

# UNIVERSITÀ DEGLI STUDI DI MILANO-BICOCCA

### **COURSE SYLLABUS**

## **Diagnostics and Radiation Oncology**

2324-3-H4102D020-H4102D067M

#### **Aims**

- Understanding the application of integrated imaging modalities, including conventional radiology (computed tomography, ultrasound, and magnetic resonance imaging), Nuclear imaging (Scintigraphy and PET/CT) in cancer imaging.
- 2. Understanding the importance of each imaging modality in diagnosis, staging, prognostication, treatment response assessment and follow-up of patients with cancer.
- 3. Understanding the complementarity of different imaging modalities.
- 4. Learning the main imaging protocol
- 5. Learning how to read a diagnostic flow-chart and a clinical guideline for each cancer type
- 6. Understanding the role of imaging in guiding surgery and radiotherapy
- 7. Understanding the main challenges of the use of imaging in guiding the treatment and in treatment assessment

#### **Contents**

- 1. Refresh of imaging techniques
- 2. Imaging protocols: what you need to know to properly inform and prepare your patients
- 3. Imaging technique how to make the proper choice for the diagnosis of solid tumors in the central nervous system, thorax, abdomen, breast, prostate and haematopoietic system
- 4. How to stage patients with solid and haematologic tumors by integrating different imaging modalities:
  - a. the key point of diagnostic imaging.
  - b. Strength, and weakness of cross sectional imaging techniques.
  - c. How to properly assess actual tumor spread in the view of optimal treatment planning.
  - d. Performances analysis: pro and cons, dosimetric burden, costs, availability.

- 5. Image guided therapy
- 6. Image for treatment planning and treatment assessment
- 7. Principle of AI in diagnostic imaging

#### **Detailed program**

- 1. Diagnostic imaging refresh
- 2. Imaging in screening, diagnosis, staging and treatment planning/monitoring in:
  - a. Breast cancer
  - b. Prostate Cancer
  - c. Urological cancers
  - d. Lung cancer
  - e. Bone tumors
  - f. Haematological tumors: MM and lymphoma
  - g. Melanoma
- 3. Role of AI in diagnostic imaging

#### **Prerequisites**

Preparatory courses for Vertical Tracks

#### **Teaching form**

Lessons and small group activities, case reading, Problem Based Learning and Case Based Learning

#### Textbook and teaching resource

Diseases of the Abdomen and Pelvis 2023-2026, Diagnostic Imaging. Editors: Juerg Hodler, Rahel A. Kubik-Huch, Justus E. Roos, Gustav K. von Schulthess, Springer 2023 (open access). Chapters 11, 16

Computed Tomography of the Lung, A Pattern Approach. Editors: Johny A. Verschakelen, Walter De Wever, Springer 2018

Tutorials in Diagnostic Radiology for Medical Students, Editors: Ciaran E. Redmond, Michael Lee, Springer 2020

Handbook of Evidence-Based Radiation Oncology. Editors: Eric K. Hansen, Mack Roach III. Springer 2018

Breast Imaging, Diagnosis and Intervention. Editors: Michael Fuchsjäger, Elizabeth Morris, Thomas Helbich, Springer 2023

Molecular & Diagnostic Imaging in Prostate Cancer - Clinical Applications and Treatment Strategies. Editor Heide Schatten, Springer 2023

Nuclear medicine textbook, Methodology and Clinical Applications. Editors: Duccio Volterrani, Paola Anna Erba, Ignasi Carrió, H. William Strauss, Giuliano Mariani. Springer 2019. Chapters

14, 15, 16, 17, 18, 22, 23, 35, 38

Basic Radiotherapy Physics and Biology. Editors: David S. Chang , Foster D. Lasley , Indra J. Das , Marc S. Mendonca , Joseph R. Dynlacht. Springer 2021

#### Semester

Second term

#### **Assessment method**

Self-evaluation with cased based discussion, problem solving activities on specific issues during the course.

Final exam: integrated oral exams consisting of the discussion of a relevant clinical topic as part of the course program, requiring the integration of from different perspectives covered by each of the teaching units of the course.

Evaluation criteria: theoretical knowledge, synthesis skills, ability in the application of diagnostic methods to a specific clinical problem or contest.

#### Office hours

By appointment fixed by e-mail

#### **Sustainable Development Goals**

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