<table>
<tr><td colspan="2">NAME OF THE COURSE</td><td colspan="5">Electrodynamics II</td></tr>
<tr><td>Code</td><td>79098 (PMP113)</td><td>Year of study</td><td colspan="4">3rd year of BSc study</td></tr>
<tr><td>Course teacher</td><td>Assist. Prof. Dr. Petar Stipanović</td><td>Credits (ECTS)</td><td colspan="4">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Viktor Cikojević, MSc. Phys.</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>15</td><td>15</td><td></td></tr>
<tr><td>Status of the course</td><td>COMPULSORY</td><td>Percentage of application of e-learning</td><td colspan="4">10%</td></tr>
<tr><td colspan="7">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="6">The formulation of the basic laws of classical and relativistic electrodynamics and special theory of relativity, with the development of mathematical methods and critical judgment of their applicability in selected physical problems.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">Enrolled subject “Electrodynamics I”.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">1) Formulate the basic quantities and laws of classical electrodynamics in vacuum and matter, and of special theory of relativity using vector and tensor analysis.
2) Chose appropriate conservation laws and equivalent quantities to simplify the complex and dynamic distributions of charges and currents.
3) Calculate electromagnetic potentials/fields for given charge/current density, argue their dis-/continuity at the boundary and sketch relations between quantities.
4) Examine the laws of geometric optics using Maxwell's equations and make simple models for describing the absorption, dispersion and spread of electromagnetic waves through the waveguides.
5) Formulate classical electrodynamics using scalar and vector potential, performing gauge transformations and estimating retardation effects.
6) Argue approximations in models of electric/magnetic dipole radiation, of arbitrary charge density, and of a point charge in motion.
7) Formulate space-time transformations for ideal systems in a relatively uniform motion by using Einstein’s postulates of the special theory of relativity; and evaluate their influence on the basic physical quantities of relativistic mechanics.
8) Formulate Maxwell equations in covariant form.
9) Search, self-evaluate and recommend professional literature and other relevant sources of information, improving the English as a language of the profession.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Practical exams and seminars follow the lectures according to the following content.
(6 h) Maxwell's formulation of classical electrodynamics (electromotive force, Faraday's law, electromagnetic induction, energy of the electromagnetic fields, Maxwell's equations and boundary conditions)
(3 h) Conservation laws of charge, energy, momentum (continuity equation, Poynting's vector, Poynting's theorem, Maxwell's tensor)
(7 h) Electromagnetic waves (laws of geometrical optics in vacuum and matter, absorption and dispersion, waveguides)
(4 h) Potential formulation of classical electrodynamics (gauge transformations of scalar and vector potentials, retarded potentials)
(4 h) Radiation (radiation of electric/magnetic dipole, of arbitrary charge density and of point charge in motion)
(6 h) Relativistic electrodynamics (special theory of relativity, transforma-tions of mechanical quantities and electromagnetic fields, tensor formulation)</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☒ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">☒ independent assignments
☒ multimedia
☐ laboratory
☐ work with mentor
☐ (other)</td></tr>
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Student responsibilities	1) Active participation on lectures by giving critical judgment and argumentation of opinions, asking and answering questions. 2) Solve given problems from electromagnetism. 3) Discuss given concepts and laws and their applicability.					
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	1.5	Research		Practical training	
	Experimental work		Report		Individual work	1
	Essay		Seminar essay		(Other)	
	Tests	0.5	Oral exam		(Other)	
	Written exam	1	Project		(Other)	
Grading and evaluating student work in class and at the final exam	The final grade is formed after the student passes both test parts: written exam (problem solving, 50% rating) and oral exam (theory, 50% rating). During the course a short examination of the learning outcomes (theoretical questions) is carried out which are part of the oral exam (theory), and colloquia (problems) which are equivalent to the written exams.					

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	1) David J. Griffiths: Introduction to Electrodynamics	0	Yes
	2) Željko Antunović: Specijalna teorija relativnosti (lecture notes)	0	Yes
	2) I. Supek: Teorijska fizika i struktura materije	15	No
	3) Lecture notes	0	Yes
Optional literature (at the time of submission of study programme proposal)	1) John David Jackson: Classical electrodynamics 2) Different www-materials from electromagnetism		
Quality assurance methods that ensure the acquisition of exit competences	1) Lecturers who teach subjects, which have correlated learning outcomes, collaborate and take care of teaching quality. 2) Discussion with students and anonymous comments via web application. 3) Statistics of exam results and evaluation of efficacy in accordance with the learning outcomes. 4) Student evaluation by anonymous survey conducted according to the rules of the University of Split.		
Other (as the proposer wishes to add)			