

**Table 5.2** Course specification

<b>Course program: MASTER STUDIES IN BIOLOGY - MOLECULAR BIOLOGY</b>			
<b>Studies type and level:</b> Master studies of Biology – second degree			
<b>Course name: BMB213 Biology of cancer</b>			
<b>Lecturer</b> (Name, Middle Name, Last Name): <a href="#">Snežana D. Marković</a>			
<b>Semestar:</b> winter			
<b>ECTS:</b> 6			
<b>Required knowledge:</b> Rolled in the semester			
<b>The aim of the course</b> The aim of the course is to acquire knowledge about the molecular and cellular bases of the carcinogenesis, as well as its potential use and application in different strategies of cancer therapy; significance and application of cell lines as model systems for studying malignant cells and using of cell lines in a preclinical investigation of anticancer compounds.			
<b>Course outcome</b> Knowledge, logical thinking and ability of finding, connecting and presenting information of scientific importance, as well as learning about molecular base responsible for carcinogenesis. This results in getting professional staff capable of improving and applying this knowledge in the new experiments in the future.			
<b>Course content</b> <i>Theoretical part</i> Tumor: meaning and types. Stages of tumor development. Genetic predisposition and cell mechanism dysfunction on a molecular level. Epigenetic (inherited) changes in tumor progression. The molecular base for carcinogenesis. Cell cycle. Cancer stem cell. Proto-oncogenes and oncogenes. Tumor suppressor genes. Regulation of cell growth and proliferation. Genes responsible for regulation of DNA reparation. Genes responsible for apoptosis regulation. Telomere structure errors. Malignant cell characteristic. Morphological and biochemical characteristics of malignant cells. Mechanisms and signaling pathways of cancer cell migration – metastasis. Mechanisms of tumor angiogenesis. Role of immune system in carcinogenesis. Cancer epidemiology and causes. Characteristics of tumors originated from different organs. Cancer therapy. Therapeutics (immune and gene therapy); Types of cytostatic and therapy. Malignant cell resistance. Cell biology, cell cultures. Experimental techniques and methods in the biology of cancer. Preclinical investigation of potential cytostatic, <i>in vitro</i> and <i>in vivo</i> studies. <i>Practical part: Practice, Other types of classes, Research work paper</i> Cell culture (working with cell lines, seeding cells in a culture). Investigation of cytotoxic and potential anticancer substances (determination of cell viability with Trypan blue method and MTT test of cell cytotoxicity). Apoptosis detection (AO/EB microscopic assay). Immunology methods (immunofluorescence method, Western Blot). Reactive oxygen and nitrogen species and their effect on cancer cells and apoptosis (redox status measurement). Assays.			
<b>Literature</b> Jurišić V, Živančević-Simonović S. Etiologija i patogeneza tumora. U: Opšta patološka fiziologija, urednik Živančević-Simonović S. Univerzitet u Kragujevcu, Medicinski fakultet 2002, str. 463-484. Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P. Molecular Biology of the Cell. 5 <sup>th</sup> ed. Garland Science, New York, 2008. Weinberg R. The Biology of Cancer. Garland Science, 2006. Scientific paper-works from the field.			
<b>Number of classes</b>			Other types of classes
Lecture: 30	Practice: 30	Other: Research work paper	
<b>Lecturing methods:</b> Frontal (PowerPoint presentations), interactive and discussions. Experimental work in a lab, independent researcher work paper. Students write essays with theme of the newest scientific information about malignant transformation mechanisms.			
<b>Knowledge evaluation (maximal points: 100)</b>			
<b>Pre-exam activity</b>	Points	<b>Final exam</b>	Points
Activity during the lecture	5	Written/Practical exam	10
Practical part	5	Oral exam	40
Tests	30	.....	
Assays	10		