Name of the course	**Elective Course 2** **Pain and genes – custom made pain treatment**					
Code		Year of study	1-6			
Course teacher	Assistant prof. Sandra Kostić, PhD	Credits (ECTS)	1.5			
Associate teachers	Associate prof. Katarina Vukojević, MD, PhD	Type of instruction (number of hours)	L	S	E	T
			15	10		
Status of the course	Elective	Percentage of application of e-learning				

COURSE DESCRIPTION

Course enrolment requirements and entry competences required for the course	–
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After the end of the course, the students will be able to: - Describe and explain the basic pain terminology and definitions (e.g. nociception, nociceptors, central and peripheral sensitization, allodynia, hyperalgesia…) - Identify and describe the main difference between acute and chronic pain - Identify and describe the methods, drugs and different approaches for the pain treatment available to patients today - Name and explain the most relevant achievements in the field of pharmacogenomics and their therapeutic potential - Name and describe the examples from the scientific literature which point to the link between the gene-environment interaction and our pain tolerance - Name and describe specific pain disorders which result from gene mutations, including congenital insensitivity to pain
Course content broken down in detail by weekly class schedule (syllabus)	*Lectures:* -The basic pain terminology and definitions (e.g. nociception, nociceptors, central and peripheral sensitization, allodynia, hyperalgesia…) - The main difference between acute and chronic pain; Methods, drugs and different approaches for the pain treatment available to patients today - Pharmacogenomics – the future of custom made pain treatment - The most relevant achievements in the field of pharmacogenomics and their therapeutic potential – from preclinical trials to clinics - The link between the gene-environment interaction and our pain tolerance: epigenetics *Seminars:* - Specific pain disorders which result from gene mutations, including congenital insensitivity to pain
Format of instruction	☐ lectures ☐ seminars and workshops ☐ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work ☐ independent assignments ☐ multimedia ☐ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	In accordance to Rules of studying and Deontological code for USSM students.

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of*						
	Class attendance	60 %	Research		Practical training	
	Experimental work		Report		(Other)	
	Essay		Seminar essay		(Other)	

ECTS credits is equal to the ECTS value of the course)	Tests		Oral exam		(Other)	
	Written exam	40 %	Project		(Other)	

Grading and evaluating student work in class and at the final exam	Written exam

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	Webster LR, Belfer I. Pharmacogenetics and Personalized Medicine in Pain Management. Clin Lab Med. 2016 Sep;36(3):493-506. doi: 10.1016/j.cll.2016.05.007. Epub 2016 Jun 22.		Yes
	Ko TM, Wong CS, Wu JY, Chen YT. Pharmacogenomics for personalized pain medicine. Acta Anaesthesiol Taiwan. Mar;54(1):24-30, 2016.		Yes
	Devor M: How Do Pain Genes Affect Pain Experience? In: Pain Genetics: Basic to Translational Science, First Edition. Editors: Belfer I and Diatchenko L. John Wiley & Sons, Inc., 1-14, 2014.		Yes
	Meyer K, Kaspar BK. Making Sense of Pain: Are Pluripotent Stem Cell–derived Sensory Neurons a New Tool for Studying Pain Mechanisms? Mol Ther. 2014 Aug;22(8):1403-5.		Yes
	Mogil JS. Pain genetics: past, present and future. Trends Genet. 2012 Jun;28(6):258-66.		Yes
	Dib-Hajj SD, Waxman SG. Translational pain research: Lessons from genetics and genomics. Sci Transl Med. 2014 Aug 13;6(249):249sr4.		Yes
	Cregg R, Russo G, Gubbay A, Branford R, Sato H. Pharmacogenetics of analgesic drugs. Br J Pain. 2013 Nov; 7(4):189-208.		Yes
	Janicki PK. Pharmacogenomics of Pain Management. In: Comprehensive Treatment of Chronic Pain by Medical, Interventional, and Integrative Approaches, 23 T.R. Deer et al. (eds.), American Academy of Pain Medicine 2013.		Yes
	Young EE, Lariviere WR, Belfer I. Genetic basis of pain variability: recent advances. J Med Genet. 2012 Jan;49(1):1-9.		Yes

Optional literature (at the time of submission of study programme proposal)	
Quality assurance methods that ensure the acquisition of exit competences	▪ Teaching quality analysis by students and teachers ▪ Exam passing rate analysis ▪ Committee for control of teaching reports ▪ External evaluation
Other (as the proposer wishes to add)	