NAME OF THE COURSE	General Relativity and Cosmology						
Code	PMP400	Year of study					
Course teacher	Marko Kovač, PhD, Assistant Professor	Credits (ECTS)	6				
Associate teachers	Zvonimir Vlah, PhD	Type of instruction (number of hours)	L	S	E	F	
			30		30		
Status of the course		Percentage of application of e-learning					

COURSE DESCRIPTION

Course objectives	The first part of the course will cover the basics of general relativity, its mathematical foundations: Special Relativity; Manifolds, Riemannian metric, connection, curvature; Equivalence principle; Energy-momentum tensor, field equations, Newtonian limit; Post-Newtonian approximation; Schwarzschild solution; Black holes, Gravitational waves. The second part will cover the following topics; FLRW metric and homogeneous cosmology; Thermal history of the universe; Dark matter and Dark Energy; Cosmic microwave background; Structure formation.
Course enrolment requirements and entry competences required for the course	Students should have good grasp of material typpically covered in courses: - Classical electrodynamics - Mathematical Methods in Physics - Special Theory of Relativity
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	On successful completion of this course, students should: - have good understanding of the Special Relativity - be familiar with the geometrical representation of General Relativity and its link to Newtonian gravity - basic understanding the black hole solutions in General Relativity, and be familiar with the gravitational waves and its origins within the scope of General Relativity - grasp the basic picture of the homogeneous cosmology and evolution of the Universe
Course content broken down in detail by weekly	Short Review of Special Theory of Relativity Introduction and the Geometric Viewpoint on Physics

class schedule (syllabus)	Gravity and Einstein's Equations Schwarzschild Solution and Black Holes Perturbation theory and Newtonian limit Gravitational waves Cosmology and FLRW metric History and evolution of the universe CMB and the structure formation in the universe					
Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☒ *on line* in entirety ☒ partial e-learning ☐ field work			☐ independent assignments ☒ multimedia ☐ laboratory ☐ work with mentor ☒ homework assignments		
Student responsibilities	Students should: - participate and follow the lectures and exercises (at least 70%) - work through the assigned material and lecture notes - work on homework assignments - actively participate in the interactive part of the lectures					
Screening student work *(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)*	Class attendance		Research		Practical training	
	Experimental work		Report		Homework assignments	3
	Essay		Seminar essay		(Other)	
	Tests		Oral exam	3	(Other)	
	Written exam		Project		(Other)	
Grading and evaluating student work in class and at the final exam	The examination consists of two parts: - homework assignments: 50% - final oral examination: 50%					
Required literature (available in the	**Title**				**Number of copies in the library**	**Availability via other media**

library and via other media)	S. Carroll - Spacetime and Geometry: An Introduction to General Relativity		
Optional literature (at the time of submission of study programme proposal)	R. Wald - General Relativity S. Weinberg - Gravitation and Cosmology A. Zee - Einstein Gravity in a Nutshell B. Schutz - A first course in General Relativity,		
Quality assurance methods that ensure the acquisition of exit competences	Exam results statistics and student evaluation through an anonymous survey at the end of the course. The survey is conducted according to the regulations of the University of Split.		
Other (as the proposer wishes to add)			