<table>
<tr><td colspan="2">NAME OF THE COURSE</td><td colspan="5">Phyiscal Chemistry II</td></tr>
<tr><td>Code</td><td>PMC112</td><td>Year of study</td><td colspan="4">1</td></tr>
<tr><td>Course teacher</td><td>Assistant Professor PhD Perica Bošković</td><td>Credits (ECTS)</td><td colspan="4">4.0</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></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></td><td></td></tr>
<tr><td>Status of the course</td><td>Basic</td><td>Percentage of application of e-learning</td><td colspan="4"></td></tr>
<tr><td colspan="7">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="6">Objectives of the course are to introduce students with
1. Understanding the chemical and electrochemical kinetics raised to a higher level,
2. application of thermodynamic and kinetic approaches to various processes and balances in electrolytic solutions and on liquid and solid surfaces,
3. Applying theoretical knowledge to solving practical problems,
4. Apply acquired knowledge and skills in professional and specialist subjects</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">Entry competences required for this course are knowledge of mathematics (calculus) and general physics and chemistry.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">After successfully passing a course, students will be able to:
1. analyze and interpret the mechanisms and kinetics of chain reactions and photochemical reactions,
2. Evaluate the influence of different variables on equilibrium systems of electrolytic solutions
3. Analyze the balance on liquid and solid surfaces,
4. Calculate physico-chemical parameters using thermodynamic and kinetic equations,
5. Interpret experimental and computational data.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6"><u>Lectures (2 hours per week):</u>
1st, 2nd and 3rd week: Ionic equilibrium: Activity of dissolved solids based on molarity. Average Coefficient of Electrolyte Activity. Debye-Hückel's theory. The coligative properties of the electrolyte solution. Acid-base equilibrium in water. Solubility in the presence of other electrolytes. Activity coefficients from solubility measurements.
4th, 5th, 6th and 7th week: Electrochemistry: Thermodynamic Functions of Ion forming. Galvanic cells. Electrodes and electrolyte solutions. The reaction and electromotive force of the cell. Standard electrode potentials. Nernst equation. Standard electromotive force of the cell from reduction potential. Types of electrodes. Types of galvanic cells. Transference Numbers. Potentiometric determination of the solubility constant. Potentiometric titrations. Diffusion potential.
8th, 9th and 10th week: Kinetics of complex reactions. Chained reactions with unbranched and branched chain. Responses with continuous branching - explosion. Polymerization Kinetics. Photochemical reactions. Chemical dynamics of molecules. The theory of activated complexes. Catalysis. Kinetics in the liquid phase.
11th, 12th and 13th week: Surface properties (surface dynamics): Types of dispersion systems. Colloidal systems. Critical concentration of micelization. Properties of liquid surfaces. Surface tension. Adsorption on solid surfaces. Physisorption and chemisorption. Types of adsorption. Langmuir adsorption isotherm. Heterogeneous catalysis.
14th and 15th Week: Dynamic Electrochemistry: Processes on Electrodes. Electrode Interface Structure - Solution. Charge transfer rate. Concentration polarization. Electrolysis.
Seminars (1 hour per week): Solving 30 numerical tasks.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☒ seminars and workshops
☐ exercises</td><td colspan="3">☒ independent assignments
☒ multimedia
☐ laboratory</td></tr>
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	☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ work with mentor ☐ (other)

Student responsibilities	Attendance and activity in lectures and seminars in the amount of at least 70% of the anticipated hourly rate. The examination can be carried out continuously through partial tests during the semester in which theoretical and practical exercises are combined, or whole exam (written and oral exam).					
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	1.0	Research		Practical training	0.2
	Experimental work		Report		(Other)	
	Essay		Seminar essay		(Other)	
	Tests	1.0	Oral exam		(Other)	
	Written exam	0.8	Project		(Other)	
Grading and evaluating student work in class and at the final exam	Continuous evaluation: efficacy(%) / percentage in grade (%)) attendance and activity: (70-100 / 10) • first partial test: (60-100 / 30) • second partial test (60-100 / 30) • second partial test (60-100 / 30 • third partial test (60-100 / 30) Final evaluation: efficacy(%) / percentage in grade (%)) Written exam: (50 - 100/40) • oral exam: (50 - 100/45) Activities (Continuous Evaluation): (50 - 100/15)					

	Title	**Number of copies in the library**	**Availability via other media**
Required literature (available in the library and via other media)	R. J. Silbey, R. A. Alberty, M. G. Bawendi, Physical Chemistry, 4th Edition, John Wiley and Sons, New Jersey, 2005.		
	P. Atkins, J. de Paula, Elements of Physical Chemistry, 4th Edition, Oxford University Press, Oxford, 2005.		

Optional literature (at the time of submission of study programme proposal)	
Quality assurance methods that ensure the acquisition of exit competences	Continuous evaluation by monitoring activities and testing, anonymous survey.
Other (as the proposer wishes to add)	