis of therapeutic approaches, including medical management and myocardial revascularization
- Discuss the treatment options for myocardial revascularization
- Understand the underlying mechanisms and clinical presentations of acute coronary syndromes.
- Discuss risk stratification in patients with acute coronary syndromes, and the management of patients with non-ST-segment elevation and ST-segment elevation.
- Describe the pathophysiology and define the management of cardiogenic shock.

Sub-module 4. Heart valve diseases and congenital heart diseases
Lesson 1: Heart valve diseases

Lesson 2: Congenital cardiac abnormalities in adults
Lesson 3: Transcatheter bioprosthetic valves
Lesson 4: Clinical cases
Learning goals:

- Define the pathophysiology and clinical presentation of heart valve diseases
- Discuss the clinical evaluation of heart valve diseases.
- Discuss the diagnostic tools for assessing heart valve diseases.
- Discuss the treatment options and indications for intervention for heart valve diseases.
- Discuss the optimal medical management after interventions for heart valve diseases.
- Discuss the anatomy and the development of the heart, veins and great vessels, their major congenital malformations and the principles of nomenclature.
- Discuss the physiology of the foetal and transitional circulations; aetiology of congenital heart disease, including the developmental anatomy of the heart and vasculature.
- Discuss the pathophysiology, natural history and complications of: valve and outflow tract lesions; septal defects; patent ductus arteriosus; Eisenmenger syndrome; coarctation of the aorta; Ebsteins's anomaly; aortic and pulmonary artery malformations; venous anomalies; transposition of the great arteries (complete and congenitally corrected); tetralogy of Fallot; congenital malformations of coronary arteries; cyanotic congenital heart disease and secondary erythrocytosis; and pulmonary hypertension in congenital heart disease.
- Describe adolescent and adult patients with simple congenital heart defects (grown-up congenital heart disease (GUCH), including those who have undergone cardiac surgery.
- Describe and recognize physical signs of congenital heart disease and its complications.

Sub-module 5. Arrhythmias
Lesson 1: Cardiac arrhythmias: Basic mechanisms and pathophysiology
Lesson 2: Cardiac arrhythmias: Clinics and therapeutics
Lesson 3: Cardiac arrhythmias mapping systems
Lesson 4: Clinical cases
Learning goals:

- Distinguish the epidemiology, pathophysiology, diagnosis and clinical features of arrhythmias and conduction disturbances.
- Illustrate of the cellular and molecular mechanisms involved in the electrical activity of the heart; the anatomy and physiology of the conduction system; and the electrical vectors throughout the cardiac cycle.
- Indicate how to recognize the characteristic appearances of, and explanation for, the ECG in the main pathological conditions.
- Discuss the classification and definition of bradycardia, tachycardia, supraventricular arrhythmia (including atrial fibrillation and flutter) and ventricular arrhythmia.
- Present the mechanism of action of the various classes of anti-arrhythmic drugs and their use in the clinic, as related to the classification of arrhythmias.
- Discuss the basic functioning of the pacemaker and its indications.
- Describe the basic functioning of the implantable cardioverter–defibrillator (ICD) and its indications for arrhythmia prevention.

- Discuss the flow-chart of therapeutic options in arrhythmias

Sub-module 6. Surgery for the treatment of cardiovascular diseases
Lesson 1: Principles of cardiovascular surgery
Lesson 2: Clinical and surgical approaches for great vessel disease
Lesson 3: Invasive mechanical ventilation
Lesson 4: Clinical cases
Learning goals:
- Describe the surgical approaches to cardiac diseases .
- Describe the basic techniques for cardiac surgery (coronary artery bypass surgery, valvular replacement/repair, correction of congenital diseases)
- Describe the principles of extracorporeal circulation
- Describe the principles of mechanical ventilation
- Discuss the epidemiology, pathophysiology, diagnosis and clinical features of aneurysms and occlusive artery diseases in different anatomical settings.
- Define the basis of open or endovascular therapeutic approaches.
- Introduce planning and sizing for vascular diseases.

LUNG DISEASES

- **Faculty:** Stefano Aliberti (P)
- **Adjunct faculty for seminars:** Letizia Corinna Morlacchi; Nicola Sverzellati; Andrea Aliverti; Giovanni Sotgiu, Michela Bezzi.
- **Suggested reading/Reference:** Essentials of Clinical Pulmonology. Edited by Pallav L. Shah, Felix JF Herth, YC Gary Lee, Gerald J Criner. CRC Press
- Based on the European Curriculum Recommendations for Training in Adult Respiratory Medicine (Loddenkemper R. Breathe 2008, Volume 5, No 1.

Introduction
The lungs and the respiratory system are far more complex than many other organs and apparatus. The lungs must play multiple roles, gases exchanges, oxygen supplementation, removing of wastes, toxins, and defense against hostile intruders. Nowadays epidemiological data shows that the respiratory diseases are becoming more and more important in terms of morbidity, invalidity, and mortality. Lung diseases are not only a killer, but an impressive number of patients are now living worldwide with a chronic pulmonary disease with a terrific impact on hospitalization and general economic impact. Based on these data, the present course tries to focus on the most important aspects of respiratory medicine examining prevalence, risk factors, physiopathological and clinical features of the most important chapters of lung diseases. For more complex diseases or clinical presentations, an integrated approach with other specialists (i.e.: radiologists, pathologists, pharmacologists, ENT…) will be used to describe in an accurate way the complexity and the heterogeneity of them.

Learning Objectives

1. **Patient-oriented approach according to respiratory signs and symptoms**
- Describe characteristics and potential causes of cough, sputum production, dyspnoea, wheeze, stridor, haemoptysis, and chest pain.
- Describe characteristics and potential causes of abnormal examination findings, including cyanosis, finger clubbing, chest wall deformities, abnormal breathing patterns, and abnormal findings on inspection, palpation, percussion and auscultation.

2. **Respiratory Physiopathology**
- Understand ventilation, mechanics of breathing and cardio-pulmonary relationship.
- Describe principles of plethysmography, bronchial hyper-responsiveness, diffusion, blood flow, ventilation-perfusion relationships, and control of ventilation.
- Interpret pulse oximetry, simple spirometry, plethysmography, bronchodilation test, bronchial provocation testing, single breath diffusing capacity, and peak flow monitoring.

3. **Respiratory imaging**
- Describe basic principles of chest radiography, computed tomography (CT; with and without contrast medium), high-resolution CT (HRCT) and bed-side lung ultrasound (LUS).
- Perform a basic interpretation of chest radiographs (PA, AP and lateral views).
- Perform a basic interpretation of CT scans (identification of mass lesions, consolidation, collapse, mediastinal/hilar lymphadenopathy, interstitial lung disease, hyperinflation/air-trapping, bronchiectasis, ground-glass shadowing, pneumothorax and pleural effusions/plaques).
- Perform a basic interpretation of bed-side LUS images (identification of pleural effusion, aspecific alveolar consolidation, wet lung/interstitial syndrome, diaphragm movements) and understand the role of LUS in assisting pleural procedures.
- Describe the main radiological features of the most common pulmonary and pleural diseases.

4. **Interventional pulmonology**
- Describe normal and variant bronchial anatomy.
- Recognize indications and contraindications for bronchoscopy and other interventional techniques.

5. **COPD (chronic obstructive pulmonary disease)**
- Define, classify and describe the etiology of COPD, chronic bronchitis and emphysema and awareness of its heterogeneity.
- Describe the epidemiology and pathophysiology of COPD, including mechanisms of inflammation, structural changes and cell damage and repair.
- Recognize risk factors for COPD, including tobacco smoke and anti-protease deficiency
- Understand possible differential diagnoses /co-existent disorders, including asthma, upper respiratory tract disorders, gastro-oesophageal reflux, and bronchiectasis.
- Describe relevant investigations including spirometry, other relevant lung function tests, arterial blood gas analysis, peak flow monitoring, bronchodilator and bronchoprovocation

testing. The use of X-Ray, and CT.

- Recognize related complications, including pneumothorax, respiratory failure, pulmonary arterial hypertension and cor pulmonale, as well as systemic effects of COPD.

6. **Asthma**
   - Define, classify (including clinical forms, phenotypes, staging and level of control) and describe the etiology of asthma.
   - Describe the epidemiology and pathophysiology of asthma, including mechanisms of inflammation, structural changes involved, pathology in allergic and non-allergic asthma, relationship between pathology and asthma severity.
   - Recognize risk factors for asthma, including host and environment factors.
   - Describe relevant investigations including lung function testing (including bronchodilator and bronchoprovocation tests, as well as peak flow monitoring), chest X-ray, CT, exhaled NO, skin allergy testing, and serum allergy testing.
   - Recognize possible differential diagnoses, including early childhood asthma, occupational asthma, vocal cord dysfunction, gastro-oesophageal reflux, upper respiratory tract disorders, bronchiectasis and COPD.
   - Define, classify, describe the etiology and diagnose non-asthma allergic and eosinophilic lung diseases, including hypersensitivity pneumonitis, eosinophilic granulomatosis with polyangiitis (EGPA), acute and chronic eosinophilic pneumonia, allergic bronchopulmonary aspergillosis and drug-induced diseases.

7. **Bronchiectasis**
   - Define, classify, describe the etiology and diagnose bronchiectasis and be awareness of its heterogeneity.
   - Describe the epidemiology and pathophysiology of bronchiectasis.
   - Describe basic principles, indications and contraindications of relevant investigations used in the management of bronchiectasis, including spirometry and other relevant lung function tests, arterial blood gas analysis, bronchodilator and bronchoprovocation testing, bronchoscopy, chest X-Ray, and chest CT.
   - Understand basic principles for bronchiectasis management (including relevant therapeutic measures, respiratory physiotherapy and pulmonary rehabilitation, patient education, indications for hospitalization, and the role of vaccinations).
   - Describe bronchiectasis-related complications, including exacerbations and haemoptysis.
   - Define, classify and diagnose respiratory and non-respiratory manifestations of cystic fibrosis (CF).
   - Describe the epidemiology and pathophysiology of CF.
   - Become familiar with chest physiotherapy techniques used in CF, nutritional programs, indications for lung transplantation and new drugs (potentiators and modulators).
   - Understand the importance of a multidisciplinary approach in the management of bronchiectasis and CF.

8. **Pulmonary embolism**
   - Define, classify, describe the etiology and diagnose pulmonary embolism.

- Describe genetic and acquired risk factors for pulmonary embolism.
- Illustrate current epidemiology and relevant pathology of pulmonary embolism.
- Describe relevant investigations used in the management of pulmonary embolism, including lab tests (D-dimer), scintigraphy, EKG, echocardiography, chest CT, and right heart catheterization.
- Describe respiratory and non-respiratory clinical manifestations and complications of pulmonary embolism.
- Assess severity of respiratory and systemic involvement of pulmonary embolism.

9. **Diffuse parenchymal lung diseases (DPLD) and occupational lung diseases**
- Define, classify, describe the etiology and diagnose DPLD.
- Describe the epidemiology and pathophysiology of DPLD.
- Describe relevant investigations used in the management of DPLD, including non-invasive (chest X-ray, high resolution CT-scan, lung function tests) and invasive (broncho-alveolar lavage, transbronchial lung biopsy, and VATS biopsy) procedures.
- Describe the pulmonary and extrapulmonary manifestations of specific DPLD..
- Define, classify, describe the etiology and diagnose occupational/environmental lung disease

10. **Respiratory infections**
- Define, classify, describe the etiology, diagnose and stratify in terms of disease severity upper respiratory tract infections (URTI), lower respiratory tract infections (LRTI) including pneumonia - community acquired pneumonia (CAP), hospital-acquired pneumonia (HAP), and pneumonia in the immunocompromised host.
- Describe the epidemiology of respiratory tract infections (microbiology, age related factors, geographical issues, occupational considerations, comorbidities, immunological status).
- Describe the clinical manifestations of viral (excluding COVID-19), bacterial, and fungal respiratory infections.
- Illustrate relevant investigations used in the management of respiratory tract infections including noninvasive (sputum induction, chest X-ray, chest CT, lung ultrasound) and invasive (bronchoscopy, thoracentesis, thoracic drainage) techniques
- Describe the related complications of respiratory tract infections such as pleural effusion, lung abscess, empyema, respiratory failure and sepsis.
- Describe preventive measures, including influenza and pneumococcal vaccinations.
- Define, classify, and diagnose infections and pulmonary diseases due to non-tuberculous mycobacteria (NTM)
- Describe the epidemiology and pathophysiology of infections and pulmonary diseases due to NTM.
- Describe the clinical manifestations of pulmonary diseases due to NTM and relevant investigations used in their management.

11. **COVID-19**
- Define, classify, describe the etiology, and diagnose COVID-19, and stratify it in terms of disease severity.
- Describe the epidemiology and pathophysiology of COVID-19.

- Describe the clinical manifestations of COVID-19 (acute disease and long-COVID) and relevant investigations used in the management of COVID-19.
- Describe the differential diagnosis of COVID-19 among respiratory tract infections.

12. Tuberculosis (TB) and latent TB infection
- Define, classify and diagnose tuberculosis.
- Illustrate epidemiology and pathophysiology of TB.
- Describe transmission of mycobacteria and risk factors for developing TB.
- Illustrate the pathogenesis of TB (events in non-immunised host, immunologic response to *M. tuberculosis*, exogenous versus endogenous infection, latent TB infection).
- Illustrate immunological features of latent TB (tuberculin sensitivity and interferon gamma release).
- Describe the general manifestations, clinical and radiological features of pulmonary TB.
- Become familiar with treatment of TB (general principles, drugs, combination regimens) and special problems in treatment (e.g. multidrug resistant TB, extensively resistant TB, pregnancy and breast feeding, TB and HIV infection, and latent TB infection).

13. Pleural diseases and procedures
- Define, classify, describe the etiology, and diagnose pleural effusions (serothorax, chylothorax, hemothorax, and empyema)
- Describe epidemiology and pathophysiology of infectious, inflammatory, and neoplastic pleural disorders.
- Describe the macroscopic appearance of pleural fluids, distinction between transudative and exudative pleural effusions.
- Define, classify, describe the etiology, and diagnose pneumothorax (primary and secondary) and related complications such as tension pneumothorax.
- Illustrate relevant investigations to manage pleural diseases, including non-invasive (chest X-ray, ultrasound, and chest CT) and invasive (thoracentesis, pleural biopsy, pleural drainage, medical thoracoscopy, and biopsy) techniques.
- Understand indications for pleural ultrasound, thoracentesis, and intercostal tube drainage.

14. Sleep-related, chest and neuromuscolar disorders
- Define, classify, describe the etiology, and diagnose obstructive sleep apnoea syndrome (OSA), central sleep apnoea syndrome (CSA), periodic breathing (PB), and obesity hypoventilation syndrome (OHS).
- Describe the epidemiology and pathophysiology of OSA, CSA, PB, and OHS.
- Illustrate relevant investigations used in the management of sleep-related disorders, including pulmonary function tests, respiratory polygraphy and polysomnography.
- Recognize complications of OSA, CSA, PB, and OHS.
- Define, classify, describe the etiology and diagnose chest wall diseases -CW-(including kyphoscoliosis, ankylosing spondylitis, flail chest, pectus excavatum), diseases of the respiratory muscles -RM-, and diseases of the diaphragm -D- (including diaphragmatic paralysis)

15. **Thoracic tumours**

- Define, classify and describe the etiology of thoracic tumours: lung cancer (LC), mesothelioma (M), metastatic TT (MTT), benign intrathoracic tumours, mediastinasinal (MT), chest wall tumours, sarcoma and lymphoma (L)
- Describe the epidemiology, risk factors, clinical symptoms, syndromes and physical signs of TT, including paraneoplastic syndromes.
- Describe relevant investigations used in the management of TT, including noninvasive (chest X-ray, ultrasound, chest CT, PET-CT) and invasive (sampling methods for cytology and histology) techniques.
- Describe tumour markers, histological and TNM classification of TT.
- Become familiar with therapeutic modalities in LC, M, MT and in other TT, including chemotherapy (including targeted molecular therapy), radiotherapy, interventional bronchoscopic techniques, palliative therapy, and best supportive care.
- Understand the importance of a multidisciplinary approach in the management of TT.

16. **Acute and chronic respiratory failure and respiratory high-dependency unit**

- Define, classify and describe the etiology of both acute and chronic respiratory failure (RF).
- Describe the pathophysiology of RF.
- Describe relevant investigations used in the management of RF including non-invasive (chest x-ray, ultrasound, chest CT, pulmonary function tests) and invasive (bronchoscopy) techniques
- Become familiar with relevant therapeutic measures such as oxygen therapy (including high-flow nasal cannula oxygen therapy), continuous positive end-expiratory pressure and non-invasive ventilatory support.
- Become familiar with the "respiratory HDU culture" and the multidisciplinary team work which includes respiratory physiotherapists, critical care physicians, ER physicians, nurses, etc.

EXAM MODALITY

The Exam will be based on a written, multiple choice question-based, test.
The test will consist of 3 blocks of 20 questions for each of the modules: Cardiovascular Diseases, Lung Diseases, and Blood Diseases.
In order to pass the exam, students must answer correctly to at least 60% of all questions, without scoring below 50% of correct answers in each specific subject.
Scores of the written exam will be based on the number of questions answered correctly and converted in a mark out of 30, according to the conversion table presented below:

% of correct answers	Mark
≥ 95%	30/30 e lode
90-94%	30/30
85-89%	28/30

80-84%	26/30
75-79%	24/30
70-74%	22/30
65-69%	20/30
60-64%	18/30
<60%	Fail