

NAME OF THE COURSE		Molecular Oncology				
Code	PMB739	Year of study	2			
Course teacher	Jasminka Omerovic, PhD, Assistant Professor	Credits (ECTS)	3			
Associate teachers	Igor Štagljar, PhD, Professor Special guest lecturer chosen from year to year.	Type of instruction (number of hours)	L	S	E	F
			15	15		
Status of the course	Elective	Percentage of application of e-learning	10%			
COURSE DESCRIPTION						
Course objectives	Main objective of the programme is to broadly present the fundamental molecular and cellular processes that contribute to cancer development and progression, fostering the precision oncology. In other words, course will focus on current state-of-the-art, and the students will be able to speculate on future direction in cancer therapy.					
Course enrolment requirements and entry competences required for the course	Students who have competence in undergraduate level in Genetics, Molecular and Cell Biology, and Cancerogenesis and Mutagenesis.					
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	<p>The programme enables learners to be able to:</p> <ul style="list-style-type: none"> <li>• Demonstrate knowledge of disrupted pathways specific to individual types of cancer as well as the opportunity</li> <li>• Critically evaluate personalised therapy</li> <li>• Define relevant molecular pathways in oncology.</li> <li>• Illustrate personalised treatment options for cancer patients.</li> <li>• Estimate the limitations of targeted cancer therapies.</li> </ul>					
Course content broken down in detail by weekly class schedule (syllabus)	<p>We will broadly cover contemporary topics in molecular oncology: Mechanisms of action of oncogenes and tumor suppressor genes; Cell cycle regulations; Cancer progression: angiogenesis, invasion, and metastasis; Targeted therapies, and their limitations.</p> <p>Hence, the course content will be broken down as following:</p> <ol style="list-style-type: none"> <li>1. Signalling pathway frequently found deregulated in cancer (Ras/MAPK, PI3-K/Akt...)</li> <li>2. Rational treatment of cancer: Inhibition of tumor growth by targeting downstream signalling elements, apoptosis inducers...</li> <li>3. Druggable target molecules and their structure; Inhibitors of protein-protein interactions; Tyrosin-kinase inhibitors, signal transduction inhibitors; Gene expression modulators.</li> <li>4. Monoclonal antibodies; Monoclonal antibodies that deliver toxic molecules.</li> <li>5. Biology of Angiogenesis; Endogenous inhibitors of angiogenesis and activators, and balancing the angiogenic switch; Angiogenesis inhibitors as treatment of cell carcinogenesis; Synopsis and prospects.</li> <li>6. Genetic basis of invasion and metastasis cascade and the roles of metastasis suppressor genes. Mesenchymal-epithelial transition (EMT) signals. Synopsis and prospects.</li> <li>7. Examples of targeted therapies in breast cancer, lung cancer, and brain cancer.</li> </ol>					

	8. Examples of targeted therapies in melanoma, colorectal cancer, and leukemia. 9. Basis of system biology in cancer research. 10. Limitations of targeted cancer therapy. 11. New approaches in cancer treatments.					
Format of instruction	X lectures X seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> <i>on line</i> in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work			<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)		
Student responsibilities						
Screening student work ( <i>name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course</i> )	Class attendance	1	Research		Practical training	
	Experimental work		Report		(Other)	
	Essay		Seminar essay		(Other)	
	Tests		Oral exam		(Other)	
	Written exam	2	Project		(Other)	
Grading and evaluating student work in class and at the final exam						
Required literature (available in the library and via other media)	<b>Title</b>				<b>Number of copies in the library</b>	<b>Availability via other media</b>
	Students are encouraged to refer to the textbook "The biology of cancer" edited by Robert A. Weinberg.					
	Reviews and research papers published in scientific journals will be used. The course will also present special novel and important topics from year to year.					
Optional literature (at the time of submission of study programme proposal)	Molecular Oncology edited by Edward P. Gelmann, Charles L. Sawyers, and Frank J. Rauscher III					
Quality assurance methods that ensure the acquisition of exit competences	The educational program will be based on lectures and seminars, followed by direct interactions among experts and learners, and the acquisition of the competences will be verified by written test.					
Other (as the proposer wishes to add)						