Course title	Cancer Diagnostics and Therapeutics				
Course code	MCB630				
Course type	Compulsory				
Level	Master's (2nd Cycle)				
Year / Semester	1st Year / 2nd Semester				
Teacher's name	TBA				
ECTS	10	**Lectures / week**	3 Hours/14 weeks	**Laboratories / week**	None
Course purpose and objectives	The main objective of the Cancer Diagnostics and Therapeutics course is to introduce the latest advances in cancer diagnostic methodologies as well as provide a comprehensive overview of the different types of cancer treatment currently available in the clinic, emphasizing the connection between basic and translational knowledge in tumor biology.				
Learning outcomes	Upon completion of the course, students will be able to: • Describe and determine the appropriate the diagnostic methods in different cancer types • Recognize the advantages of using non-invasive or minimally invasive approaches in cancer diagnostics • Appraise the usefulness of different molecular markers for cancer diagnosis and prognosis • Describe different ionizing and non-ionizing imaging methodologies for cancer diagnosis • Describe the objectives and functions of Artificial Intelligence (AI) in medical imaging for cancer management • Understand of the challenges behind AI techniques for cancer management • Describe application of AI for different medical tasks and scenarios • Describe the different types of cancer treatment strategies • Differentiate and compare the use of chemotherapy, nanotherapy and current targeted cancer therapies • Discuss the role of the tumor microenvironment in the efficacy of cancer treatment • Develop hypotheses to address the development of resistance to selected therapies				
Prerequisites	None		**Required**	None	
Course content	**Description:** • Diagnostic methodologies using biopsies from biological tissues or fluids • Molecular diagnostic and prognostic markers for different cancer types • Ionizing radiation imaging methodologies for cancer diagnosis • Practical training with PET/CT images in order to extract quantitative				

	information and compare it with biopsy results for non-Hodgkin lymphoma patients (use of a freely available software installed in the Radiology lab).
	• Non-ionizing radiation imaging methodologies for cancer diagnosis
	• Artificial Intelligence (AI) in medical imaging for cancer management
	• AI techniques in x-rays, CT, MRI, PET/CT imaging for cancer management
	• Histological classification, grading and staging of tumors
	• Chemotherapy: Different types and mechanisms of action in frequently diagnosed tumors, such as breast, colon, lung, prostate, pancreas, melanoma, leukemias.
	• Nanotherapy: Latest technologies and advantages over traditional chemotherapy.
	• Applications of radiation oncology in cancer treatment
	• Personalized medicine: cancer treatment using targeted therapies
	• Anti-hormone therapies
	• Mechanisms of drug resistance
	• Novel technologies for drug development
Teaching methodology	Face-to-face
Bibliography	Anticancer Therapeutics, Latest Edition, by S. Missalidis, Wiley Breast Cancer: Translational Therapeutic Strategies, Latest Edition, by Gary H. Lyman, Harold J. Burstein, CRC Press Cancer Biomarkers: Minimal and Noninvasive Early Diagnosis and Prognosis, Latest Edition, by D. Barh, A. Carpi, M. Verma, M. Gunduz, CRC Press Cancer Nanotechnology: Principles and Applications in Radiation Oncology (Imaging in Medical Diagnosis and Therapy), Latest Edition, by S.H. Cho and S. Krishnan, CRC Press Selected scientific articles in pdf format that will be provided in advance by the lecturer
Assessment	Mid-Term Examination 30% Final Examination 40% Oral presentations/Assignments 20% Class participation and Attendance 10% **Total** **100%**
Language	English