

Course Title	Molecular and Cellular Biology of Cancer				
Course Code	MCB610				
Course Type	Compulsory				
Level	Master's (2 nd cycle)				
Year / Semester	1 st Year / 1 st Semester				
Teacher's Name	TBA				
ECTS	10	Lectures / week	3 Hours	Laboratories / week	None
Course Purpose and Objectives	The main objective of the Molecular and Cellular Biology of Cancer course is to provide a deep understanding and insights into the principles governing biology of cancer, while highlighting different molecular and cellular mechanisms of this profoundly complex disease.				
Learning Outcomes	<p>Upon completion of the course, students will be able to:</p> <ul style="list-style-type: none"> • Describe the hallmarks of cancer • Develop an in depth understanding of the molecular and cellular mechanisms that lead to carcinogenesis, including oncogenes and tumor suppressor genes • Distinguish the role of cancer stem-like cells as tumor initiating cells • Differentiate between hereditary and sporadic forms of various cancer types • Describe different mechanisms of cellular communication as well as the commonly observed pathway alterations during cancer progression • Correlate the activity of each pathway to specific cellular functions and properties (e.g. apoptosis, proliferation, migration) • Describe the multistep process of cancer metastasis • Understand and evaluate the role of tumor microenvironment in cancer progression • Develop hypotheses to answer cancer-related questions and design the appropriate experimental strategies to address them. 				
Prerequisites	None	Required	None		
Course Content	<p>Description:</p> <ul style="list-style-type: none"> • Definition and hallmarks of cancer. Multi-step tumorigenesis and the evolution of cancer. Cancer stem cells as tumor initiating cells. • Mutagens and mutations. Tumor viruses. DNA repair defects and carcinogenesis 				

	<ul style="list-style-type: none"> • Cellular senescence, telomeres and immortalization in tumorigenesis. • Cancer genetics and hereditary cancer types • Tumor suppressor genes: Cell cycle regulation and apoptosis • Oncogenes and mechanisms of oncogenic activation • Mechanisms of cellular communication: Gap junctions, autocrine, paracrine, endocrine signaling and implications for cancer. • Integrin signaling in cancer and cell signaling cross-talk in the tumor microenvironment. • Types of cell receptors and signaling pathways. G-protein coupled receptor signaling, second messengers, receptor tyrosine kinase and Serine/Threonine receptor pathways: EGF, FGF, PDGF, IGF, TGFβ, Wnt/β-catenin signaling. • Angiogenesis and hypoxic adaptation • Tumor microenvironment and cancer progression • Dormancy and mechanisms of cancer metastasis 										
Teaching Methodology	Face to face										
Bibliography	<p>Biology of Cancer, Latest Edition, by R. Weinberg, Garland Science</p> <p>Molecular Biology of Cancer: Mechanisms, Targets and Therapeutics Latest Edition, by Lauren Pecorino. Oxford Press</p> <p>Molecular Biology of the Cell, Latest Edition, by B. Alerts, Garland Science.</p> <p>Molecular Cell Biology, Latest Edition, by H. Lodish, W.H. Freeman publisher</p> <p>Selected scientific articles in pdf format that will be provided in advance by the lecturer</p>										
Assessment	<table> <tr> <td>Mid-Term Examination</td> <td>30%</td> </tr> <tr> <td>Final Examination</td> <td>40%</td> </tr> <tr> <td>Assignments</td> <td>20%</td> </tr> <tr> <td>Class participation</td> <td>10%</td> </tr> <tr> <td>Total</td> <td>100%</td> </tr> </table>	Mid-Term Examination	30%	Final Examination	40%	Assignments	20%	Class participation	10%	Total	100%
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