<table>
<tr><td colspan="2">NAME OF THE COURSE</td><td colspan="5">Electrodynamics I</td></tr>
<tr><td>Code</td><td>79089 (PMP112)</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">Formulation of basic laws of classical electromagnetic theory with the development of mathematical methods for solving static problems and critical judgments of their applicability to classical physical problems.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">There are no additional requirements for enrolment because they already covered with learning outcomes in the subjects that students have to pass in order to enroll some subjects from the 3rd year of the study.</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 in electrostatics and magnetostatics in vacuum and matter using vector analysis.
2) Choose a suitable method (separation of variables in the Cartesian or spherical coordinates, the method of images, multipole expansion...) for solving Poisson's or Laplace's equations for predetermined or estimated boundary conditions, i.e. to predict the behavior of the electric potential/field in a given system (e.g. charge above the grounded metal sheet, sphere of linear dielectric in a homogeneous field...).
3) For a given constant charge/current density, evaluate the electromagnetic potentials and fields, argue their dis-/continuity at the boundary and sketch the dependence of observed quantities.
4) Calculate the behavior of more complex systems by superposing known or more easily determinable electromagnetic quantities.
5) Evaluate contributions of terms in multiple expansion of electric/vector potential.
6) To segregate contributions of free and bounded sources of electromagnetic fields in electric/magnetic polarized matter and determine the macroscopic effects of electric/magnetic polarization.
7) Qualitatively and quantitatively compare potentials, fields and field energy for similar distributions of appropriate sources in magnetostatics and electrostatics.
8) 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.
I. ELECTROSTATICS:
• (7 h) Electrostatics of various charge distributions (vector analysis, electric force, electric field, Maxwell 's equations for electrostatics, electrical potential, energy, conductors);
• (7 h) Special Techniques (Poisson and Laplace equation and boundary conditions, methods of separating variables, method of images, multipole expansion);
• (6 h) Electrostatics in matter (polarization, volume and surface bound charges, electrical displacement, energy, linear and nonlinear matter);
II. MAGNETOSTATICS:
• (6 h) Magnetostatics of various current distributions (magnetic force, magnetic field, Biot-Savart law, Maxwell 's equations for magnetostatics, magnetic vector potential, boundary conditions, multipole expansion);</td></tr>
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	• (4 h) **Magnetostatics in matter** (magnetization, volume and surface bound currents, magnetic field in matter, linear and nonlinear matter).

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	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) 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)	