



## HUMANITAS MEDICAL SCHOOL

**Course: Oncology**

**Year (1<sup>st</sup>-2<sup>nd</sup>-3<sup>rd</sup>-4<sup>th</sup>-5<sup>th</sup>-6<sup>th</sup>): 5<sup>th</sup>**

**Period (1<sup>st</sup>-2<sup>nd</sup> semester – annual): 2<sup>nd</sup> semester – 2022/23**

**Credits: 4 (Medical Oncology: 3; Radiotherapy: 1)**

### Objectives

- To understand the basic principles of epidemiology, genetics, risk factors and molecular bases of the most common cancer types
- To illustrate the general aspects of cancer diagnosis, staging, and conventional and innovative therapeutic strategies including chemotherapy, hormonotherapy, targeted therapy, immunotherapy, and radiotherapy
- To describe the most common cancer complications, treatment toxicities, late effects in cancer survivors, supportive care, and approach to terminally ill patients
- To describe the main goals of clinical and translational research with the different phases of clinical trials
- To illustrate the multidisciplinary approach to patients diagnosed with main solid tumors, including gastrointestinal, breast, lung, prostate cancers and melanoma

### Prerequisites

- General bases of carcinogenesis
- Anatomy, histology, and molecular biology of main solid tumors
- Pharmacologic bases of the different classes of anticancer drugs

### Contents

**Overview:** The course of Oncology is designed to guide medical students across the essential features of clinical oncology and to achieve an understanding of the



current knowledge of the clinical, therapeutic, molecular, biological, radiological, radiobiological, and pharmacological aspects of the most common tumor types. This course will be mainly structured focusing on practical aspects and clinical cases, in particular with regard to diagnostic and therapeutic aspects, with the goal of facilitating the learning process and the retention of fundamental information in the field of clinical and radiation oncology. Notions of the epidemiology of cancer and molecular mechanisms involved in the biological processes that lead to cancer development and dissemination will be discussed. Theory will be applied for the evaluation, classification, diagnosis, and monitoring of solid tumors. Conversely, blood cancers including leukemia, lymphoma, and myeloma are addressed in the System Diseases 2 integrated course - Blood Diseases module.

The course will start introducing the general principles of tumor diagnosis and staging, and of clinical and therapeutic approach to cancer patients. Also, aspects of clinical and translational research with the different phases of clinical trials will be discussed. Subsequent lectures will cover in detail the most relevant solid tumors. In the field of Medical Oncology, molecular knowledge of conventional and innovative therapeutic targets, and related pharmacological therapies used in current practice and clinical trials will be addressed.

The Radiation Oncology (Radiotherapy) program aims to offer an insight on novel techniques characterizing modern radiotherapy. The interactions of radiation with cells and tissues, theories and principles of time-dose relationships, fractionation schemes, and the relationship to the clinical practice of radiation therapy will be discussed. Topics will also include isodose description, patient contouring, dosimetric calculations, and clinical application of treatment beams. Medical students will be guided in the exploration of the main phases of radiation treatment planning: from the 1<sup>st</sup> consultation, to the indication, simulation CT scan and treatment delivery. Side effects, diagnosis and management of the most common complications, late effects in cancer survivors, as well as supportive care and approach to terminally ill patients will also be addressed.

## **Lectures:**

### **Topic 1 General aspects of cancer**

#### **Lecture: Epidemiology, genetics, and cancer prevention**

##### *Learning goals:*

- Illustrate the basic principles of epidemiology and risk factors of most common cancer types

- List the general principles of hereditary and familial cancer
- Explain the general aspects of cancer prevention: primary prevention, secondary prevention (screening)

### **Lecture: Cancer and nutrition - Molecular biology of cancer and precision medicine**

#### *Learning goals:*

- Illustrate the general principles of the relationship between diet and carcinogenesis and cancer progression
- Describe the basic principles of cancer biology as a tool to select patients for anticancer treatments
- Discuss the role of precision medicine in clinical practice

### **Topic 2 Clinical and therapeutic approach to the patient with cancer**

#### **Lecture: Clinical approach to the patient with cancer**

##### *Learning goals:*

- Illustrate the general principles of cancer diagnosis, staging, and tumor assessment
- Describe how to take a thorough clinical history, perform a physical examination, define the performance status (different scales) of a cancer patient
- Explain how to define patient prognosis, and describe the role of prognostic and predictive factors and biomarkers

#### **Lecture: Treatment strategies 1**

##### *Learning goals:*

- Illustrate the main therapeutic options and the role of surgery, radiotherapy, and medical treatment (including nursing)
- Describe the general principles of the therapeutic management of cancer patients, the importance of the multidisciplinary approach, and of personalized medicine
- Describe treatment endpoints, and criteria for assessment of objective response

#### **Lecture: Radiation oncology (Radiotherapy) and clinical indication (2 lectures)**

##### *Learning goals:*

- Introduce radiation oncology and illustrate the general principles of radiobiology
- Describe the principles of integration of radiotherapy and concomitant systemic therapy
- Illustrate the clinical application of radiotherapy in the management of oligometastatic disease
- Describe the role of radiotherapy as a palliative treatment

### **Lecture: Treatment strategies 2 and clinical trials**

#### *Learning goals:*

- Indicate the role of adjuvant/neoadjuvant treatment and of treatment for advanced/metastatic disease
- Illustrate the basic principles of the interaction between immune system and cancer and of cancer immunotherapy
- Describe the general aspects of clinical and translational cancer research, and different phases of clinical trials

### **Lecture: Emergencies, simultaneous and palliative care, and other aspects of cancer patient management (3 lectures)**

#### *Learning goals:*

- Describe most common complications and emergencies associated with cancer, their diagnosis and treatment
- Illustrate the general principles of simultaneous care, supportive care, approach to terminally ill patients
- Illustrate other aspects of cancer patient management: nutrition, quality of life, psycho-oncology

### **Lecture: Treatment toxicities, complications, follow up, cancer survivors**

#### *Learning goals:*

- Describe the most common side effects of anti-cancer therapies, their diagnosis and treatment, and their late effects in cancer survivors
- Illustrate the importance of follow-up care

### **Topic 3 Approach to main solid tumors**

#### *Learning goals:*

- Develop a systematic and multidisciplinary approach to the main solid tumors, including modern laboratory, radiological and therapeutic tools currently used in oncology
- Explain the general principles of diagnosis, staging, and treatment of the main solid tumors



**Lecture: Breast cancer – Medical Oncology (2 lectures)**

**Lecture: Lung cancer (non-small cell lung cancer and small cell lung cancer) – Medical Oncology**

**Lecture: Breast cancer and lung cancer – Radiotherapy**

**Clinical case discussion: Breast cancer and lung cancer – Multidisciplinary team**

**Lecture: Gastro-intestinal cancers (colorectal cancer) – Medical Oncology**

**Lecture: Gastro-intestinal cancers (non-colorectal cancer) – Medical Oncology**

**Lecture: Gastro-intestinal cancers (colorectal cancer and non-colorectal cancer) – Radiotherapy**

**Clinical case discussion: Gastro-intestinal cancers (colorectal cancer and non-colorectal cancer) – Multidisciplinary team**

**Lecture: Prostate cancer and melanoma – Medical Oncology**

**Lecture: Prostate cancer and melanoma – Radiotherapy**

**Clinical case discussion: Prostate cancer and melanoma – Multidisciplinary team**

**Clinical case discussion: Other cancer types – Multidisciplinary team**

## **Teaching Methods**

### Lectures and clinical case discussion

Lectures: The aim of lectures is to transfer knowledge to students by guiding them through the most relevant aspects and principles of Medical Oncology and Radiotherapy. Students are expected to participate in lectures in a proactive manner, asking questions, and taking notes as part of the learning process. Participation is mandatory.



Clinical case discussion: The aim of clinical case discussion is to activate and solidify knowledge acquired during lessons, and to increase student engagement in a collaborative learning setting. Participation is mandatory.

Topic 1 and 2: Lectures; Topic 3: Lectures and clinical case discussion

Students are encouraged to actively participate to the lectures with questions and comments.

## **Assessment**

Written exam; multiple choice

### **End of Semester Exam content and evaluation**

Content of End of Semester Exam (ESE) (63 questions): Questions will include the whole program of the course.

ESE evaluation: 63 questions, each question 0.5 points

To pass the test you need to answer to at least 36 questions correctly

60 correct answers = 30

61-63 correct answers = 30 cum laude

## **Texts**

Medical Oncology

Niederhuber J, Armitage J, Doroshow J, Kastan M, Tepper J: *Abeloff's Clinical Oncology* – Saunders – 2019 – 6th edition

DeVita VT Jr., Lawrence TS, Rosenberg SA: *DeVita, Hellman, and Rosenberg's Cancer: Principles & Practice of Oncology* – Wolters Kluwer Health – 2018 – 11th edition

Radiation Oncology (Radiotherapy)

Halperin EC, Wazer DE, Perez CA, Brady LW: *Perez and Brady's Principles and Practice of Radiation Oncology* – Lippincott Williams & Wilkins - 2018 - 7th edition

Hansen EK, Roach M III: *Handbook of Evidence-Based Radiation Oncology* – Springer Verlag New York - 2018 – 3rd edition