

NAZIV PREDMETA		Instrumentalne metode analize					
Kod	PPC215	Godina studija	1.				
Nositelji predmeta	izv. prof. dr.sc. Ivica Ljubenkov	Bodovna vrijednost (ECTS)	2				
Suradnici	doc. dr.sc. Ivana Mitar	Način izvođenja nastave (broj sati u semestru)	P	S	V	T	
			15	0	15	0	
Status predmeta	izborni	Postotak primjene e-učenja	0				
OPIS PREDMETA							
Ciljevi predmeta	Usvojiti i razumjeti osnove i primjenu instrumentalnih analitičkih metoda fizikalno-kemijske analize.						
Uvjeti za upis predmeta i ulazne kompetencije potrebne za predmet	Nema ih.						
Očekivani ishodi učenja na razini predmeta (4-10 ishoda učenja)	Student će nakon završetka odslušanog predmeta moći: 1. objasniti fizikalno-kemijske osnove pojedinih metoda instrumentalne analize, 2. razlikovati metode prema skupinama ispitivanja, 3. sudjelovati u odabiru odgovarajuće metode ispitivanja prema vrstama uzoraka koji se ispituju 4. sudjelovati u tumačenju rezultata analiza						
Sadržaj predmeta detaljno razrađen prema satnici nastave	<p>Predavanja:</p> <p>SPEKTROSKOPSKE METODE</p> <ol style="list-style-type: none"> Uvod u spektrokemijske m. i instrumenti u spektroskopiji (2 sata) UV-Vis i fluorescencijska spektr. (2 sata) IR i Ramanova spektrometrija (2 sata) Atomska spektrometrija, XRF (1 sat) Masena spektrometrija (1 sat) NMR spektrometrija (1 sat) <p>KROMATOGRFSKE METODE</p> <ol style="list-style-type: none"> Uvod u kromatografske metode (TLC, Kolonska kromatografija) (2 sata) Tekućinska kromatografija-HPLC (size ex., ionska, afinitetna, superkritična krom.) (2 sata) Plinska kromatografija-GC (2,0 sata) <p>Vježbe:</p> <p>SPEKTROSKOPIJA</p> <ol style="list-style-type: none"> UV-Vis i fluorescencijska spektrometrija (3 sata) IR i Ramanova spektrometrija (3 sata) XRF- spektrometrija (3 sata) <p>KROMATOGRAFIJA</p> <ol style="list-style-type: none"> HPLC- Tekućinska kromatografija (3 sata) GC- Plinska kromatografija (3 sata) 						
Vrste izvođenja nastave:	<input checked="" type="checkbox"/> predavanja <input type="checkbox"/> seminari i radionice <input checked="" type="checkbox"/> vježbe <input type="checkbox"/> <i>on line</i> u cijelosti <input type="checkbox"/> mješovito e-učenje <input type="checkbox"/> terenska nastava		<input type="checkbox"/> samostalni zadaci <input checked="" type="checkbox"/> multimedija <input checked="" type="checkbox"/> laboratorij <input type="checkbox"/> mentorski rad <input type="checkbox"/> (ostalo upisati)				
Obveze studenata	Studenti su obvezni pohađati nastavu (predavanja 80%, te vježbe 100%) te aktivno sudjelovati u nastavnom procesu. Navedeno će se evidentirati i vrednovati kod donošenja konačne ocjene.						
Praćenje rada studenata (<i>upisati</i>)	Pohađanje nastave	0,5	Istraživanje		Praktični rad	1,0	

<i>udio u ECTS bodovima za svaku aktivnost tako da ukupni broj ECTS bodova odgovara bodovnoj vrijednosti predmeta):</i>	Eksperimentalni rad		Referat		(Ostalo upisati)	
	Esej		Seminarski rad		(Ostalo upisati)	
	Kolokviji		Usmeni ispit	0,5	(Ostalo upisati)	
	Pismeni ispit		Projekt		(Ostalo upisati)	
Ocjenjivanje i vrjednovanje rada studenata tijekom nastave i na završnom ispitu	Kriterij ocjenjivanja: izvrstan (5) - 90 do 100 bodova, vrlo dobar (4) - 80 do 89 bodova, dobar (3) – 70 do 79 bodova, dovoljan (2) - 60 do 69 bodova, manje od 60 bodova – nedovoljan (1).					
Obvezna literatura (dostupna u knjižnici i putem ostalih medija)	Naslov			Broj primjeraka u knjižnici	Dostupnost putem ostalih medija	
	D.A. Skoog, D.M. West, F.J. Holler, Osnove analitičke kemije, Školska knjiga, Zagreb, 1999.			10		
Dopunska literatura						
Načini praćenja kvalitete koji osiguravaju stjecanje utvrđenih ishoda učenja	Praćenje kvalitete i uspješnosti izvođenja nastave i usvajanja znanja (vještina), prati se na razini: (1) nastavnika, prihvaćanjem sugestija polaznika i kolega, (2) fakulteta, provođenjem anketiranja polaznika o kvaliteti nastave.					
Ostalo (prema mišljenju predlagatelja)						

NAME OF THE COURSE		Instrumental methods of analysis				
Code	PPC215	Year of study	1.			
Course teacher	Assoc.prof. Ivica Ljubenkov	Credits (ECTS)	2			
Associate teachers	Assist.prof. Ivana Mitar	Type of instruction (number of hours)	L	S	E	F
			15		15	
Status of the course	elective	Percentage of application of e-learning				
COURSE DESCRIPTION						
Course objectives	Adopt and understand the basics principles and application of instrumental analytical methods of physico-chemical analysis.					
Course enrolment requirements and entry competences required for the course						
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	<ul style="list-style-type: none"> ➤ 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 					
Course content broken down in detail by weekly class schedule (syllabus)	<p>Lectures:</p> <p>SPECTROSCOPIC METHODS</p> <ol style="list-style-type: none"> 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) <p>CHROMATOGRAPHIC METHODS</p> <ol style="list-style-type: none"> 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) <p>Exercises:</p> <p>SPECTROSCOPY:</p> <ol style="list-style-type: none"> 1. UV/Vis and fluorescence spectroscopy (3 lessons) 2. IR and Raman spectroscopy (3 lessons) 3. XRF spectroscopy (3 lessons) <p>CHROMATOGRAPHY:</p> <ol style="list-style-type: none"> 1. HPLC – liquid chromatography (3 lessons) 2. GC - gas chromatography (3 lessons) 					
Format of instruction	x lectures <input type="checkbox"/> seminars and workshops x exercises <input type="checkbox"/> <i>on line</i> in entirety <input type="checkbox"/> partial e-learning	<input type="checkbox"/> independent assignments x multimedia x laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)				

	<input type="checkbox"/> 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)						