NAME OF THE COURSE	**Electrodynamics**				
Code	PMP118	Year of study	3.		
Course teacher	Doc. Dr. Damir Kovacic	Credits (ECTS)	8		
Associate teachers		Teaching method (number of hours per semester)	L	S	E
			45	15	30
Status of the course	Obligatory	Percentage of e-learning applications	20		

CASE DESCRIPTION

Course objectives	Introduce students to the basics of classical electrodynamics.
Course enrolment requirements and entry competences required for the course	No.
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	• To explain the properties of electrical charge • To explain the basic laws of electrostatic; Coulomb and Gauss law; Laplace and Poisson equations; • To explain mirror charge method and Green function; • To explain spherical accordions and multipole order; • To explain the basic laws of magnetostatics; Faraday Law and Maxwell equations; • To explain the wave equation and properties of electromagnetic waves • To explain the concepts of energy, impulses and angular torque of the electromagnetic field
Course content broken down in detail by weekly class schedule (syllabus)	Electric charge – properties and distributions. Dirac δ s function. Charge density and currents. Electrostatics – electrical force, electric field and scalar potential. Gauss' law. Maxwell's electrostatic equations. Poisson equation. Boundary conditions – Dirichlets, Neumanns and mixed. Green's function for the Poisson's equation. Mirror charges. Sphere/ball and point charge. Laplace equation in Cartesian and spherical coordinates. Spherical harmonics. Dielectrics. Electricity field energy. Potential Series into acmultipole order. Multipole moments. Electric current. Magnetostatics. Biot.Savart's Law. Faraday's induction law. Magnetic field energy. Ferromagnetism. Maxwell equations. Electromagnetic potentials. Gauge transformations and gauge symmetry electrodynamics. The wave equation and its Green function. Linear materials. Poynting's theorem. Energy, impulse and angular torque of the EM fields. Electromagnetic waves and their properties. Laws of geometric optics. Dispersion and dissipation. Em wave emissions. Dipole radiation.
Format of instruction	☒ Lectures ☒ seminars and workshops ☒ Exercise ☐ *online* in its entirety ☐ mixed e-learning ☐ field teaching ☐ standalone tasks ☐ Multimedia ☐ Laboratory ☐ mentoring work ☐ (other to type)
Student responsibilities	Attending lectures, seminars and exercises. In order to acquire the right to sign, the student should attend at least 50% of lectures and exercises.

Screening student work *(name the proportion of ECTS credits for each activity so that the*						
	Class Attendance	1	Research		Practical training	
	Experimental work		Paper		(Other type)	
	Essay		Seminar paper		(Other type)	

total number of ECTS credits is equal to the ECTS value of the course)	Colloquiums	2	Oral exam	3	(Other type)	
	Written exam	2	Project		(Other type)	

Grading and evaluating student work in class and at the final exam	The final score goes to:1. Written exam (or colloquia) - 40% rating,2. Oral exam - 60% of the grade. At least 50% of tasks need to be solved to pass a written exam. The student can be released from the written exam via two colloquiums. On both colloquia it is necessary to solve at least 50% of the tasks.		
Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability through other media**
	Griffiths, David J., Introduction to Electrodynamics (Prentice Hall, New Jersey, 1999)	1	internet
	Jackson, David J., Classical Electrodynamics (John Wiley and Sons, New Jersey1998)	3	internet
Optional literature (at the time of submission of study programme proposal)	I.Supek, Theoretical Physics and Structure of Matter		
Quality assurance methods that ensure the acquisition of exit competences	• Evaluation of results in accordance with these learning outcomes • Feedback from students via survey • Teacher self-evaluation • Institutional and non-institutional checks		
Other (as the proposer wishes to add)			