<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">Laboratory course in analytical chemistry I</td></tr>
<tr><td>Code</td><td>PMC102</td><td>Year of study</td><td colspan="3">2.</td></tr>
<tr><td>Course teacher</td><td>Ivana Mitar, assistant professor</td><td>Credits (ECTS)</td><td colspan="3">3.0</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></td><td></td><td>45</td><td></td></tr>
<tr><td>Status of the course</td><td>mandatory</td><td>Percentage of application of e-learning</td><td colspan="3">10 %</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Adopt and understand the basics principles and application of classical methods of qualitative and quantitative analysis of the matter.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">Attending course Analytical Chemistry I.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">Upon completion of the course, students will be able to:
1. distinguish quantitative test methods (gravimetry and volumetry),
2. critically evaluate the appropriate analytical method depending on the analyte studied in the sample,
3. apply appropriate sample preparation for the chosen analytical method, and
4. compare the calculation and discuss the result of the analysis.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">EXERCISES:

1. Basic actions in the laboratory of quantitative chemical analysis
2. Basic principles of solution preparation and safety in the laboratory
3. Preparation of solutions for quantitative analysis
4. Preparation of buffer solutions
5. Hydrolysis of salts
6. Standardization of titrants: hydrochloric acid and sodium hydroxide
7. Acidimetry: determination sample of unknown base
8. Alkalimetry: determination of oxalic acid
9. Complexometric titration: determination of ferrous ions
10. Complexometric titration: determination of magnesium ions
11. Methods based on precipitation reactions: determination of chloride ions according to Mohr method
12. Methods based on redox reactions: determination of manganese(II) ions
13. Methods based on redox reactions: Determination of copper ions
14. Gravimetric methods of analysis
15. Exercise review</td></tr>
<tr><td>Format of instruction</td><td colspan="2">☐ lectures
☐ seminars and workshops
x exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">☐ independent assignments
☐ multimedia
x laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="5">Students are required to attend laboratory practice 100 % and actively participate in the teaching process. Before each exercise, students have written or oral exam. After each laboratory exercise students are obligatory to write a report. That will be recorded and evaluated in making a final assessment.</td></tr>
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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		Research		Practical training	1.0
	Experimental work		Report		practical	
	Essay		Seminar essay		Oral exam	
	Tests	0.5	Oral exam		Report	0.5
	Written exam		Project		(Other)	

Grading and evaluating student work in class and at the final exam	All assignments for each exercise must be completed. The grade will be based on the oral or written colloquia that precede each exercise, the student's laboratory work, the exercise reports that the student writes at the end of each exercise, and possibly the final examination of the exercises. Practical work will be graded as each exercise is performed.		
Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	1. D. A. Skoog, D. M. West, F. J. Holler and S. R. Crouch, Fundamentals of Analytical Chemistry, 9th Edition, Thompson Brooks/Cole, Belmont, USA, 2014.	10	
	2. I. Mitar, Laboratory exercises for courses in analytical chemistry, internal, unlicensed script.		
Optional literature (at the time of submission of study programme proposal)	1. R. Kellner, J. M. Mermet, M. Otto, M. Valcarcel and H. M. Widmer, Analytical Chemistry (A Modern Approach to Analytical Science, Second Edition) Wiley-VCH Verlag Gmbh & Co. KGaA, Weinheim, 2004. 2. D. C. Harris, Quantitative Chemical Analysis, W. H. Freeman and Company, 41 Madison Avenue New York, NY, 2016. 3. B. M. Tissue, Basic of Analytical Chemistry and Chemical Equilibria, John Wiley & Sons, Inc., Hoboken, New Jersey, NY, 2013. 4. G. D. Christian, P. K. Dasgupta, K. A. Schug, Analytical Chemistry, John Wiley & Sons, Inc., 111 River Street, Hoboken, New Jersey, NY, 2014.		
Quality assurance methods that ensure the acquisition of exit competences	Quality of the teaching and learning, monitored at the level of the (1) teachers, accepting suggestions of students and colleagues, and (2) faculty, conducting surveys of students on teaching quality.		
Other (as the proposer wishes to add)			