<table>
<tr><td colspan="2">NAME OF THE COURSE</td><td colspan="5">Instrumental methods of analysis</td></tr>
<tr><td>Code</td><td>PPC215</td><td>Year of study</td><td colspan="4">1.</td></tr>
<tr><td>Course teacher</td><td>Assoc.prof. Ivica Ljubenkov</td><td>Credits (ECTS)</td><td colspan="4">2</td></tr>
<tr><td>Associate teachers</td><td>Assist.prof. Ivana Mitar</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>15</td><td></td><td>15</td><td></td></tr>
<tr><td>Status of the course</td><td>elective</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">Adopt and understand the basics principles and application of instrumental analytical methods of physico-chemical analysis.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6"></td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">➢ explain the physico-chemical fundamentals of particular method of instrumental analysis,
➢ distinguish methods by types of testing
➢ participate in selection of the appropriate test method according to the types of samples to be tested
➢ participate in explanation and interpretation of the results of analyzes</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Lectures:
SPECTROSCOPIC METHODS
1. Introduction to spectroscopic methods, instruments in spectroscopy (2 lessons)
2. UV-Vis, Fluorescence spectroscopy (2 lessons)
3. IR, Raman spectroscopy (2 lessons)
4. Atomic spectroscopy, XRF (1 lesson)
5. Mass spectrometry (1 lesson)
6. NMR spectroscopy (1 lesson)
CHROMATOGRAPHIC METHODS
7. Introduction to chromatographic methods, (TLC, Column chromatography) (2 lessons)
8. Liquid chromatography -HPLC (Size ex., Ion, Affinity, Supercritical) (2 lessons)
9. Gas chromatography –GC (2 lessons)

Exercises:
SPECTROSCOPY:
1. UV/Vis and fluorescence spectroscopy (3 lessons)
2. IR and Raman spectroscopy (3 lessons)
3. XRF spectroscopy (3 lessons)

CHROMATOGRAPHY:
1. HPLC – liquid chromatography (3 lessons)
2. GC - gas chromatography (3 lessons)</td></tr>
<tr><td>Format of instruction</td><td colspan="3">x lectures
☐ seminars and workshops
x exercises
☐ on line in entirety
☐ partial e-learning</td><td colspan="3">☐ independent assignments
x multimedia
x laboratory
☐ work with mentor
☐ (other)</td></tr>
</table>

	☐ field work	

Student responsibilities	Students are required to attend classes (lectures and seminars 80%, laboratory practice and field work 100%) and actively participate in the teaching process. This will be recorded and evaluated in making a final assessment.

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	0,5	Research		Practical training	1,0
	Experimental work		Report		(Other)	
	Essay		Seminar essay		(Other)	
	Tests		Oral exam	0,5	(Other)	
	Written exam		Project		(Other)	

Grading and evaluating student work in class and at the final exam	Grades: <50% not satisfied; 50-60% successful (2) 60-70% good (3), 70-85% very good (4), 85-100% excellent (5).

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, Osnove analitičke kemije, Školska knjiga, Zagreb, 1999.	10	

Optional literature (at the time of submission of study programme proposal)	
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)	