UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

# COURSE SYLLABUS

## Hematology

**2526-3-H4102D020-H4102D069M**

### Aims

At the end of the lessons, the student has the knowledge to recognize and interpret the main diseases of blood and lymphatic system. In particular, the student is able to interpret the signs, symptoms and clinical and laboratory data that characterize:

• Chronic myeloproliferative neoplasms: Polycythemia Vera, Essential Thrombocythemia and Primary Myelofibrosis
• Chronic myeloid leukemia
• Myelodysplastic syndromes
• Acute myeloid leukemia
• Hodgkin Lymphoma
• Indolent and aggressive non-Hodgkin lymphomas
• Chronic lymphocytic leukemia
• Monoclonal Gammopathies of Undetermined Significance (MGUS)
• Multiple Myeloma
• Venous thromboembolism
• Thrombotic thrombocytopenic purpura (TTP)
• Disseminated intravascular coagulation (DIC)
• Anemia: general aspects
• Hemoglobinopathies
• Basis of Transfusion Medicine
• Blood donation
• The HLA system, hematopoietic stem cell (HSC) donation and HSC transplant

Furthermore, the student has the knowledge to describe the main therapeutic treatments of the diseases described above, with particular attention to the methods of use of:

- autologous hematopoietic stem cell transplantation
- allogeneic transplantation of hematopoietic stem cells

- new immunotherapies (including CAR-T)
  The student is able to describe the principles of the morphological and molecular diagnostics of the hematological diseases and the basis of the Transfusion Medicine.

## Contents

HEMATOLOGY I

1. Venous thromboembolism
2. Thrombotic microangiopathies: Thrombotic thrombocytopenic purpura (TTP), disseminated intravascular coagulation (DIC)
3. Anemia: general aspects and calssification
4. Hemoglobinopathies: thalassemia syndromes and sickle cella anemia
5. The blood groups and the HLA system

HEMATOLOGY II

6. Intro to normal Hematopoiesis - Blood Count and Differential - Blood Cytology - Acute Leukemias (Intro) - Acute Myeloid Leukemia.
7. Intro to Innate and Adaptive Immunity - Leukemia and Infections - Acute Lymphoblastic Leukemia
8. Myelodysplastic Syndromes
9. Chronic Myeloproliferative Neoplasms and Chronic Myeloid leukemia
10. Hodgkin and non-Hodgkin Lymphomas (including CLL)
11. Plasma Cell Dyscrasias (including Waldenstrom)

## Detailed program

HEMATOLOGY I

1. Venous thromboembolism: definition, epidemiology, risk factors, congenital and acquired thrombophilia, clinical presentation, diagnostic tests, prognostic aspects, prevention, notes on anticoagulant therapy.
2. Thrombotic microangiopathies: definition, epidemiology, classification, differential diagnosis; thrombotic thrombocytopenic purpura (TTP): clinical and laboratory diagnosis, epidemiology, etiology (congenital vs acquired), therapeutic approach, prognosis and follow-up; disseminated intravascular coagulation (DIC): clinical and laboratory diagnosis, epidemiology, etiology, therapeutic approach, prognosis.
3. Anemias: definition, classification, characteristics of the main forms of anemia such as iron deficiency anemia, vitamin B12 and folic acid deficiency anemia, inflammatory anemia, hemolytic anemias, anemias secondary to primary bone marrow disease.
4. Hemoglobinopathies: thalassemia syndromes: alpha and beta thalassemia, epidemiology, diagnosis, clinical characteristics, therapeutic approach; sickle cell anemia: epidemiology, diagnosis, clinical characteristics, therapeutic approach.
5. Blood groups and HLA system: the main blood group systems (ABO, Rh, Kell), approach to the identification of blood groups, transfusion compatibility, transfusion indications, donation of blood and blood components; the HLA system: genetic basis, HLA compatibility, donation of hematopoietic stem cells.

HEMATOLOGY II

6. Intro to normal Hematopoiesis: definition, cellular and molecular regulation of normal stem cells proliferation and differentiation. The Hematopoietic growth factors: biology and clinical application.

7. Chronic Myeloid leukemia (CML) and Ph negative Chronic Myeloproliferative Neoplasms (CMNs): Epidemiology. WHO and ICC classification. Cytogenetic and molecular basis of CML and CMNs. Clinical presentation of CML, Polycythemia Vera, Essential Thrombocythemia and Myelofibrosis (Primary and Secondary) Natural history and risk factors. Pharmacological treatments and transplant indications.
8. Myelodysplastic Syndromes and Acute Leukemias: Epidemiology. WHO and ICC classification. Cytogenetic and molecular basis of MDS - AML and ALL (Acute Lymphoblastic Leukemia). Heterogeneity of natural history. Clinical presentation. Pharmacological treatments and transplant indications.
9. Hodgkin and non-Hodgkin Lymphomas (including CLL): Epidemiology. Classification, Clinical presentation, staging systems. Natural history and treatment modalities including conventional chemotherapy including transplantation, New biological treatments, and immunotherapies (CAR-T cells and bi-specific antibodies)
10. Plasma Cell Dyscrasias (including Waldenstrom): The monoclonal gammopathies (IgG, IgA and IgM) and their natural history. Epidemiology. Classification, Clinical presentation, staging systems of Multiple Myeloma. Treatment modalities including steroids, Proteasome Inhibitors, iMIDS, Monoclonal Antibodies), conventional chemotherapy including transplantation, new biological treatments, and immunotherapies (CAR-T cells and bi-specific antibodies).

## Prerequisites

Basic Clinical Skills course

## Teaching form

Lectures, presentation of clinical cases

## Textbook and teaching resource

Course slides including bibliography

## Semester

Second term

## Assessment method

Integrated oral exam

## Office hours

Appointment by email

## Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY