

NAME OF THE COURSE		Astroparticle Physics					
Code	PMP133	Year of study	2				
Course teacher	Nikola Godinović, PhD, Professor	Credits (ECTS)	5				
Associate teachers	Darko Zarić, mag. Phys.	Type of instruction (number of hours)	L	S	E	F	
			30		15		
Status of the course	Compulsory	Percentage of application of e-learning	25 %				
COURSE DESCRIPTION							
Course objectives	To teach students about the basic concept and techniques used in experimental astroparticle physics						
Course enrolment requirements and entry competences required for the course	Acquired knowledge and understanding on the courses of: Nuclear physics and Introduction in elementary particle physics.						
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	<ul style="list-style-type: none"> ▪ It is expected that students knew the following: ▪ Understand the cosmic ray spectrum ▪ Understand the accelerations mechanism of cosmic ray ▪ Understand the various emission mechanism responsible for nonthermal electromagnetic radiation from space ▪ Understand the various technique of cosmic rays and high energy photons ▪ Understand the bases of neutrino astronomy 						
Course content broken down in detail by weekly class schedule (syllabus)	<ol style="list-style-type: none"> 1. Cosmic rays: spectrum and composition 2. Acceleration mechanisms. 3. Emission mechanisms: Thompson scattering and bremsstrahlung. 4. Synchrotron radiation and inverse Compton scattering. 5. Detection techniques of cosmic rays and high-energy gamma rays. 6. Sources of high-energy gamma ray: supernovae, pulsars and AGNs. 7. Neutrino astronomy. 8. The search for dark matter. 9. Review of relevant experiments in astroparticle physics 						
Format of instruction	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> <i>on line</i> in entirety <input checked="" type="checkbox"/> partial e-learning <input type="checkbox"/> field work		<input checked="" 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 (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	1	Research		Practical training		
	Experimental work		Report		(Other)		
	Essay		Seminar essay	1	(Other)		
	Tests		Oral exam	1	(Other)		
	Written exam		Project	2	(Other)		

Grading and evaluating student work in class and at the final exam	Project task: detailed study of the selected experiment and seminar presentation		
Required literature (available in the library and via other media)	Title	Number of copies in the library	Availability via other media
	Authors: De Angelis , Alessandro, Pimenta , Mário; Introduction to Particle and Astroparticle Physics Multimessenger Astronomy and its Particle Physics Foundations		yes
	Malcom S. Longair: "High Energy Astrophysics", Cambridge University Press, Third edition, 2012		yes
	Donald Perkins: "Particle Astrophysics", Oxford University Press, Second edition, 2009.		yes
	Trevor Weeks: "Very High Energy Gamma-Ray Astronomy", IOP Publishing, 2003.		yes
Optional literature (at the time of submission of study programme proposal)	Review articles		
Quality assurance methods that ensure the acquisition of exit competences	Statistics of the exam outcomes, anonymous survey at the end lectures to get input from the students about the quality of lectures		
Other (as the proposer wishes to add)			