Department of Biology Josip Juraj Strossmayer University of Osijek

Programme of study in Biology and Chemistry

Master level programme of study in Biology and Chemistry Education

accredited by the Ministry of Science, Education and Sports of the Republic of Croatia on 16 June 2005

Osijek, October 2020

1.INTRODUCTION

a) Modern society is knowledge-based, and biology i.e. the science of life, has a significant role in it. Biodiversity, recombinant DNA technology and nature protection are biological disciplines, without the knowledge of which the modern society would not be able to survive. Therefore it is easy to recognize the value of knowledge gained from a study of natural sciences. With much focus on globalization, we often forget natural processes and it is important to provide education on the importance and functioning of life. Teaching plays and important role in the process of education, and it should provide younger generations with the knowledge that will explain and protect life. Biologists, in all segments of their activity, and whatever they professional interests may be (education, science, or professional activities), are necessary in society, and can find employment in the global job market. In addition to educational and scientific institutions, there is an increasing number of private companies that conduct research or have the production for which they need the expertise of biologists. The core and optional modules are based on the results of the most recent investigations, and provide basic knowledge that will make it possible for our graduates to be competitive in the global market of knowledge.

We are offering a 'major' programme for biologists that is comparable to many study programmes in the European Union (Universities in Wageningen, Heidelberg, Pecs), and the programme structure is agreed upon with other Croatian biology professionals. The programme also provides for vertical and horizontal student mobility.

b) The University Department of Biology was originally the Institute of Biology that was part of the Faculty of Education. Since 1977 educated teachers of biology and chemistry. Based on the Report of the committee for assessment of institutions of higher education in the Republic of Croatia, natural sciences, field biology (section 11 of the Report), we are proposing the bachelor level study programme in biology and master level study programmes in biology, biology education, and biology and chemistry education.

c) Partners in the education process are primary and secondary schools, where graduates will find employment. Partners in the education of graduates with and MA in biology are public institutions involved in nature protection, as well as other research-oriented institutions.

d) Proposed study programmes provide for the horizontal and vertical student mobility, as they are composed of 70% core modules and 30% optional modules like many European 'major + minor' study programmes, and they are comparable to similar study programmes in the Republic of Croatia.

e) Following the recommendations of the above mentioned Report of the committee for assessment of institutions of higher education in the Republic of Croatia (sections 7, 8, and 9), and since we managed to implement our plan to relocate the Institute of Biology and founded the University Department of Biology, we now have much better conditions for research and teaching, and can offer a modern programme of study in biology. Moreover, there have been considerable investments made in order to equip the labs and practicums, and such a positive trend is expected to continue.

2. GENERAL DESCRIPTION

2.1. Biology

Master level programme of study in biology and chemistry education

2.2. Josip Juraj Strossmayer University, Department of Biology2.3. Duration of studies: 2 years (4 semesters)Qualifications awarded: MSc in biology and chemistry education2.4. Admission requirements: completed bachelor programme in biology, passed all exams in the optional module chemistry

2.6. On completion of the master level programme of study in biology and chemistry education, graduates will be able to continue some of the doctoral level programmes in natural sciences. Graduates can be employed to teach subjects in biology and chemistry at primary and secondary schools.

2.8. On completion of the master level study programmes the qualifications awarded are: MSc in biology and chemistry education

3. STUDY PROGRAMME DESCRIPTION

3.1. The list of obligatory and elective courses and modules with corresponding number of teaching hours and ECTS credits

Obligatory Courses

I semester Pedagogy 1 Psychology in Education 1 Animal Physiology 2 Plant Physiology 2 Biochemistry 3 Fundamentals of Physical Chemistry 1 Practices in Physical Chemistry School Teaching Practice 1	375	L 15 30 30 30 45	s 15 15 15	P 15 15 15 15 60 30 165	ECTS 3 3 3 3 5 5 5 2 2 27	CODE BP9100 BP798 BP755 BP756 BP754 K058 K053 BP7108
			c		FOTO	
II semester		L 15	S 15	Р 15	ECTS 3	BP9101
Pedagogy 2 Psychology in Education 2		15	15	15	3	BP9101 BP798-2
Didactics 1		15	15	15	3	BP798-2 BP797
Biological Collections		15	13	30	2	BP 899
Basics of Horticulture		30		15	3	BM861
Methodology of Teaching Biology		30	15	60	6	BP8102
Fundamentals of Physical Chemistry 2		30	15	00	5	K059
Methodology of Teaching Chemistry		30	15		3	K071
Practices in Methodology of Teaching Chemistry				60	3	K073
School Teaching Practice 2				30	2	BP8109
	510	180	90	240	33	
III semester		L	S	Р	ECTS	0 20200
Didactics 2		15	15	15	3	BP797-2
Terrestrial Ecosystems		15	5		2	
Aquatic Ecosystems		30	10		3	
Conservation Biology		30			3	BP91006
Teaching Practice in Biology				30	3	BP9107
Teaching Practice in Chemistry				30	3	K072
School Teaching Practice 3 Study Visit	30			30	2	BP9110 BP9112
Elective Courses	180				11	
	225	90	30	105	30	

IV semester	ECTS
Acceptance of MS theses	5
Research work	15
MS theses defence and final exam	10
	30

Elective Courses - Chemistry	L+S+P	ECTS	CODE
Atmosphere and Environment	15+15+0	2	K082
Research Work in Teaching Chemistry	15+0+45	2	K075
Chemistry in Everyday Life	15+0+15	2	K083
Colloid and Interfacial Chemistry	15+15+0	2	K054
Materials of the 21st Century – Technology and Environment	15+15+0	2	K026
Modern Spectroscopic Methods in Chemistry	15+0+15	2	K056
Introduction to Chemical Sensors and Biosensors	30+15+0	3	K066

Elective Courses - Biology

Elective Courses - Biology					
	L	S	Р	ECTS	CODE
Biomolecules in Food	15	15		2	BMZ77
Genome Evolution	15	15		2	BMZ79
Plant Pathoanatomy	15		15	2	BMZ80
Plant Microtechnique and Microscopy	30		15	2	BMZ82
Immunocompetence and Transplantation	15		15	2	BMZ84
Animal Behaviour	15	15		2	BM969
Inquiry-based Teaching of Biology	15		15	2	BBZ49
Ecology in Education	15		15	2	BBZ50
Medicinal Plants	15	15	15	3	BBZ51
Fauna Diversity of Croatia	15	15	15	3	BBZ52
Sexuality of Living Creatures	30	15		3	BBZ53
Vegetation Mapping	15		15	2	BMZ92
Protection and Revitalisation of Aquatic	15	15		2	BBZ55
Ecosystems					
Biofilms	15	15		2	
Herpetology	15		15	2	
Areas of Importance for Croatian Flora	15	15		2	
Introduction to Scientific Research	15		15	2	
Methodology					
Algae as Biological Indicators	15		15	2	
Socially Useful Learning	3	27		2	
Ecological Immunology	15	15		2	
Ecological Projects	15	15		2	
Neuroimmunology	15	15		2	
History of Plant Physiology Research	15	5	10	2	
Application of Algae and Cyanobacteria	15	15		2	

Course teachers and associates are assigned to courses as of the academic year 2020/2021. The study program will be carried out starting from the academic year 2021/2022.

Course title	Animal Ph	ysiology	y 2					
Code	BP755		-					
Study programme	Graduate L	Jniversity	v Study Programme i	n Biology and Ch	emistry Teacher	Educatio	n	
Semester	I semester							
Workload/ECTS credits	3							
Course status	Obligatory							
Course teacher	Assoc. Prof	. Dr. Sand	dra Ečimović					
Associate teachers								
Course entry requirements (Preceding courses)	Biochemist	ry 1, Bioc	chemistry 2, Animal	Physiology 1				
Course objective	mechanism homeostas system. To system ar environme	To enable students to acquire knowledge about animal organisms and their physiological nechanisms of adaptation to changes in the environment. To learn about principles of nomeostasis regulation and energy balance at lower and higher levels of the biological ystem. To learn about necessary connection between different levels of the biological ystem and the integration of physiological processes under the influence of environmental factors. To acquaint students with the principles of adaptation in different ypes of environment and different environmental conditions.						
Learning outcomes Link between learning	er 2. Sk th 3. Sk co	vironme ills in pre e enviror ills in pr nditions svironme	etermine the physio ntal conditions. esenting the adaptiv ment. resenting the princ in the terrestrial ntal conditions.	e mechanisms o iples of adapta and aquatic	f animal organisn tion to different environment, a	ns to cha	anges in nmental	
outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching	Methods of monitoring		ding ints	
activities					and evaluation	min	max	
	1-3	1	Lecture	Lecture attendance and active participation	Records related to active participation in conversations and discussions	5	10	
	1-3	1	Seminar	Seminar paper. Critical conversation and discussion	Monitoring of student performance at interpreting and solving of exercises	10	15	

Obligatory courses

	1	r								
	1-3	0.5		am n exam)	Preparation for written exam	Written exam	20	35		
	1-3	0.5		am exam)	Preparation for oral exam	Oral exam	25	40		
	Total	3					60	100		
	Final grade	:								
	60-70 poin	ts: grade	2 (sufficie	ent)						
	71-80 poin	-								
	81-90 poin 91-100 poi	-	• • •	•						
Consultation	By appoint		•							
hours		_								
Teaching	L	ectures			Seminars	Pra	actices			
Hours - total	30 15 0									
Course content	Lectures:	Lectures:								
/ teaching units	● In	troductio	n into and	l review o	f the basic physic	logical concepts				
		-	boundari							
			-	nsive adap						
						l the environmen	t			
		-		-	ion and evaporat	tion				
		-			mal interactions					
		-	re adapta mia and o		a Homoothormy	and endothermy				
					nvironment	and endothermy				
		-			transitional anim	hals				
			-	-	change in terrestr					
			ige adapta							
			of locomo							
	• Pł	nysiologic	al energy	balance						
	● Er	nvironme	ntal perio	dicity and	physiological cha	nges				
	• Pł	nysiology	of hiberna	ation						
	• Di	versity of	fdigestion	and nutri	tion					
			-		phology and phys	siology of the dige	estive sy	stem		
			tary regin							
					to herbivores					
				digestive t				c i		
					components in t	he organism and	their in	fluence		
			ogical proc		of ovtratorroctria	l biological syster	20			
					and water pressu		115			
			-		physiological fact					
	Seminars:			Sicul and	physiological rac					
	• Ca	-	-	-		emperatures. Th	-	-		
						s. Respiratory a ental stress. Ph				
		ndocrine				Cillar SUESS. PII	ysiology			
Recommended	McNab B.H	(2002)	The Phys	iological	Ecology of Verte	brates, Cornell L	Jniversit	y Press,		
reading	London.	_								
				-	-	al Physiology – N	/lechani	sms and		
	Adaptation	i <i>,</i> W. H. Fi	reeman ar	nd Compa	ny, New York.					

Optional reading	 Bradshaw D. (2003) Vertebrate Ecophysiology, Cambridge University Press, Cambridge. Paul J.R. (2001) Physiologie der Tiere, Thieme, Stuttgart. Schmidt-Nielsen K. (1998) Animal physiology, Cambridge University Press, Cambridge. Withers C.P. (1992) Comparative Animal Physiology, Saunders College Publishing, Los Angeles.
Conditions for obtaining teacher's signature	Regular attendance of lectures, successful completion of seminars.
Exam passing procedure	During the course, the teacher monitors and evaluates performance of each student, which refers to 10% of the final grade. Prior to taking written exam, student is obliged to prepare and present a seminar paper, which contributes 20% to the final grade. Passing of written exam refers to 30% of the final grade, and passing of oral exam refers to the remaining 40% of the final grade.
Main language of instruction; other languages	Croatian language
Method of monitoring the quality and efficiency of teaching	Student survey to evaluate the overall quality of the course. Analysis of student success at exams.

Course title	Biochemist	ry 3					
Code	BP754	-					
Study programme	Graduate Un	iversity	Study Progr	amme in Biology and	d Chemistry Teacher	Educatio	on
Semester	l semester						
Workload/ECTS credits	3						
Course status	Obligatory						
Course teacher	Assist. Prof. [Dr. Rose	emary Vukov	/ić			
	Assist. Prof. [Dr. Senl	ka Blažetić				
Associate teachers	Ana Vuković,	, assista	nt				
Course entry requirements (Preceding courses)							
Course	To enable st	udents	to understa	and the basic princi	ples of biochemical	processe	es in the
objective				with physiological f		-	
	working on e	experim	nents, to app	o environmental cha oly appropriate bioc sults by using releva	hemical methods ar	nd techni	
Learning				nanisms that enable	a living organism to	react suc	cessfully
outcomes				nental changes.			
				mpare the mechanis			
				review the importan			
		-		nparison between view cell responses tl			-
			athways.				
	-		-	n biochemistry rese	arch work, which ir	ncludes li	iterature
	anal	lysis, e	xperiment o	design, selection an	d implementation	of meth	ods and
				of hypotheses, dat		nalysis, a	nd their
		•		relevant scientific re			
		•		tion between the im	mune system parts	and to de	etermine
			on in the or			fastara	
		-		he connection of ge	enetic and external	Tactors	with the
Link between			/elopment.				
learning	Loarning	Share	Form of	Activities of	Assess	ment	
outcomes,	outcome	of	teaching	learning and	Methods of	Gra	ding
teaching and students'	E	ECTS	icaening	teaching	monitoring and		ints
activities					evaluation	min	max
Generation				Critical	Records related		
	1-3, 4-6	1	Lecture	conversation and	to student	5	10
				discussion	performance		
					during lectures		

	4 1-6	0.75	Practices Written exam	analysis; presentation and interpretation of obtained results	expe work Wo Asses preser interp obtair with p fee	itoring of erimental progress; rk diary; ssment of ntation and retation of ned results rovision of edback ten exam	25	40
	1-6	0.25	Oral exam	Preparation for oral exam	Ora	al exam	20	30
	Total	3					60	100
Consultation hours	Final grade 60-70 poin 71-80 poin 81-90 poin 91-100 poi By appoint	ts: grade ts: grade ts: grade nts: grad ment	3 (good) 4 (very go	ood) ent)				
Teaching	L	ectures		Seminars		P	ractices	
Hours - total		30		0			15	
Course content / teaching units	tr. cc Si, tr ep pa In ba im M ar im Se M ar in in	ansport, pannels (: pmpound gnal trar iphospha pidermal athway p nmune sy asis of hig mune re MC II), ce nd helper nmune sy ensory sy olecular nd dyneir bacteria	P-type A sodium, po s, channel isduction te and di growth f articipants stem: spec gh antiboc isponse, pi lls and rece s, T-cell se stem in ca stems: sen motors: m n in interace , chemotaz		n gradi oline cha eric G-p ndary m g, comr isturban f antiboc s of anti istocom em cells, autoim and acti and acti	ents, lactos annel), action proteins, cAl nessengers, non feature ces in signal ly molecule body classes patibility cor (T-cell recep mune diseas ag and touch n, muscle co rial moveme	e-perment n potenti MP, Ca ²⁺ , insulin si es and s pathway structure s as a pa nplex (M ptors, T-c es, the rc ntraction nt, rotary	ase, ion al, crack inositol gnalling, ignalling rs , genetic rt of the HC I and ell killers ole of the h, kinesin y motors
Recommended	-	-		o G.J., Stryer L. (2019) D. New York	Biochem	istry (9th ed	ition). Ma	acmillian
reading	Stryer L., B knjiga, Zag	Berg J., Ty reb.	vmoczko J.	n, New York. (2013) Biokemija (6 th 				
Optional reading	Neuroscier Harperova Alberts B., the Cell (5t	nce (5th e ilustrirar Johnson h edition	edition). Sin na biokemi A., Lewis J). Garland	tzpatrick D., Hall W.(nauer Associates, INC, ja (28th edition) (2011 ., Raff M., Roberts K., Science, New York. nemistry (4th edition).	Sunderl) Medic Walter F	and, Massac inska naklad P. (2008) Mo	husetts, a.	USA.

	Nelson D.L., Cox M.M. (2013) Lehninger Principles of Biochemistry (6th edition). W. H. Freeman & Co, New York. Original scientific papers and review papers
Conditions for obtaining teacher's signature	Students are obliged to participate in lectures actively and to fulfil all assignments within the course.
Exam passing procedure	During the course, the teacher monitors and evaluates the activities of students by awarding points according to determined criteria. After the course, students take a written exam and then oral exam. During the semester, students can take preliminary exams and substitute them for the written exam if passing each preliminary exam with more than 60% of the total number of points.
Main language of instruction; other languages	Croatian language
Method of monitoring the quality and efficiency of teaching	During the course, the teacher continuously evaluates student achievement, and gives students the opportunity to make oral or written comments. After the course, students are given a survey in which they give their subjective opinion about quality and organisation of teaching, all with the aim to improve future teaching.

Course title	Didactics	1					
Code	BP797						
Study programme	Graduate l	Jniversity	/ Study Prog	ramme in Biology and	d Chemistry Teache	r Educati	on
Semester	II semester	-					
Workload/ECTS credits	3						
Course status	Obligatory						
Course teacher	Assist. Pro	^f . Dr. Iren	a Labak				
Associate							
teachers							
Course entry							
requirements							
(Preceding							
courses)							
Course	To teach st	udents a	bout theory	of didactics and its p	ractical application	in the ed	ucational
objective	process.						
Learning							
outcomes				the educational proc			
		-		e autonomy of tead			
				ring the planning of i			
		•		effectiveness of str	• •	•	
		-	-	and teaching within	n the process of de	efining cu	ırriculum
		ojectives.					
		-		teaching methods b	y using approache	s to eval	uation in
				ing and teaching.			
	5. Sk	tills in val	orisation of s	cientific and professi	onal literature refer	ring to e	ducation.
Link between					Asses	sment	
learning	Learning	Share	Form of	Activities of			
outcomes, teaching and	outcome	of	teaching	learning and	Methods of		ding
students'		ECTS	Ū	teaching	monitoring and	Ро	ints
activities					evaluation	min	max
				Critical			
				conversation and			
				discussion;	Records related		
				collaborative	to active		
				learning and	participation in		
	1-5	0.5	Lecture	reciprocal	discussions and	5	10
				teaching within	analysis;		
				analysis of	portfolio		
				different types of			
				information			
				sources			

Total 3 Final grade:	Consultation hours Teaching	Total Final grade 60-70 poin 71-80 poin 81-90 poin 91-100 poi By appoint	3 e: its: grade its: grade its: grade ints: grad ment ectures 15	exam 2 (sufficien 3 (good) 4 (very goo e 5 (excelle	oral exam t)		15	10 100
Lectures Seminar	Hours - total Course content			! ! .	alandar i Lit			
	hours	60-70 poin 71-80 poin 81-90 poin 91-100 poi By appoint	its: grade its: grade its: grade ints: grade ints: grad ints: grad ints: grad ints: grad ints: grad ints: grad ints: grad ints: grad ints: grade ints:	3 (good) 4 (very goo e 5 (excelle	d) nt) Semir			
Total 3		1-5 Fotal	0.25 3	Oral exam	Preparation for oral exam	Oral exam		_
		1-5	0.75	Written exam	learning process improvement Writing of an academic essay	provision of feedback, portfolio Essay	20	30
1-50.5Written examWriting of an academic essa1-50.25OralPreparation for		1-5	0.75	Practices	teaching practices; <i>Journal Club</i> Independent work on tasks for	portfolio Analysis of completed tasks with	10	20
1-50.75Practices PracticesIndependent work on tasks f learning proce improvement1-50.5Written examWriting of an academic essat1-50.25OralPreparation for		1-5	1	Seminar	Flipped classroom: presentation and analysis of real- life situations; independent development of proposals for improvement of analysed real-life situations and for students' own	Analysis of proposals of students' own teaching practices with provision of feedback; Records related to student activity in the Journal Club;	20	30

Optional reading Conditions for	Jensen E. (2003) Super-nastava: nastavne strategije za kvalitetnu školu i uspješno učenje. Educa, d.o.o. Klippert H. (2001) Kako uspješno učiti u timu. Educa, Zagreb. Meyer H. (2002) Didaktika razredne kvake. Educa, Zagreb. Terhart E. (2001) Metode učenja i poučavanja. Educa, Zagreb.
obtaining teacher's signature	Students are obliged to participate in lectures actively and to fulfil all assignments within the course.
Exam passing procedure	During the course, the teacher monitors and evaluates the activities of students by awarding points according to determined criteria. The teacher thus provides continuous feedback, which students use to assess their learning progress and to create a portfolio to improve the learning process and their own professional development. At the end of the course, students write an essay with a critical review of theory and practice, after which they take oral exam. During the oral exam, the teacher asks questions that are related to learning outcomes. The final grade is determined according to the number of points collected for essay and oral exam and the number of points gained during lectures.
Main language of instruction; other languages	Croatian language
Method of monitoring the quality and efficiency of teaching	During the course, the teacher performs evaluation for learning by continuous monitoring of the learning process and student achievement, thus determining and adapting his/her teaching. After the course, the teacher conducts a survey among students to evaluate their subjective impression about the teaching quality, all with the aim to improve future teaching.

Course title	Didactics 2	2					
Code	BP797-2						
Study	Graduate II	Iniversity	Study Progr	ramme in Biology and	l Chamistry Taacha	r Educativ	an an
programme	Graduate O	miversity	Study Progr	annine in biology and			JI
Semester	III semester	r					
Workload/ECTS	3						
credits	5						
Course status	Obligatory						
Course teacher	Assist. Prof	. Dr. Iren	a Labak				
Associate							
teachers							
Course entry							
requirements							
(Preceding							
courses)							
Course	To teach st	udents h	ow to succes	sfully and responsibl	v manage educatio	nal proce	ss within
objective				learning and develop			55 WICHIN
Learning		-		ation of a stimulat	-		-
outcomes				each students can n	nanage their learni	ng, emot	ions and
		otivation	-				
				eds of each student in ng knowledge at high		ely active	learning
				ort the development	-	and oth	or forms
		•		various types of litera		-	
		-		hes to evaluation.	icy by selecting app	nopriate	teaching
		-		vidualisation and diff	erentiation of tead	hing for	students
		th specia					students
				n needs and aspects	for professional de	evelonme	ent to be
				responsibly manage		evelopine	
Link between							
learning		Share		Activities of	Asses	sment	
outcomes,	Learning	of	Form of	learning and		C ==	din a
teaching and	outcome	ECTS	teaching	teaching	Methods of		ding
students'		LCIJ		teaching	monitoring and	1	ints
activities					evaluation	min	max

Final grade: 60-70 points: grade 2 (sufficient) 71-80 points: grade 3 (good) 81-90 points: grade 4 (very good) 91-100 points: grade 5 (excellent) By appointment. hours Teaching Lectures Seminars Practices Hours - total 15 15 15 Course content • Learning environment and self-regulated learning, emotions and motivation: • learning processes, self-evaluation and self-assessment of learning • metacognitive skills • motivation - types and ways of motivation • emotions and emotional regulation • competence to <i>learn how to learn</i>	 I		1							
1.5 1 Seminar Flipped classroom: presentation and independent Analysis of proposals of students' own teaching 20 30 1.5 1 Seminar development of proposals for improvement of proposals for analysed real-life situations and for students' own teaching practices 20 30 1.5 0.75 Practices Analysis of completed work on tasks for learning process improvement Analysis of feedback; portfolio 20 30 1.5 0.75 Practices Analysis of completed 10 20 1.5 0.75 Practices Analysis of completed 10 20 1.5 0.75 Practices Analysis of completed 10 20 1.5 0.25 Oral exam Preparation for oral exam Oral exam 5 10 1.5 0.25 Oral exam Preparation for oral exam Oral exam 5 10 Total 3 0 0 10 20 30 Final grade: 60-70 points: grade 2 (sufficient) 71-80 points: grade 3 (good) 81-90 points: grade 3 (good) 81-90 points: grade 4 (very good) 15 15 Consultation hours I Lectures Seminars P	1-5	0.5	Lecture	conversation and discussion; collaborative learning and reciprocal teaching within analysis of different types of information	to partic discus an	active ipation in sions and alysis;	5	10		
1-5 0.75 Practices Independent work on tasks for learning process improvement completed tasks with provision of feedback, portfolio 10 20 1-5 0.5 Written exam Writing of an academic essay Essay 20 30 1-5 0.25 Oral exam Preparation for oral exam Oral exam 5 10 Total 3 60 100 Final grade: 60-70 points: grade 2 (sufficient) 71-80 points: grade 3 (good) 81-90 points: grade 4 (very good) 91-100 points: grade 5 (excellent) 60 100 Final grade: 60-70 points: grade 5 (excellent) Consultation hours By appointment. -	1-5	1	Seminar	classroom: presentation and analysis of real- life situations; independent development of proposals for improvement of analysed real-life situations and for students' own	prop stude tea pract prov fee	oosals of ents' own aching ices with vision of edback;	20	30		
1-5 0.5 exam academic essay Essay 20 30 1-5 0.25 Oral exam Preparation for oral exam Oral exam 5 10 Total 3 0 0 60 100 Final grade: 60-70 points: grade 2 (sufficient) 60 100 Final grade: 60-70 points: grade 3 (good) 81-90 points: grade 4 (very good) 91-100 points: grade 5 (excellent) Consultation hours By appointment. 5 15 15 Course content / teaching units 15 15 15 Course content / teaching units • Learning environment and self-regulated learning, emotions and motivation: • learning processes, self-evaluation and self-assessment of learning • metacognitive skills • motivation - types and ways of motivation • emotions and emotional regulation	1-5	0.75	Practices	work on tasks for learning process	completed tasks with provision of feedback, portfolio		10	20		
I-5 0.25 exam Oral exam Oral exam 5 10 Total 3 oral exam Oral exam 60 100 Final grade: 60-70 points: grade 2 (sufficient) 60 100 Final grade: 60-70 points: grade 2 (sufficient) 60 100 Final grade: 60-70 points: grade 3 (good) 81-90 points: grade 3 (good) 81-90 points: grade 4 (very good) 91-100 points: grade 5 (excellent) Consultation hours By appointment. Practices Practices Hours - total 15 15 15 Course content / teaching units • Learning environment and self-regulated learning, emotions and motivation: • learning processes, self-evaluation and self-assessment of learning • metacognitive skills • motivation - types and ways of motivation • emotions and emotional regulation • competence to <i>learn how to learn</i> • competence to <i>learn how to learn</i>	1-5	0.5		-			20	30		
Final grade: 60-70 points: grade 2 (sufficient) 71-80 points: grade 3 (good) 81-90 points: grade 4 (very good) 91-100 points: grade 5 (excellent) Consultation hours Teaching Lectures Seminars Practices Hours - total 15 15 15 Course content / teaching units • Learning environment and self-regulated learning, emotions and motivation: • learning processes, self-evaluation and self-assessment of learning • metacognitive skills • motivation - types and ways of motivation • emotions and emotional regulation • competence to <i>learn how to learn</i>				-	Ora	al exam		_		
60-70 points: grade 2 (sufficient) 71-80 points: grade 3 (good) 81-90 points: grade 4 (very good) 91-100 points: grade 5 (excellent) Consultation hours By appointment. Teaching Lectures Seminars Practices Hours - total 15 15 0 learning environment and self-regulated learning, emotions and motivation: 0 learning processes, self-evaluation and self-assessment of learning 0 metacognitive skills 0 motivation - types and ways of motivation 0 emotions and emotional regulation 0 competence to <i>learn how to learn</i>	Total	3					60	100		
TeachingLecturesSeminarsPracticesHours - total151515Course content / teaching units•Learning environment and self-regulated learning, emotions and motivation: ••learning processes, self-evaluation and self-assessment of learning • •ometacognitive skills • ••motivation - types and ways of motivation • ••oemotions and emotional regulation • ••competence to learn how to learn	60-70 poin 71-80 poin 81-90 poin 91-100 poi	ts: grade ts: grade ts: grade nts: grade	e 3 (good) e 4 (very go	od)						
Hours - total 15 15 Hours - total 15 15 15 Course content / teaching units • Learning environment and self-regulated learning, emotions and motivation: • learning processes, self-evaluation and self-assessment of learning • metacognitive skills • motivation - types and ways of motivation • emotions and emotional regulation • competence to <i>learn how to learn</i>	 	ectures		Seminars		L L	Practices			
 / teaching units learning processes, self-evaluation and self-assessment of learning metacognitive skills motivation - types and ways of motivation emotions and emotional regulation competence to <i>learn how to learn</i> 										
 Assessment of self-regulated managing of motivation and emotions Active learning and teaching 	 • A:	 Learning environment and self-regulated learning, emotions and motivation: learning processes, self-evaluation and self-assessment of learning metacognitive skills motivation - types and ways of motivation emotions and emotional regulation competence to <i>learn how to learn</i> Assessment of self-regulated managing of motivation and emotions 								

	- Educational development of students (toursening of computing (t) it									
	 Educational development of students (taxonomies of cognitive, affective and psychomotor domains, dimensions of knowledge and development, individualised teaching) 									
	 Creative thinking: divergent and convergent processes, good practices in creative and critical thinking 									
	 Science, information and other types of literacy and development of students' literacy 									
	 Individualisation and differentiation of teaching for students with special needs Learning and teaching focused on competence development, professional development and lifelong learning. 									
Recommended	Bognar L., Matijević M. (2002) Didaktika. Školska knjiga, Zagreb.									
reading	Cindrić M., Miljković D., Strugar V. (2010) Didaktika i kurikulum. IEP d.o.o., Zagreb. Desforges C. (2001) Uspješno učenje i poučavanje: psihologijski pristupi. Educa, Zagreb. Vizek Vidović V., Rijevac M., Vlahović-Štetić V., Miljković D. (2014) Psihologija obrazovanja. IEP, Zagreb.									
Optional	Sternberg R. J. (2005) Kognitivna psihologija. Naklada Slap, Jastrebarsko.									
reading	Shunk D. H., Meece J. R., Pintrich P. R. (2020) Motivation in Education - Theory, Research									
	and Application, 4th ed. Pearson.									
	Miller M. (2020) Tech Like a PIRATE: Using Classroom Technology to Create an Experiance									
	& making learning Memorable. Dave Burges Consulting, Inc., San Diego CA.									
Conditions for	Students are obliged to participate in lectures actively and to fulfil all assignments within									
obtaining teacher's	Students are obliged to participate in lectures actively and to fulfil all assignments within the course.									
signature	נווב נטעו זב.									
Exam passing	During the course, the teacher monitors and evaluates the activities of students by									
procedure	awarding points according to determined criteria. The teacher thus provides continuous feedback, which students use to assess their learning progress and to create a portfolio to improve the learning process and their own professional development. At the end of the course, students write an essay with a critical review of theory and practice, after which they take oral exam. During the oral exam, the teacher asks questions that are related to learning outcomes. The final grade is determined according to the number of points collected for essay and oral exam and the number of points gained during lectures.									
Main language of instruction; other languages	Croatian language									
Method of monitoring the quality and efficiency of teaching	During the course, the teacher performs evaluation for learning by continuous monitoring of the learning process and student achievement, thus determining and adapting his/her teaching. After the course, the teacher conducts a survey among students to evaluate their subjective impression about the teaching quality, all with the aim to improve future teaching.									

Course title	Plant Physiology	2							
Code	BP756	BP756							
Study	Graduate University	<pre>/ Study Progr</pre>	amme in Biology and	l Chemistry Teache	r Education				
programme									
Semester	I semester								
Workload/ECTS credits	3								
Course status	Obligatory								
Course teacher	Prof. Dr. Janja Horv	atić							
Associate	Assist. Prof. Dr. Ves								
teachers	Martina Varga, Ph.[
	Vera Tikas, expert a	dvisor							
Course entry requirements (Preceding courses)	Cell Biology, Bioche	Cell Biology, Biochemistry 1, Plant Physiology 1							
Course objective	To enable studen	ts to under	rstand a cause-effe	ect relationship o	of chemical and				
	physiological chang	es in the plan	t organism. To enabl	e students to interp	pret physiological				
	changes by linking t	heoretical kr	owledge and the res	ults of experiment	al research.				
Learning		•	tabolic processes in		photosynthesis,				
outcomes			tribution of metaboli						
	· ·		mechanisms of plan	t growth regulators	s and to compare				
			ation in plants.						
		•	s and levels of plant	tissue differentiati	on and the aging				
	process of 4. Ability to e	-	hysiological process	os of plant movom	onto				
		-	I science literacy by						
	· ·		ological changes in pla	-					
Link between				-					
learning	Share		Activities of	Assess	sment				
outcomes,	Learning of	Form of	learning and	Methods of	Grading				
teaching and	outcome ECTS	teaching	teaching	monitoring	Points				
students'				and evaluation	min max				
activities									

	1-4 1,2,5 1-5 1-5 Total Final grade: 60-69.9 poi		Lecture Practice Writter exam Oral exam	active participation Practical classes attendance and active participation Preparation for written exam Preparation for oral exam	re sper with of t R re stude at (with of t	ecords lated to tudent formance provision feedback ecords lated to ent activity practices provision feedback tten exam	6 12 24 18 60	10 20 40 30 100	
Consultation	70-79.9 poi 80-89.9 poi 90-100 poin	nts: grad nts: grad ts: grad	le 3 (good le 4 (very	d) good)					
hours	By appointn	ient							
Teaching Hours - total	Le	ctures		Seminars P			Practices		
Hours - total		30		0			15		
Course content / teaching units	30 0 15 Lectures: Photosynthesis (C3, C4 and CAM plants) Photosynthesis and respiration Cell exchange regulation: inner cell regulation (gene and enzyme activity regulations) Intercellular regulations: plant growth regulators – auxins, gibberellins, cytokinins, ethylene and abscisic acid (chemical composition, biosynthesis, transport, physiological effects and their mechanism) Growth, differentiation and development: levels of differentiation, cause of cell differentiation, plant aging Regulations by ecological factors: effects of temperature and daylight on the growth and plant development Physiology of the plant organelles and/or organ movements Practices: Starch phosphorylase Amylase Influence of GA3 on starch hydrolysis during barley seed germination Influence of kinetin on leaf senescence								
Recommended reading	Taiz L., Zeig	 Influence of auxin on growth Pevalek-Kozlina B. (2003) Fiziologija bilja. Profil, Zagreb. Taiz L., Zeiger E., Moller I.M., Murphy A. (2015) Plant Physiology and Development, 6th ed. Sinauer Associates, Inc. 							
Optional reading	Berg J.M., T	ymoczko	J.L., Strye	er L. (2013) Biokemija. Š	Śkolska	knjiga, Zagr	eb.		
Conditions for obtaining teacher's signature	Regular atte	endance	and active	e participation in lecture	es.				

Exam passing procedure	Before taking oral exam, students are obliged to pass written exam. The final grade is determined according to the number of points for student's performance and the points achieved in written and oral exams.
Main language of instruction; other languages	Croatian language
Method of monitoring the quality and efficiency of teaching	Student survey after the course; reviews during the course and possibility to give oral or written remarks after lectures; monitoring of student success at exams.

Course title	Biological	Collectio	ons			
Code	BP899					
Study programme	Graduate Ur	niversity	Study Program	me in Biology and C	Chemistry Teacher	Education
Semester	II semester					
Workload/ECTS credits	2					
Course status	Obligatory					
Course teacher	Assist. Prof.	Dr. Gora	n Vignjević			
Associate teachers						
Course entry						
requirements						
(Preceding						
courses)						
Course	To develop	students	' skills in appli	cation of methods	for preparation of	various biological
objective				teaching process.	- F -F	
Learning				ogical samples by u	sing appropriate to	ols.
outcomes				of biological mater	• • • •	
	me	thods.				
	3. Usa	ige of ki	nowledge and	skills in assessmer	nt of the most sui	itable methods of
	pre	paring a	certain group o	of living organisms f	for teaching proces	S.
	4. Ma	king of s	tudent's own b	iological collection.		
	5. Ma	king a pr	oposal for a livi	ing corner in the cla	assroom.	
Link between					A	
learning		Share	Forma of	Activities of	Assess	sment
outcomes,	Learning outcome	of	Form of	learning and	Methods of	Grading
teaching and	outcome	ECTS	teaching	teaching	monitoring and	Points
students'					evaluation	min max
activities						

		r	1		ſ					
	1-5	0.25	Lectur	e	Critical conversation and discussion; collaborative learning within analysis of different taxidermy methods	to a partici discuss	s related active pation in ions and alysis	5	10	
	1-5	0.25	Field-bas teachir		Practical application of methods in sampling of biological material, selection of suitable biological material within field classes	to a engage the fie	s related active ement in Id-based rning	5	10	
	1-5	0.5	Practices Oral practice- based exam		Independent preparation of biological collection	Analysis of stuffed material with provision of feedback, preparation of a small collection		10	20	
	1-5	1			Prepared student's own biological collection	me appli taxic detern and st	trol of thods ied for lermy, nination orage of ection	40	60	
	Total Final grade: 60-70 point 71-80 point 81-90 point 91-100 poin	s: grade s: grade s: grade its: grade	3 (good) 4 (very goo	od)				60	100	
Consultation hours	By appointn	nent.								
Teaching	Lectures Seminars Practices									
Hours - total	15 0 30									
Course content / teaching units	Overvie Taxider vertebr Product Making	15030What is a biological collection and how it looks like?Overview of taxidermy methods - possibilities of creating a biological collectionTaxidermy methods of living organisms: protozoa, plants, fungi and lichens, arthropods, vertebratesProduction of permanent and semi-permanent microscopic preparationsMaking of aquariums, terrariums, and living cornersSelection of suitable biological material for field teaching								

Recommended reading	Chinery M. (1989) 1000 ideja za prirodoslovca. Svjetlost, Sarajevo. Durrell G. (1990) Svijet prirode. GZH, Zagreb.
	Various authors (2015) Taxidermy Vol. 9 Bones and Skeletons - The Collection, Preparation and Mounting of Bones, Sigaud Press.
Optional reading	
Conditions for obtaining teacher's signature	Students are obliged to participate in lectures actively and to fulfil all assignments within the course.
Exam passing procedure	During the course, the teacher monitors and evaluates the activities of students by awarding points according to determined criteria. In this way, the teacher provides continuous feedback, which students use to assess their learning progress and to create their own biological collection. After having prepared their biological collection, students take the oral exam. During the oral exam, the teacher checks the applied methods that are related to learning outcomes. The final grade is determined according to the number of points gained during the course and at the oral exam, as well as for preparation of biological collection.
Main language of instruction; other languages	Croatian language
Method of monitoring the quality and efficiency of teaching	During the course, the teacher performs evaluation for learning by continuous monitoring of the learning process and student achievement, thus determining and adapting his/her teaching. After the course, the teacher conducts a survey among students to evaluate their subjective impression about the teaching quality, all with the aim to improve future teaching.

Course title	Conservation Biology
Code	BP91006
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education
programme	
Semester	III semester
Workload/ECTS credits	3
Course status	Obligatory
Course teacher	Assist. Prof. Dr. Nataša Turić
Associate	
teachers	
Course entry	
requirements	
(Preceding	
courses)	
Course objective	To understand the basic concepts of conservation biology as an interdisciplinary science
	that connects the principles of biology and other social and economics sciences, and to develop students' skills in searching for referential scientific literature.
Learning	1. Ability to critically evaluate the basic principles and goals of conservation
outcomes	biology.
	2. Ability to assess negative human influence on the biodiversity of ecological systems.
	3. Ability to assess the role of key species and their importance in living communities.
	4. Acquired knowledge about natural, socio-economic and cultural aspects of protected areas.
	 Awareness about the importance of biological diversity, its conservation and sustainable management of natural resources.

Link between learning		Share		Activities of		Assess	sment		
outcomes, teaching and	Learning outcome	of ECTS	Form of teaching	learning and teaching		hods of hitoring		ding ints	
students'				-		aluation	min	max	
activities	1-5	1	Lecture	Critical conversation and discussion	rela ac partici conve	cords ated to ctive pation in ersations scussions	15	20	
	1-5	1.5	Written exam	Preparation for seminar	Semin	nar paper	25	50	
	1-5	0.5	Oral exam	Preparation for oral exam	Ora	l exam	20	30	
	Total	3					60	100	
Consultation	71-80 points 81-90 points 91-100 poin Wednesdays	s: grade 4 ts: grade	4 (very god 5 (excelle	nt)					
hours	meanesaay	s) II OIII 1							
Teaching	Leo	tures		Seminars	Practices				
Hours - total		30		0			0		
Course content / teaching units	 Biodiversity - importance of species in conservation biology Human influence: human population growth, current human influence, human influence on species extinction, habitat fragmentation Habitat disorders: chemical pollution, introduction of exotic species and diseases, genetically modified organisms, disturbances in ecosystem dynamics Unsustainable management: what is sustainable management, hunting of wild populations, overexploitation of resources Scientific development of conservation biology Selection of protected areas - historical overview, criteria for measuring the value of an area. Design and management of protected areas: management of semi-natural communities, monitoring of changes in protected areas <i>In situ</i> conservation: rarity among species, threat assessment and categorisation, small populations <i>Ex situ</i> conservation: ex situ conservation of plants and animals, reproduction in captivity, reintroduction of species Landscape conservation: landscape ecology and conservation, improvement of species movement in the landscape, preservation of ecosystem function, ecosystem management 								
Recommended reading Optional reading	 Practical application of knowledge in research Groom J.M., Meffe K.G., Carroll R.C. (2006) Principles of Conservation Biology. Sinnauer Associates, Massachusetts. Pullin S.A. (2007) Conservation Biology. CambridgeUniversity Press, New York. DZZP (2008) Izvješće o stanju prirode i zaštite prirode u Republici Hrvatskoj. Zagreb. Hunter M.L. JR., Gibbs J. (2007) Fundamentals of Conservation Biology. 3rd ed. Blackwell Publishing, UK. 								

	Maczulak A. (2010) Biodiversity. Conserving Endangered Species. Facts On File, USA. Magurran A.E. (2010) Measuring Biological Diversity. Blackwell Publishing, UK.
Conditions for obtaining teacher's signature	During the course, the teacher evaluates the activities of students. By regular attendance of lectures, students will be eligible to obtain teacher's signature.
Exam passing procedure	Before taking oral exam, students are obliged to complete the written assignment by preparing and presenting their seminar paper. Points achieved at written and oral exam are added to the points obtained up to the final exam, thus making a total number of points to be converted to final grade.
Main language of instruction; other languages	Croatian language
Method of monitoring the quality and efficiency of teaching	Survey on the subjective impression about the organisation of the course will be carried out after the course; during the course, students will be given an opportunity to make oral or written remarks; the teacher monitors students' success at exams.

Course title	Terrestrial	Ecosyst	tems			
Code						
Study	Graduate Ur	Graduate University Study Programme in Biology and Chemistry Teacher Education				
programme						
Semester	III semester					
Workload/ECTS	2					
credits	2					
Course status	Obligatory					
Course teacher	Prof. Dr. Stje	epan Krč	imar			
Associate						
teachers						
Course entry						
requirements						
(Preceding						
courses)						
Course			-	out the basic findings		-
objective	ecosystems	and terr	estrial biom	es and to teach them l	how to make a synt	hesized approach
	to understa	nding of	terrestrial b	iomes while linking re	elevant information	n about their flora
	and fauna.					
Learning	1. Knowle	dge abo	ut the basic	concepts of ecologica	al systems, and abo	out distribution of
outcomes	terrestr	ial biom	es on Earth.			
				d importance of diffe		
				es and differences be		
			-	hin preparation of a s	eminar paper and i	review of relevant
	scientifi	ic literat	ure.			
Link between		Share		Activities of	٨٢٢٥٢	sment
learning	Learning	of	Form of	learning and	ASSES	Sincil
outcomes, teaching and	outcome	ECTS	teaching	teaching		Grading Points

students' activities					moni	thods of toring and aluation	min	max
	1-3	1	Lecture	Lecture attendance and active participation	Re	ecords, aluation	25	45
	1-4	0.5	Seminar	Independent search for and critical revision of scientific references used in preparation of a seminar paper, and presentation of a seminar paper	asse: pre	ords and ssment of esented nar paper	15	25
	1-4	0.25	Written exam	Preparation for written exam	Writ	ten exam	10	15
	1-4	0.25	Oral exam	Preparation for oral exam	Or	al exam	10	15
	Total	2					60	100
Consultation	Final grade: 60-70 points: grade 2 (sufficient) 71-80 points: grade 3 (good) 81-90 points: grade 4 (very good) 91-100 points: grade 5 (excellent) According to announced schedule							
hours	_					_		
Teaching	L	ectures		Seminars		P	ractices	
Hours - total		15		5			0	
Course content / teaching units	 Lectures: Basic characteristics of an ecosystem Spatial distribution of terrestrial biomes on Earth Comparison of climatic and edaphic characteristics of terrestrial biomes on Earth Comparison of faunal and floristic similarities and differences of terrestrial biomes (tundra, coniferous woods, deciduous woods, grasslands, deserts, tropical rainforests and Mediterranean biome) Seminars: Presentation of a seminar paper referring to biological diversity of selected comparison of terrestrial biomes 							
Recommended reading	Aber J.D., N Chapin S.F. Springer, N	components of terrestrial biomes Aber J.D., Melillo J.M. (2001) Terrestrial ecosystems. Harcourt/Academic Press, San Diego. Chapin S.F.III, Matson P.A., Mooney H.A. (2002) Principles of terrestrial ecosystem ecology. Springer, New York.						
Optional reading	-			of biomes. Gale, Ceng of biodiversity. Acader	-	-		
Conditions for obtaining teacher's signature	Active part	icipation	in lectures,	preparation and prese	entatio	n of a semin	ar paper	

Exam passing procedure	During lectures and seminars, the teachers monitor and evaluate performance of each student, which refers to 70% of the final grade. Passing of written exam refers to 15% of the final grade, and passing of oral exam refers to the remaining 15% of the final grade.
Main language of instruction; other languages	Croatian language
Method of monitoring the quality and efficiency of teaching	Evaluation form

Course title	Teaching Practice in Biology
Code	BP9107
Study programme	Graduate University Study Programme in Biology and Chemistry Teacher Education
Semester	III semester
Workload/ECTS credits	3
Course status	Obligatory
Course teacher	Assist. Prof. Dr. Irena Labak
Associate	
teachers	
Course entry requirements (Preceding courses)	Attended courses: Didactics 1, Pedagogy 1, Pedagogy 2, Psychology in Education 1, Psychology in Education 2, Methodology of Teaching Biology.
Course objective	To enable students to develop knowledge and cognitive skills for independent teaching of biology and for self-assessment of their own professional development aspects.
Learning outcomes	 Skills in preparing teaching material for classes. Ability to deliver teaching independently. Ability to critically evaluate the success of their practice classes by referring to learning and teaching management, evaluation, classroom management and provision of support to each student in their achievement of full personal potential and in achievement of inclusive school culture, based on which each individual can understand the importance of lifelong learning education.

Link between learning		Share			Assessment			
outcomes, teaching and students'	Learning outcome	of ECTS	Form of teaching	Activities of learning and teaching	Methods of monitoring	Grading Points		
activities				5	and evaluation	min	max	
	1-3	1	Observations in schools	Observations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development plan)	Work diary, Completed lesson observation forms, teaching portfolio	10	20	
	1-3	1	Individually realised lecture	Writing of lesson plans and consultations with a mentor. Independent realisation of one teaching hour. (Self)evaluation of a realised teaching hour, creation of a teaching portfolio	Written lesson plan, Form for assessment of delivered lecture, teaching portfolio	25	40	
	1-3	1	Public lecture	Writing of lesson plans and consultations with a mentor Independent realization of one teaching hour for public. (Self)evaluation of a realised teaching hour, creation of a teaching portfolio	Written lesson plan, Form for assessment of delivered lecture, teaching portfolio.	25	40	
	Total Final grade	3				60	100	
			2 (sufficient)					
	71-80 poin	-						

	81-90 points: grade 4 (very go 91-100 points: grade 5 (excell	-				
Consultation hours	By appointment					
Teaching	Lectures	Seminars	Practices			
Hours - total	0	0	30			
Course content / teaching units	 Within this course, students are obliged to participation in direct educational work under supervision of a mentor: observation of mentor's teaching and analysis of lessons with a mentor and colleagues preparation of lesson plans and delivery of individual and public lectures analysis of delivered lectures with a mentor, colleagues and a course teacher creation of a portfolio - reflection forms and professional development plan (3rd outcome) 					
Recommended reading	Reading lists as defined within all obligatory courses. Curriculum documents and textbooks. Selected scientific and professional papers dealing with Biology.					
Optional reading	Reading lists as defined within	all obligatory courses, scientif	ic and popular journals.			
Conditions for obtaining teacher's signature	Students are obliged to participate in lectures actively and to fulfil all assignments within the course.					
Exam passing procedure	During the course, the teacher monitors and evaluates the activities of students by awarding points according to determined criteria. In this way, the teacher provides continuous feedback and supports the self-reflections of students that are required for creation of a teaching portfolio. Students pass the exam upon realisation of one teaching hour (lecture), the success of which is evaluated by a mentor according to defined assessment criteria. The final grade is determined according to the number of points awarded for public lecture and individual lecture delivery, as well as for observations.					
Main language of instruction; other languages	Croatian language					
Method of monitoring the quality and efficiency of teaching	of the learning process and st teaching. After the course, the	r performs evaluation for learni udent achievement, thus deter teacher conducts a survey amo the teaching quality, all with	rmining and adapting his/her ong students to evaluate their			

Course title	Teaching I	Practice	in Chemistry					
Code	K072							
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education							
programme								
Semester	III semester							
Workload/ECTS								
credits	3							
Course status	Obligatory							
Course teacher	Assoc. Prof	. Dr. Vale	ntina Pavić					
Associate								
teachers								
Course entry		Attended courses: Didactics 1, Pedagogy 1, Pedagogy 2, Psychology in Education 1,						
requirements								
(Preceding				logy of Teaching Chen	nistry, Practices i	n Metho	odology	
courses)	of Teaching	g Chemist	ry					
Course	Application	of knov	vledge and cogn	itive skills in indeper	dent realisation	of tead	hing in	
objective				e own professional de			0	
Learning				material for classes.				
outcomes		•	eliver teaching in					
		-	-	the success of their p	practice classes f	rom the	aspect	
		-	-	anagement, evaluatio			-	
		-	-	ach student in their		-		
				nt of inclusive school		•		
Link between								
learning					Assess	ment		
outcomes,	Learning	Share	Form of	Activities of	Methods of Gra		dina	
teaching and			teaching	learning and	wiethous of	Grading Points		
			teaching	-	monitoring	Doi	inte	
students'	outcome	ECTS	teaching	teaching	monitoring	Poi	ints	
-	outcome	ECTS	teaching	-	and	Poi min	ints max	
students'	outcome	ECTS	teaching	teaching	_			
students'		ECTS	teaching	teaching Observations of	and			
students'		ECTS	teaching	teaching Observations of mentor's lessons	and			
students'		ECTS		teaching Observations of mentor's lessons and analysis of	and evaluation			
students'		ECTS	Observations	teaching Observations of mentor's lessons and analysis of observed lessons,	and evaluation Work diary,			
students'	1-3	ECTS		teaching Observations of mentor's lessons and analysis of observed lessons, preparation of a	and evaluation Work diary, Completed			
students'			Observations	teaching Observations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio	and evaluation Work diary, Completed lesson	min	max	
students'			Observations	teaching Observations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms	and evaluation Work diary, Completed lesson observation	min	max	
students'			Observations	teaching Observations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional	and evaluation Work diary, Completed lesson observation forms,	min	max	
students'			Observations	teaching Observations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development	and evaluation Work diary, Completed lesson observation forms, teaching	min	max	
students'			Observations	teaching Observations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development plan)	and evaluation Work diary, Completed lesson observation forms, teaching	min	max	
students'			Observations	teaching Observations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development plan) Writing of lesson	and evaluation Work diary, Completed lesson observation forms, teaching	min	max	
students'			Observations	teaching Observations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development plan) Writing of lesson plans	and evaluation Work diary, Completed lesson observation forms, teaching	min	max	
students'			Observations	teachingObservations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development plan)Writing of lesson plans and consultations	and evaluation Work diary, Completed lesson observation forms, teaching	min	max	
students'			Observations	teachingObservations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development plan)Writing of lesson plans and consultations with	and evaluation Work diary, Completed lesson observation forms, teaching portfolio Written	min	max	
students'			Observations	teaching Observations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development plan) Writing of lesson plans and consultations with a mentor.	and evaluation Work diary, Completed lesson observation forms, teaching portfolio Written lesson plan,	min	max	
students'	1-3	1	Observations in schools	teachingObservations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development plan)Writing of lesson plans and consultations with a mentor. Independent	and evaluation Work diary, Completed lesson observation forms, teaching portfolio Written	min 18	max 30	
students'			Observations in schools	teaching Observations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development plan) Writing of lesson plans and consultations with a mentor. Independent realization of one	and evaluation Work diary, Completed lesson observation forms, teaching portfolio Written lesson plan, Form for assessment	min	max	
students'	1-3	1	Observations in schools	teaching Observations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development plan) Writing of lesson plans and consultations with a mentor. Independent realization of one teaching hour.	and evaluation Work diary, Completed lesson observation forms, teaching portfolio Written lesson plan, Form for assessment of delivered	min 18	max 30	
students'	1-3	1	Observations in schools	teaching Observations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development plan) Writing of lesson plans and consultations with a mentor. Independent realization of one teaching hour. (Self)evaluation of	and evaluation Work diary, Completed lesson observation forms, teaching portfolio Written lesson plan, Form for assessment of delivered lecture,	min 18	max 30	
students'	1-3	1	Observations in schools	teachingObservations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development plan)Writing of lesson plans and consultations with a mentor. Independent realization of one teaching hour. (Self)evaluation of a realised	and evaluation Work diary, Completed lesson observation forms, teaching portfolio Written lesson plan, Form for assessment of delivered lecture, teaching	min 18	max 30	
students'	1-3	1	Observations in schools	teaching Observations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development plan) Writing of lesson plans and consultations with a mentor. Independent realization of one teaching hour. (Self)evaluation of	and evaluation Work diary, Completed lesson observation forms, teaching portfolio Written lesson plan, Form for assessment of delivered lecture,	min 18	max 30	
students'	1-3	1	Observations in schools	teaching Observations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development plan) Writing of lesson plans and consultations with a mentor. Independent realization of one teaching hour. (Self)evaluation of a realised teaching hour, creation of a	and evaluation Work diary, Completed lesson observation forms, teaching portfolio Written lesson plan, Form for assessment of delivered lecture, teaching	min 18	max 30	
students'	1-3	1	Observations in schools	teaching Observations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development plan) Writing of lesson plans and consultations with a mentor. Independent realization of one teaching hour. (Self)evaluation of a realised teaching hour,	and evaluation Work diary, Completed lesson observation forms, teaching portfolio Written lesson plan, Form for assessment of delivered lecture, teaching	min 18	max 30	
students'	1-3	1	Observations in schools	teachingObservations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development plan)Writing of lesson plans and consultations with a mentor. Independent realization of one teaching hour. (Self)evaluation of a realised teaching hour, creation of a teaching portfolio	and evaluation Work diary, Completed lesson observation forms, teaching portfolio Written lesson plan, Form for assessment of delivered lecture, teaching	min 18 21	max 30 35	
students'	1-3	1	Observations in schools	teaching Observations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms and professional development plan) Writing of lesson plans and consultations with a mentor. Independent realization of one teaching hour. (Self)evaluation of a realised teaching hour, creation of a	and evaluation Work diary, Completed lesson observation forms, teaching portfolio Written lesson plan, Form for assessment of delivered lecture, teaching portfolio	min 18	max 30	

	Total 3		and consultations with a mentor. Independent realization of one teaching hour for public. (Self)evaluation of a realised teaching hour, creation of a teaching portfolio	Form for assessment of delivered lecture, teaching portfolio.	60	100	
	Final grade: 60-70 points: grade 2 (suff 71-80 points: grade 3 (goo 81-90 points: grade 4 (ver 91-100 points: grade 5 (ex	od) y good)			I		
Consultation hours	By appointment						
Teaching	Lectures		Seminars	Pra	ctices		
Hours - total	0		0		30		
Course content / teaching units	 Within this course, students are obliged to participation in direct educational work under supervision of a mentor: observation of mentor's teaching and analysis of lessons with a mentor and colleagues preparation of lesson plans and delivery of individual and public lectures analysis of delivered lectures with a mentor, colleagues and a course teacher creation of a teaching portfolio - reflection forms and professional development plan 						
Recommended reading	Reading lists as defined wi Curriculum documents and with Chemistry.			and professional	papers	dealing	
Optional reading Conditions for obtaining teacher's		Reading lists as defined within all obligatory courses, scientific and popular journals. Students are obliged to participate in lectures actively and to fulfil all assignments within					
signature Exam passing procedure	During the course, the teacher monitors and evaluates the activities of students by awarding points according to determined criteria. In this way, the teacher provides continuous feedback and supports the self-reflections of students that are required for creation of a teaching portfolio. Students pass the exam upon realisation of one teaching hour (lecture), the success of which is evaluated by a mentor according to defined assessment criteria. The final grade is determined according to the number of points awarded for public lecture and individual lecture delivery, as well as for observations.						
Main language of instruction; other languages	Croatian language						
Method of monitoring the quality and efficiency of teaching	During the course, the tead of the learning process an teaching. After the course, subjective impression about teaching.	d student the teach	achievement, thus de er conducts a survey a	termining and a mong students t	dapting o evalua	his/her ate their	

Course title	Methodology of Teaching Biology							
Code	BP8102	BP8102						
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education							
programme								
Semester	II semester	II semester						
Workload/ECTS	6							
credits Course status	Obligatory							
Course teacher	Assist. Prof		a Labak					
Associate								
teachers	Nataša Buš	śić, assista	ant					
Course entry								
requirements								
(Preceding								
courses)								
Course		-	students res	ponsibly, independe	ntly and effectively	through	the	
objective	learning pr							
Learning				ment of each stude	nt's potential by di	rect plan	ning of a	
outcomes		aching h						
		-		propriate learning a	-	-	methods,	
	-			ques in order to achie				
				aches and strategies				
				oment of natural scie	•	•		
				cal-thinking skills and		-		
				ogical and didactic a	daptations in work	ing with	students	
		ith specia		ious of too obing and	avalvation in anda			
				view of teaching and onal regulation.	evaluation in order		t student	
Link between	111							
learning		Share		Activities of	Asses	sment		
outcomes,	Learning	of	Form of teaching	learning and	Methods of	Gra	ading	
teaching and	outcome	outcome ECTS		A sea als have		Ula	aing	
students'				teaching	monitoring and		aing ints	
				teaching	monitoring and evaluation		-	
activities				teaching	-	Ро	ints	
activities					evaluation	Ро	ints	
activities				Critical	evaluation Records related	Ро	ints	
activities				Critical conversation and	evaluation Records related to active and	Ро	ints	
activities				Critical conversation and discussion;	evaluation Records related to active and independent	Ро	ints	
activities				Critical conversation and discussion; collaborative	evaluation Records related to active and independent participation in lecture	Po min	ints max	
activities	1-6	1	Lecture	Critical conversation and discussion; collaborative learning and	evaluation Records related to active and independent participation in lecture activities;	Ро	ints	
activities	1-6		Lecture	Critical conversation and discussion; collaborative learning and reciprocal	evaluation Records related to active and independent participation in lecture activities; analysis of	Po min	ints max	
activities	1-6		Lecture	Critical conversation and discussion; collaborative learning and reciprocal teaching;	evaluation Records related to active and independent participation in lecture activities; analysis of performed	Po min	ints max	
activities	1-6		Lecture	Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based	evaluation Records related to active and independent participation in lecture activities; analysis of performed tasks with	Po min	ints max	
activities	1-6		Lecture	Critical conversation and discussion; collaborative learning and reciprocal teaching;	evaluation Records related to active and independent participation in lecture activities; analysis of performed tasks with provision of	Po min	ints max	
activities	1-6		Lecture	Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based	evaluation Records related to active and independent participation in lecture activities; analysis of performed tasks with	Po min	ints max	
activities	1-6		Lecture	Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based	evaluation Records related to active and independent participation in lecture activities; analysis of performed tasks with provision of feedback; portfolio	Po min	ints max	
activities	1-6		Lecture	Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks	evaluation Records related to active and independent participation in lecture activities; analysis of performed tasks with provision of feedback; portfolio Analysis of a	Po min	ints max	
activities	1-6		Lecture	Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent	evaluation Records related to active and independent participation in lecture activities; analysis of performed tasks with provision of feedback; portfolio Analysis of a lesson plan and	Po min	ints max	
activities		1		Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent preparation of a	evaluation Records related to active and independent participation in lecture activities; analysis of performed tasks with provision of feedback; portfolio Analysis of a lesson plan and lesson	Po min 5	ints max 10	
activities	1-6		Lecture	Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent preparation of a lesson plan	evaluation Records related to active and independent participation in lecture activities; analysis of performed tasks with provision of feedback; portfolio Analysis of a lesson plan and lesson simulation with	Po min	ints max	
activities		1		Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent preparation of a lesson plan proposal, simulation of a	evaluation Records related to active and independent participation in lecture activities; analysis of performed tasks with provision of feedback; portfolio Analysis of a lesson plan and lesson simulation with provision of	Po min 5	ints max 10	
activities		1		Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent preparation of a lesson plan proposal,	evaluation Records related to active and independent participation in lecture activities; analysis of performed tasks with provision of feedback; portfolio Analysis of a lesson plan and lesson simulation with provision of feedback;	Po min 5	ints max 10	
activities		1		Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent preparation of a lesson plan proposal, simulation of a teaching hour,	evaluation Records related to active and independent participation in lecture activities; analysis of performed tasks with provision of feedback; portfolio Analysis of a lesson plan and lesson simulation with provision of	Po min 5	ints max 10	

	1	1				1	
				of a video record			
				of simulation			
	2,4,5,6	2	Practices	Independent completion of an experiment, sections, demonstration of inquiry-based learning	Records related to active and independent participation in practical activities; Analysis of completed tasks with provision of feedback portfolio	10	20
	1-6	0.5	Written exam	Preparation for preliminary exam	Preliminary exam	20	30
	1-6	0.5	Oral exam	Preparation for oral exam	Oral exam	5	10
	Total	6				60	100
	Final grade	:					
Consultation	-	ts: grade nts: grad	3 (good) 4 (very goo e 5 (excelle				
hours							
Teaching	Lectures Seminars Practices						
Hours - total		30		15		60	
Course content / teaching units	 Di O(ev fa in di As ta ev M Cc Aj de cr In th Fc Vi Ba 	rect plan utcomes: valuated ctual, com plement rect plan ssessmen xonomy, valuation lotivation oplication evelopme eative- a quiry-bas e develo orms of te sualizatio	ning (currice planning of with the aim neeptual, pr ation of def ning t in direct p self-evaluat and teaching and emotic on of exams of learning ent of natura nd critical-th sed learning pment of na eaching, typ- on of knowle tation of tea	ined curricula in reali ular alignment in crea what is to be learned to develop knowled ocedural, epistemolo ined curriculum of crea lanning, issues related ind, creation of conce g/learning onal regulation throug and assessment of w strategies, methods, al science literacy of s ninking skills , the 5E learning mod itural science literacy es of lessons and pha edge and understandi ching to students wit	tion of lesson plan I (content) and how ge at higher cognit gical and metacog oss-curricular topic d to higher cognitiv epts – correlation I gh teaching and ev ritten knowledge to procedures and te tudents and develo el and out-of-class and other types of ses of a teaching h ng	w it is tau ive levels nitive con cs in teach ve levels, between aluation tests cohniques opment o croom tea f literacy our	ght and in texts; ing and Crooks for f their ching in
Recommended reading	Bognar L., Cindrić M.,	Miljkovi	M. (2005) E ć D., Strugar	Didaktika. Školska knji V. (2010) Didaktika i 011) Teaching usmje	kurikulum. IEP d.o		vine.

Optional reading	Vizek Vidović V., Rijevac M., Vlahović-Štetić V., Miljković D. (2014) Psihologija obrazovanja. IEP, Zagreb. Glasser W. (2005) Kvalitetna škola: škola bez prisile. Educa, Zagreb. Kyriacou (2001) Temeljna nastavna umijeća. Educa, Zagreb Matijević M. (2005) Grading u osnovnoj školi. Tipex, Zagreb. Sekulić Majurec A., Cvetković Lay J. (2008) Darovito je, što ću s njim? Alineja, Zagreb.
	Theobald M.A. (2006) Increasing student motivation. Strategies for Middle and High School Teachers. Corwing Press.
Conditions for obtaining teacher's signature	Students are obliged to participate in lectures actively and to fulfill all assignments within the course.
Exam passing procedure	During the course, the teacher monitors and evaluates the activities of students by awarding points according to determined criteria. The teacher thus provides continuous feedback, which students use to assess their learning progress and to create a portfolio to improve the learning process and their own professional development. During the course, students take two preliminary exams and then they proceed with the oral exam. During the oral exam, the teacher asks questions that are related to learning outcomes. The final grade is determined according to the number of points awarded for preliminary and oral exam and the number of points gained during lectures.
Main language of instruction; other languages	Croatian language
Method of monitoring the quality and efficiency of teaching	During the course, the teacher performs evaluation for learning by continuous monitoring of the learning process and student achievement, thus determining and adapting his/her teaching. After the course, the teacher conducts a survey among students to evaluate their subjective impression about the teaching quality, all with the aim to improve future teaching.

Course title	Methodo	logy of 1	Teaching C	hemistry			
Code	K071			•			
Study	Graduate l	Jniversity	V Study Prog	gramme in Biology and	d Chemistry Teache	r Educati	on
programme	Cradate (,			Laacath	011
Semester	II semester						
	II semester						
Workload/ECTS	3						
credits	Ohlisster						
Course status	Obligatory			1/			
Course teacher	Assist. Pro	t. Dr. Elvi	ra Kovač-Ar	idrić			
Associate							
teachers							
Course entry							
requirements	Passed exa	ms withi	n undergrad	duate study courses ar	nd attended winter	semester	courses:
(Preceding	Pedagogy 3	1, Psycho	logy in Edu	cation 1, School Teach	ing Practice 1.		
courses)							
Course	Developed	skills fo	or successfu	and responsible te	eaching of chemist	try based	d on the
objective	applicatior	n of expe	erimental, p	problem-based and ir	iquiry-based learni	ng in wh	ich each
	student ac	hieves fu	ll personal a	and educational poter	itial.		
Learning	1. Re	ealisatior	of teaching	g in accordance with t	he defined curricul	um.	
outcomes	2. Al	bility to e	valuate tea	ching strategies, meth	ods, procedures, a	nd learnii	ng
				or achievement of che			•
				cal experiments withi			p their
				y in classroom conditi			F
				when working with ch			
				wn teaching and to re		aching ac	tivities
		-		ation and cooperation	•	-	
		evelopeu	Communic				16
		itsida the					
			e school by	exchanging experienc			
	te	aching a	e school by dvancemen	exchanging experience t.	es and finding optir	nal soluti	ons for
	te 6. Al	aching a bility to a	e school by dvancemen ssess the ne	exchanging experience t. eeds of individual stud	es and finding optir lents during their co	mal soluti ognitive le	ons for earning
Link between	te 6. Al	aching a bility to a	e school by dvancemen ssess the ne	exchanging experience t.	es and finding optir lents during their co	mal soluti ognitive le	ons for earning
Link between	te 6. Al	aching a bility to a order to	e school by dvancemen ssess the ne	exchanging experience t. eeds of individual stuc m to acquire knowled	es and finding optir lents during their co ge at higher cogniti	mal soluti ognitive le	ons for earning
learning	te 6. Al in	aching a bility to a order to Share	e school by dvancemen ssess the ne	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of	es and finding optir lents during their co ge at higher cogniti	nal soluti ognitive le ve levels. sment	ons for earning
learning outcomes,	te 6. Al in Learning	aching a bility to a order to Share of	e school by dvancemen ssess the no enable the Form of	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and	es and finding optir lents during their co ge at higher cogniti	nal soluti ognitive le ve levels. sment	ons for earning
learning outcomes, teaching and	te 6. Al in	aching a bility to a order to Share	e school by dvancemen ssess the no enable the	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of	es and finding optir lents during their co ge at higher cogniti Asses	nal soluti ognitive le ve levels. sment Gra	ons for earning
learning outcomes, teaching and students'	te 6. Al in Learning	aching a bility to a order to Share of	e school by dvancemen ssess the no enable the Form of	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and	es and finding optir lents during their co ge at higher cogniti Asses Methods of	nal soluti ognitive le ve levels. sment Gra	ons for earning ding
learning outcomes, teaching and	te 6. Al in Learning	aching a bility to a order to Share of	e school by dvancemen ssess the no enable the Form of	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and	es and finding optir lents during their co ge at higher cogniti Asses Methods of monitoring and	nal soluti ognitive levels. sment Gra Po	ons for earning ding ints
learning outcomes, teaching and students'	te 6. Al in Learning	aching a bility to a order to Share of	e school by dvancemen ssess the no enable the Form of	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and teaching Critical	es and finding optir lents during their co ge at higher cogniti Asses Methods of monitoring and	nal soluti ognitive levels. sment Gra Po	ons for earning ding ints
learning outcomes, teaching and students'	te 6. Al in Learning	aching a bility to a order to Share of	e school by dvancemen ssess the no enable the Form of	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and teaching Critical conversation and	es and finding optir lents during their co ge at higher cogniti Assess Methods of monitoring and evaluation	nal soluti ognitive levels. sment Gra Po	ons for earning ding ints
learning outcomes, teaching and students'	te 6. Al in Learning	aching a bility to a order to Share of	e school by dvancemen ssess the no enable the Form of	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and teaching Critical conversation and discussion,	es and finding optir lents during their co ge at higher cogniti Asses Methods of monitoring and evaluation Records related	nal soluti ognitive levels. sment Gra Po	ons for earning ding ints
learning outcomes, teaching and students'	te 6. Al Learning outcome	aching a bility to a order to Share of	e school by dvancemen ssess the ne enable the Form of teaching	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and teaching Critical conversation and discussion, collaborative	es and finding optir lents during their co ge at higher cogniti Asses Methods of monitoring and evaluation Records related to student	nal soluti ognitive le ve levels. sment Gra Po min	ints
learning outcomes, teaching and students'	te 6. Al in Learning	aching a bility to a order to Share of	e school by dvancemen ssess the no enable the Form of	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and teaching Critical conversation and discussion, collaborative learning by	es and finding optir lents during their co ge at higher cogniti Assess Methods of monitoring and evaluation Records related to student performance at	nal soluti ognitive levels. sment Gra Po	ons for earning ding ints
learning outcomes, teaching and students'	te 6. Al Learning outcome	Share of ECTS	e school by dvancemen ssess the ne enable the Form of teaching	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and teaching Critical conversation and discussion, collaborative learning by analysing various	es and finding optir lents during their co ge at higher cogniti Assess Methods of monitoring and evaluation Records related to student performance at discussions and	nal soluti ognitive le ve levels. sment Gra Po min	ints
learning outcomes, teaching and students'	te 6. Al Learning outcome	Share of ECTS	e school by dvancemen ssess the ne enable the Form of teaching	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and teaching Critical conversation and discussion, collaborative learning by analysing various written	es and finding optir lents during their co ge at higher cogniti Assess Methods of monitoring and evaluation Records related to student performance at discussions and analyses,	nal soluti ognitive le ve levels. sment Gra Po min	ints
learning outcomes, teaching and students'	te 6. Al Learning outcome	Share of ECTS	e school by dvancemen ssess the ne enable the Form of teaching	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and teaching Critical conversation and discussion, collaborative learning by analysing various written documents and	es and finding optir lents during their co ge at higher cogniti Assess Methods of monitoring and evaluation Records related to student performance at discussions and	nal soluti ognitive le ve levels. sment Gra Po min	ints
learning outcomes, teaching and students'	te 6. Al Learning outcome	Share of ECTS	e school by dvancemen ssess the ne enable the Form of teaching	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and teaching Critical conversation and discussion, collaborative learning by analysing various written documents and electronic	es and finding optir lents during their co ge at higher cogniti Assess Methods of monitoring and evaluation Records related to student performance at discussions and analyses,	nal soluti ognitive le ve levels. sment Gra Po min	ints
learning outcomes, teaching and students'	te 6. Al Learning outcome	Share of ECTS	e school by dvancemen ssess the ne enable the Form of teaching	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and teaching Critical conversation and discussion, collaborative learning by analysing various written documents and electronic materials	es and finding optir lents during their co ge at higher cogniti Assess Methods of monitoring and evaluation Records related to student performance at discussions and analyses,	nal soluti ognitive le ve levels. sment Gra Po min	ints
learning outcomes, teaching and students'	te 6. Al Learning outcome	Share of ECTS	e school by dvancemen ssess the ne enable the Form of teaching	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and teaching Critical conversation and discussion, collaborative learning by analysing various written documents and electronic materials Flipped classroom:	es and finding optir lents during their co ge at higher cogniti Assess Methods of monitoring and evaluation Records related to student performance at discussions and analyses, portfolio	nal soluti ognitive le ve levels. sment Gra Po min	ints
learning outcomes, teaching and students'	te 6. Al Learning outcome	Share of ECTS	e school by dvancemen ssess the ne enable the Form of teaching	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and teaching Critical conversation and discussion, collaborative learning by analysing various written documents and electronic materials Flipped classroom: case study	es and finding optir lents during their co ge at higher cogniti Asses: Methods of monitoring and evaluation Records related to student performance at discussions and analyses, portfolio Monitoring of	nal soluti ognitive le ve levels. sment Gra Po min	ints
learning outcomes, teaching and students'	te 6. Al Learning outcome	Share of ECTS	e school by dvancemen ssess the ne enable the Form of teaching	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and teaching Critical conversation and discussion, collaborative learning by analysing various written documents and electronic materials Flipped classroom: case study analysis;	es and finding optin lents during their co ge at higher cogniti Asses: Methods of monitoring and evaluation Records related to student performance at discussions and analyses, portfolio Monitoring of students'	nal soluti ognitive le ve levels. sment Gra Po min	ints
learning outcomes, teaching and students'	te 6. Al Learning outcome	Share of ECTS	e school by dvancemen ssess the ne enable the Form of teaching	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and teaching Critical conversation and discussion, collaborative learning by analysing various written documents and electronic materials Flipped classroom: case study	es and finding optin lents during their co ge at higher cogniti Assess Methods of monitoring and evaluation Records related to student performance at discussions and analyses, portfolio Monitoring of students' performance at	nal soluti ognitive le ve levels. sment Gra Po min	ints
learning outcomes, teaching and students'	te 6. Al in Learning outcome	Share of ECTS	e school by dvancemen ssess the ne enable the Form of teaching Lecture	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and teaching Critical conversation and discussion, collaborative learning by analysing various written documents and electronic materials Flipped classroom: case study analysis;	es and finding optin lents during their co ge at higher cogniti Assess Methods of monitoring and evaluation Records related to student performance at discussions and analyses, portfolio Monitoring of students' performance at interpretations	nal soluti ognitive le ve levels. sment Gra Po min 15	ints 30
learning outcomes, teaching and students'	te 6. Al Learning outcome	Share of ECTS	e school by dvancemen ssess the ne enable the Form of teaching	exchanging experience t. eeds of individual stuc m to acquire knowled Activities of learning and teaching Critical conversation and discussion, collaborative learning by analysing various written documents and electronic materials Flipped classroom: case study analysis; independent	es and finding optin lents during their co ge at higher cogniti Assess Methods of monitoring and evaluation Records related to student performance at discussions and analyses, portfolio Monitoring of students' performance at interpretations and tasks,	nal soluti ognitive le ve levels. sment Gra Po min	ints
learning outcomes, teaching and students'	te 6. Al in Learning outcome	Share of ECTS	e school by dvancemen ssess the ne enable the Form of teaching Lecture	exchanging experience t. eeds of individual stuce m to acquire knowled Activities of learning and teaching Critical conversation and discussion, collaborative learning by analysing various written documents and electronic materials Flipped classroom: case study analysis; independent selection and	es and finding optin lents during their co ge at higher cogniti Assess Methods of monitoring and evaluation Records related to student performance at discussions and analyses, portfolio Monitoring of students' performance at interpretations and tasks, analysis of	nal soluti ognitive le ve levels. sment Gra Po min 15	ints 30
learning outcomes, teaching and students'	te 6. Al in Learning outcome	Share of ECTS	e school by dvancemen ssess the ne enable the Form of teaching Lecture	exchanging experience t. eeds of individual stuce m to acquire knowled Activities of learning and teaching Critical conversation and discussion, collaborative learning by analysing various written documents and electronic materials Flipped classroom: case study analysis; independent selection and completion of an experiment,	es and finding optin lents during their co ge at higher cogniti Asses: Methods of monitoring and evaluation Records related to student performance at discussions and analyses, portfolio Monitoring of students' performance at interpretations and tasks, analysis of created lesson	nal soluti ognitive le ve levels. sment Gra Po min 15	ints 30
learning outcomes, teaching and students'	te 6. Al in Learning outcome	Share of ECTS	e school by dvancemen ssess the ne enable the Form of teaching Lecture	exchanging experience t. eeds of individual stuce m to acquire knowled Activities of learning and teaching Critical conversation and discussion, collaborative learning by analysing various written documents and electronic materials Flipped classroom: case study analysis; independent selection and completion of an experiment, independent	es and finding optin lents during their co ge at higher cogniti Asses: Methods of monitoring and evaluation Records related to student performance at discussions and analyses, portfolio Monitoring of students' performance at interpretations and tasks, analysis of created lesson plans with	nal soluti ognitive le ve levels. sment Gra Po min 15	ints 30
learning outcomes, teaching and students'	te 6. Al in Learning outcome	Share of ECTS	e school by dvancemen ssess the ne enable the Form of teaching Lecture	exchanging experience t. eeds of individual stuce m to acquire knowled Activities of learning and teaching Critical conversation and discussion, collaborative learning by analysing various written documents and electronic materials Flipped classroom: case study analysis; independent selection and completion of an experiment,	es and finding optin lents during their co ge at higher cogniti Asses: Methods of monitoring and evaluation Records related to student performance at discussions and analyses, portfolio Monitoring of students' performance at interpretations and tasks, analysis of created lesson	nal soluti ognitive le ve levels. sment Gra Po min 15	ints 30

				direct educational		dback,		
				process	por	rtfolio		
	1-6	0.5	Written exam	Preparation for written exam	Writte	en exam	10	20
		0.5	Oral exam	Preparation for oral exam	Oral	Oral exam	5	10
	Total	3					50	100
	Final grade	e:						
	50-70 points: grade 2 (sufficient) 71-80 points: grade 3 (good) 81-90 points: grade 4 (very good) 91-100 points: grade 5 (excellent)							
Consultation hours	By appoint	ment						
Teaching	Lectures			Seminars		Practices		
Hours - total	30			15			0	
Course content / teaching units	 Lectures Chemistry as a school as a science and as a Strategies of teachind discovery, group wo Curriculum (specific principles of curricul defining learning our chemistry curricula fil content, methods, for teaching materials) Interdisciplinary teact Teaching in a classro chemicals, developm measures when con that occur as a conset Preparation of teach material and technic unit and individual th evaluation of studer Assessment of know process, social signifie external evaluation, construction of quest achievements, self-a Social and working eduties, professional assignments, professional astivities) 			ng (applying experiments in chemistry teaching, learn rk, pair work, individual work, frontal work) tasks of chemistry teaching and the age of students, lum development, principles of teaching units select tcomes for students, qualitative and quantitative and for primary and secondary school, evaluation of teac orms and results educational work, textbooks and of ching bom (chemistry classroom, laboratory equipment an nent and use of teaching aids, safety and protection ducting experiments in the classroom, misinterpreta equence of the teaching process) ners for teaching (language and speech, psychologica cal preparations for: new school year, individual teac eaching hour, writing of a lesson plan, blackboard pl nt achievements) vledge, abilities and skills (evaluation during the teac ficance of assessment as a measure of value, interna national exams, state graduation exam, the use and stions, students' cognitive abilities and evaluation of				ning by , cion, alysis of ching ther d ations al, ching lan, ching lan, ching land d source ching ching land d source ching land d ching cogical coks, cular

	biologically significant molecules, medicines, addiction)
	Seminars
	• Delivery of demonstration lectures; development of teaching aids and models;
	preparation of a seminar paper related to current topics in chemistry teaching
	methodology, up-to-date achievements in chemistry and their application
	according to the original literature
Recommended	Bognar L., Matijević M. (1993) Didaktika. Školska knjiga, Zagreb.
reading	Sikirica M. (2003) Metodika nastave kemije. Školska knjiga, Zagreb.
Optional	Herak J. (1992) Što, kako i zašto – prilog metodici početne nastave kemije. Školske novine,
reading	Zagreb.
	Herak J. (1985) Uvođenje početnika u kemiju. Školske novine, Zagreb.
	Herron J.D. (1996) The Chemical Classroom: Formulas for Successful Teaching. American
	Chemical Society.
	Radonić F. (1997) Obrazovna tehnologija u nastavi učenja. Biotehnika, Zagreb.
	Raos P. (2004) Nove slike iz kemije. Školska knjiga, Zagreb.
Conditions for	
obtaining	Students are obliged to participate in lectures actively and to fulfill all assignments within
teacher's	the course.
signature	
signature Exam passing procedure	Written and oral exams are taken after attended lectures.
Exam passing	Written and oral exams are taken after attended lectures.
Exam passing procedure	
Exam passing procedure Main language	Written and oral exams are taken after attended lectures. Croatian language
Exam passing procedure Main language of instruction;	
Exam passing procedure Main language of instruction; other	
Exam passing procedure Main language of instruction; other languages	
Exam passing procedure Main language of instruction; other languages Method of monitoring the	Croatian language Continuous monitoring of the learning process and of students' achievement, for the
Exam passing procedure Main language of instruction; other languages Method of monitoring the quality and	Croatian language Continuous monitoring of the learning process and of students' achievement, for the purpose of guiding and adjusting teaching process. Students provide feedback about the
Exam passing procedure Main language of instruction; other languages Method of monitoring the	Croatian language Continuous monitoring of the learning process and of students' achievement, for the

Course title	Basics of	Horticul	ture				
Code	BM861						
Study	Craduata	Lucius anaitu			d Chanaista Taash		ian
programme	Graduate University Study Programme in Biology and Chemistry Teacher Education						
Semester	II semester						
Workload/ECTS	2						
credits	3						
Course status	Obligatory						
Course teacher	Assoc. Pro	f. Dr. Ivna	a Štolfa Čam	agajevac			
Associate	Kaaniin Da	haž laha		viele e			
teachers	Ksenija Do	DOS, IADO	ratory techr	licidii			
Course entry							
requirements	Cormonby	to (nacco	d ovom)				
(Preceding	Cormophy	te (passe	u examj				
courses)							
Course objective	To teach s	tudents a	about princi	oles, theories and co	ncepts in horticult	ure and t	o enable
	them to ur	nderstand	d, apply and	integrate those conc	epts in direct educ	ational w	ork.
Learning		•		pasic concepts of hor	•		
outcomes	-		-	ping, dendrology) inte			der to
				ing outcomes and cu	•		
		•		priate methods of pla		-	on the
		-		sess the importance	of pedological and	climatic	
			in plant bre	-			
		•	•	ew the benefits of ec	o-schools in develo	opment o	f
				and social skills.			
		-		puter image of a sch	-		propriate
	pl	ant speci	ies by respec	cting soil characterist	ics and climatic cor	nditions.	
Link between							
	Share Activities of Assessment						
learning	Learning	Share	Form of	Activities of	Asses	sment	
outcomes,	Learning	of	Form of teaching	learning and	Asses: Methods of		ding
outcomes, teaching and	Learning outcome		Form of teaching			Gra	ding ints
outcomes, teaching and students'	-	of		learning and teaching	Methods of	Gra	-
outcomes, teaching and	-	of		learning and teaching Critical	Methods of monitoring and	Gra Po	ints
outcomes, teaching and students'	-	of		learning and teaching	Methods of monitoring and evaluation	Gra Po	ints
outcomes, teaching and students'	-	of		learning and teaching Critical conversation and discussion;	Methods of monitoring and evaluation Records related	Gra Po	ints
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion; collaborative	Methods of monitoring and evaluation Records related to active and	Gra Po min	ints max
outcomes, teaching and students'	-	of		learning and teaching Critical conversation and discussion; collaborative learning and	Methods of monitoring and evaluation Records related to active and independent	Gra Po	ints
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal	Methods of monitoring and evaluation Records related to active and independent participation in	Gra Po min	ints max
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching;	Methods of monitoring and evaluation Records related to active and independent participation in lecture	Gra Po min	ints max
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based	Methods of monitoring and evaluation Records related to active and independent participation in	Gra Po min	ints max
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching;	Methods of monitoring and evaluation Records related to active and independent participation in lecture activities	Gra Po min	ints max
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks	Methods of monitoring and evaluation Records related to active and independent participation in lecture activities Records related	Gra Po min	ints max
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent	Methods of monitoring and evaluation Records related to active and independent participation in lecture activities Records related to active and	Gra Po min	ints max
outcomes, teaching and students'	outcome 1-3	of ECTS 1	teaching	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of	Methods of monitoring and evaluation Records related to active and independent participation in lecture activities Records related to active and independent	Gra Po min	ints max 20
outcomes, teaching and students'	outcome	of ECTS	Lecture	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory	Methods of monitoring and evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in	Gra Po min	ints max
outcomes, teaching and students'	outcome 1-3	of ECTS 1	Lecture	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of	Methods of monitoring and evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in practical	Gra Po min	ints max 20
outcomes, teaching and students'	outcome 1-3	of ECTS 1	Lecture	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory	Methods of monitoring and evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in	Gra Po min	ints max 20
outcomes, teaching and students'	outcome 1-3 3,4	of ECTS 1 0.5	Lecture	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory	Methods of monitoring and evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in practical activities	Gra Po min 10	ints max 20 20
outcomes, teaching and students'	outcome 1-3	of ECTS 1	teaching Lecture Practices	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory exercises	Methods of monitoring and evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in practical	Gra Po min	ints max 20
outcomes, teaching and students'	outcome 1-3 3,4 1-4	of ECTS 1 0.5	teaching Lecture Practices Written	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory exercises Exam preparation	Methods of monitoring and evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in practical activities Exam	Gra Po min 10 20 20	ints max 20 20 35
outcomes, teaching and students'	outcome 1-3 3,4	of ECTS 1 0.5	teaching Lecture Practices Written exam	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory exercises Exam	Methods of monitoring and evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in practical activities	Gra Po min 10	ints max 20 20
outcomes, teaching and students'	outcome 1-3 3,4 1-4	of ECTS 1 0.5	teaching Lecture Practices Written exam Oral	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory exercises Exam preparation	Methods of monitoring and evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in practical activities Exam	Gra Po min 10 20 20	ints max 20 20 35
outcomes, teaching and students'	outcome 1-3 3,4 1-4 1-4 Total	of ECTS 1 0.5 1 0.5 3	teaching Lecture Practices Written exam Oral	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory exercises Exam preparation	Methods of monitoring and evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in practical activities Exam	Gra Po min 10 20 20 10	ints max 20 20 20 35 25
outcomes, teaching and students'	outcome 1-3 3,4 1-4 1-4 Total Final grade	of ECTS 1 0.5 1 0.5 3	teaching Lecture Practices Written exam Oral	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory exercises Exam preparation Preparation for oral exam	Methods of monitoring and evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in practical activities Exam	Gra Po min 10 20 20 10	ints max 20 20 20 35 25
outcomes, teaching and students'	outcome 1-3 3,4 1-4 1-4 Total Final grade	of ECTS 1 0.5 1 0.5 3 e: tts: grade	teaching Lecture Practices Written exam Oral exam	learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory exercises Exam preparation Preparation for oral exam	Methods of monitoring and evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in practical activities Exam	Gra Po min 10 20 20 10	ints max 20 20 20 35 25

	81-90 points: grade 4 (very g 91-100 points: grade 5 (excel	-	
Consultation hours	By appointment.		
Teaching	Lectures	Seminars	Practices
Hours - total	30	0	15
Course content / teaching units	Lectures: Division and main ch plants, creepers) Basics of vegetable g vegetables Propagation of veget In vitro cultivation Woody plant species Creating a school gas plants, water garden Eco-schools Horticulture in teach Practices:	aracteristics of flower species rowing and the most importar tables and flowers and park landscaping rden: spices and aromatic herb	(annuals, biennials, aquatic nt representatives of os, vegetable, ornamental
Recommended reading	fakultet, Zagreb. Idžojtić M. (2009) Dendrologi Parađiković N., Tkalec M., Zel Poljoprivredni fakultet, Osijek Parađiković N. (2002) Opće i s	a-cvijet, češer, plod, sjeme. Sv ja-list. Sveučilište u Zagrebu, Ši jković S., Kraljičak J., Vinković ⊺	umarski fakultet, Zagreb. T. (2018) Osnove florikulture. ivredni fakultet, Osijek.
Optional reading	Hartmann T.H., Kester D.E., plant propagation : principles Pittenger D.R. (2002) Californ	Davies Jr. F.T., Geneve R.L. (2 and practice. 8th ed. Prentice a Master Gardener Handbook. i bez kemikalija (2010). Mozai	011) Hartmann and Kester's Hall, USA. University of California, USA.
Conditions for obtaining teacher's signature		ipate in lectures actively and t	
Exam passing procedure	awarding points according to feedback, which students use to improve the learning proc course, students take a writt the teacher asks questions	her monitors and evaluates to determined criteria. The teach e to assess their learning progress tess and their own profession en exam, and proceed to oral that are related to learning of number of points awarded for during lectures.	her thus provides continuous ress and to create a portfolio al development. During the exam. During the oral exam, putcomes. The final grade is
Main language of instruction; other languages	Croatian language		
Method of monitoring the quality and efficiency of teaching	of the learning process and st teaching. After the course, the second stress of the course of the second stress of	r performs evaluation for learn udent achievement, thus dete ne teacher conducts a survey pout the teaching quality, all w	rmining and adapting his/her among students to evaluate

Course title	Pedagogy 1								
Code	BP9100	BP9100							
Study	Graduate l	Graduate University Study Programme in Biology and Chemistry Teacher Education							
programme									
Semester	I semester								
Workload/ECTS	3								
credits									
Course status	Obligatory								
Course teacher	Assist. Pro	f. Dr. Iren	ia Labak						
Associate	Nataša Buš	śić assist	ant						
teachers		, 499196							
Course entry									
requirements									
(Preceding									
courses)									
Course objective	To develop system.	student	s' knowledge	e about pedagogical s	cience and its role	in the edu	ucation		
Learning		bility to c	ritically eval	uate pedagogical scie	nce. its foundation	and term	inology		
outcomes		-	-	ical concepts.					
				ement of goals and p	inciples of education	n			
				mporary pedagogical	-		hool		
		actice.		inportary peddgogledi	theory and its relation				
			scass tha aff	fectiveness of educati	onal strategies in t	ho overal	I		
				en, in the identification			I		
		-		self-reflection, and in	•		2000		
							ange.		
		ducation		tific and professional		with the			
Link between	e								
					Asses	sment			
learning	Learning	Share	Form of	Activities of					
outcomes, teaching and	outcome	of	teaching	learning and	Methods of		ding		
students'		ECTS		teaching	monitoring and	Po	ints		
					evaluation	min	max		
activities									
				Critical					
				conversation and	Records related				
				conversation and discussion;	Records related to active				
	1-5	0.5	Locture	conversation and discussion; collaborative		5	10		
	1-5	0.5	Lecture	conversation and discussion; collaborative learning within	to active	5	10		
	1-5	0.5	Lecture	conversation and discussion; collaborative learning within analysis of	to active participation in	5	10		
	1-5	0.5	Lecture	conversation and discussion; collaborative learning within analysis of different types of	to active participation in discussions and	5	10		
	1-5	0.5	Lecture	conversation and discussion; collaborative learning within analysis of different types of information	to active participation in discussions and analysis;	5	10		
	1-5	0.5	Lecture	conversation and discussion; collaborative learning within analysis of different types of	to active participation in discussions and analysis; portfolio	5	10		
	1-5	0.5	Lecture	conversation and discussion; collaborative learning within analysis of different types of information	to active participation in discussions and analysis; portfolio Analysis of	5	10		
	1-5	0.5	Lecture	conversation and discussion; collaborative learning within analysis of different types of information	to active participation in discussions and analysis; portfolio Analysis of completed	5	10		
	1-5	0.5	Lecture	conversation and discussion; collaborative learning within analysis of different types of information sources	to active participation in discussions and analysis; portfolio Analysis of completed tasks with	5	10		
	1-5	0.5	Lecture	conversation and discussion; collaborative learning within analysis of different types of information sources Tasks related to	to active participation in discussions and analysis; portfolio Analysis of completed tasks with provision of	5	10		
	1-5	0.5	Lecture	conversation and discussion; collaborative learning within analysis of different types of information sources Tasks related to professional	to active participation in discussions and analysis; portfolio Analysis of completed tasks with provision of feedback;	5	10		
				conversation and discussion; collaborative learning within analysis of different types of information sources Tasks related to professional development	to active participation in discussions and analysis; portfolio Analysis of completed tasks with provision of feedback; Records related				
				conversation and discussion; collaborative learning within analysis of different types of information sources Tasks related to professional development planning by active	to active participation in discussions and analysis; portfolio Analysis of completed tasks with provision of feedback; Records related to student				
				conversation and discussion; collaborative learning within analysis of different types of information sources Tasks related to professional development planning by active research and peer	to active participation in discussions and analysis; portfolio Analysis of completed tasks with provision of feedback; Records related to student activity in the				
				conversation and discussion; collaborative learning within analysis of different types of information sources Tasks related to professional development planning by active research and peer review; Journal	to active participation in discussions and analysis; portfolio Analysis of completed tasks with provision of feedback; Records related to student activity in the Journal Club;				
				conversation and discussion; collaborative learning within analysis of different types of information sources Tasks related to professional development planning by active research and peer review; Journal Club	to active participation in discussions and analysis; portfolio Analysis of completed tasks with provision of feedback; Records related to student activity in the <i>Journal Club</i> ; portfolio				
				conversation and discussion; collaborative learning within analysis of different types of information sources Tasks related to professional development planning by active research and peer review; Journal	to active participation in discussions and analysis; portfolio Analysis of completed tasks with provision of feedback; Records related to student activity in the Journal Club;				

Consultation	71-80 poin 81-90 poin	ts: grade ts: grade ts: grade nts: grade	Written exam Oral exam 2 (sufficien 3 (good) 4 (very goo le 5 (excelle	od)	provision feedback portfolio Essay Oral exar	<, 5 20	30 10 100
hours Teaching		ectures		Seminars		Practice	5
Hours - total							5
		15		15		15	
Course content	• Sy	stem of	pedagogical	disciplines			
/ teaching units				t of pedagogy			
				and educational prac	tices in the w	orld and in Cr	oatia
		ocialisatio					
		cculturat					
			g and educat al system	lion			
			-	ropological starting p	oints of educ	ation theorie	nrocess
		-	s of educatio		onnes or educa		s, process
				ticipant in education			
			-	d teacher vocation			
		-	al strategies				
	• Ec	ducationa	al strategies	in the education syste	em		
	• As	ssessmer	it in the edu	cation system			
	• Tł	neory of s	school. Lear	ning and teaching			
	● Fa	amily upb	oringing				
		ome edu					
			during free				
				information and com	munication t	echnology	
			al and social				
			work in edu				
			ogy of pedag edagogical r				
				tative paradigm of pe	dagogical res	earch	
Recommended			-	remeljna znanja. Educ			
reading	-			e suvremene pedagog	-	HPKZ, Zagreb	
	-		-	. HKZ "MI", Zagreb.			
Optional	-			ole. Educa, Zagreb.			
reading				<. (2007) Metode istra	-	azovanju. Nal	dada Slap.
				osti o odgoju. Educa, Z		• • 7'	
				Pozitivna disciplina u r		.o.o., ∠agreb.	
Conditions for obtaining teacher's signature		re oblige		ozitivnog mišljenja. IEF nate in lectures activel		all assignmer	its within

Exam passing procedure	During the course, the teacher monitors and evaluates the activities of students by awarding points according to determined criteria. The teacher thus provides continuous feedback, which students use to assess their learning progress and to create a portfolio to improve the learning process and their own professional development. At the end of the course, students write an essay with a critical review of theory and practice, after which they take oral exam. During the oral exam, the teacher asks questions that are related to learning outcomes. The final grade is determined according to the number of points collected for essay and oral exam and the number of points gained during lectures.
Main language of instruction; other languages	Croatian language
Method of monitoring the quality and efficiency of teaching	During the course, the teacher performs evaluation for learning by continuous monitoring of the learning process and student achievement, thus determining and adapting his/her teaching. After the course, the teacher conducts a survey among students to evaluate their subjective impression about the teaching quality, all with the aim to improve future teaching.

Course title	Pedagogy	2					
Code	BP9101						
Study							
programme	Graduate C	Iniversity	Study Progr	amme in Biology and	Chemistry Teache	er Educat	ion
Semester	II semester	Il semester					
Workload/ECTS							
credits	3						
Course status	Obligatory						
Course teacher	Assist. Prof	. Dr. Iren	a Labak				
Associate		.,	_				
teachers	Nataša Buš	ic, assista	ant				
Course entry							
requirements							
(Preceding							
courses)							
Course objective	To teach st	udents h	ow to cherisł	n teaching philosophy	y that ensures scho	ol and c	assroom
-				which each studer			
				arning. To teach stud			-
	stimulating	comm	unication w	ith students, pare	nts, professional	associa	tes and
	community	<i>.</i>					
Learning	1. At	oility to c	reate a schoo	ol environment in wh	ich all students res	spect the	emselves
outcomes	an	d others	and fulfil the	eir personal potential	l.		
	2. At	oility to e	stablish com	munication with stud	lents within which	all ethic	al
	pr	inciples a	are respected	d and which is stimula	ating for building o	f positiv	e
	re	lationshi	ps towards o	neself, others, and le	earning.		
		-	-	luation in a way to su	pport creation of a	a positiv	e image
			and of others				
		-		nples of practical pro	-		
		-		behavioural disorde		-	
			idents with c	lisabilities and of enc	ouraging developn	nent of g	gifted
		udents.					
		-	-	peration and commu			
	pr	otessiona	al associates	in school who can co	ontribute to studen	ts' deve	opment.
Link between					Assess	mont	
learning	Learning	Share	Form of	Activities of	A3565:	Sillent	
outcomes,		of	Form of teaching	learning and	Methods of	Gra	ding
teaching and	outcome	ECTS	teaching	teaching	monitoring	Ро	ints
students'					and evaluation	min	max
activities				Critical			
				conversation and			
				discussion;	Records		
				collaborative	related to		
				learning and	active		
	1-5	0.5	Lecture	reciprocal	participation in	5	10
				teaching within	discussions and		
				analysis of	analysis;		
				different types of	portfolio		
				information			
				sources			
				Flipped	Analysis of a		
				classroom:	Analysis of a lesson plan and		
	1-5	0.75	Seminar	presentation and	related	10	20
	1-2	0.75	Seminar	analysis of a	examples;	10	20
				lesson plan and	portfolio		

	1-5	1	Practices	preparation of proposals for teaching by respecting the learning outcomes and preparation of proposals for improvement of analysed practice	created plans a improv with pr of fee	ysis of d lesson nd their rements rovision dback; cfolio	20	30
	1-5	0.5	Written exam	Writing of an academic essay	Es	say	20	30
	1-5	0.25	Oral exam	Preparation for oral exam	Oral	exam	5	10
	Total	3					60	100
	Final grade							
	60-70 poin	ts: grade	2 (sufficier	nt)				
	71-80 poin	-						
	81-90 poin	-		-				
	91-100 poi		e 5 (excelle	nt)				
Consultation hours	By appoint	ment						
Teaching	Le	ectures		Seminars		Ρ	ractices	
Hours - total		15		15			15	
Course content / teaching units	 wi De Cl. Hi Lee tra de Te Ec St Pr In M Scc Pr pr Gi Er Ela Th Ccc Ccc ar 	th special efinitions assifications assifications assifications associated and provi- eatment evelopme areatypic and action a actical pro- ogram fted ness fted child arciched p ements of are concep- pompetent ommunic ad other r	and termin on and termin on and etiol osition and sions and ir of children ental difficu in the proc and rehabili cal attitudes of inclusion upbringing ed groups, of legal care for oblems of i , personalit d in family a rograms for of a compre- ot of margin ces of the m ation with s members in	ties ess of diagnosis, upbri tation system s	ople with tection ar nging, ed dren and cies and c lities n disabilit ng of gift m for gift and dimen	special n nd early p lucation a youth wit civic educa ies in regu ed childre ed childre nsions of n	eeds rofessior nd rehat h disabili ation ilar educ in and yc marginal	al pilitation ities ational puth ity

	 Cooperation within school, with parents and the community
	Lifelong learning and professional development
Recommended	Bouillet D. (2010) Izazovi integriranog odgoja i obrazovanja. Školska knjiga, Zagreb.
reading	Bouillet D., Uzelac S. (2007) Osnove socijalne pedagogije. Školska knjiga, Zagreb.
	Jensen E. (2004) Različiti mozgovi, različiti učenici - Kako doprijeti do onih do kojih se teško
	dopire. Educa, Zagreb.
Optional reading	Čudina Obradović M. (1991) Nadarenost: razumijevanje, prepoznavanje, razvijanje.
	Školska knjiga, Zagreb.
	Miljković D., Rijavec M. (2015) Pozitivna disciplina u razredu. IEP d.o.o., Zagreb.
	Rijavec M. (2000) Psihologija pozitivnog mišljenja. IEP, Zagreb.
Conditions for	
obtaining	Students are obliged to participate in lectures actively and to fulfil all assignments within
teacher's	the course.
signature	
Exam passing	During the course, the teacher monitors and evaluates the activities of students by
procedure	awarding points according to determined criteria. The teacher thus provides continuous
	feedback, which students use to assess their learning progress and to create a portfolio
	to improve the learning process and their own professional development. At the end of
	the course, students write an essay with a critical review of theory and practice, after
	which they take oral exam. During the oral exam, the teacher asks questions that are
	related to learning outcomes. The final grade is determined according to the number of
	points collected for essay and oral exam and the number of points gained during lectures.
Main language	
of instruction;	Croatian language
other languages	er outrum funguage
Method of	During the course, the teacher performs evaluation for learning by continuous monitoring
monitoring the	of the learning process and student achievement, thus determining and adapting his/her
quality and	teaching. After the course, the teacher conducts a survey among students to evaluate
efficiency of	their subjective impression about the teaching quality, all with the aim to improve future
teaching	teaching.

Course title	Practices	in Phys	ical Chemistry							
Code	K053									
Study	Graduate	Universit	y Study Program	me in Biology and Ch	emistry Teacher	Educati	on			
programme			, , ,	0,						
Semester	I semester	l semester								
Workload/ECTS										
credits	5	5								
Course status	Obligatory									
Course teacher			rtina Medvidović	ć-Kosanović						
Associate	×	c .								
teachers	Matej Sag,	protessi	onal associate							
Course entry										
requirements		~								
(Preceding	Practices i	n Genera	il Chemistry, Ana	lytical Chemistry Lab	oratory Practice					
courses)										
Course objective	To develop	student	s' knowledge abo	out some concepts ar	nd laws of physica	al chemi	stry and			
	to train stu	udents fo	or independent p	ractical work related	to designing and	d perfor	ming an			
	experimen	it by revi	ewing scientific l	iterature.						
Learning	1.	Abilit	y to assess the de	sign and realisation o	of experiments pe	erforme	d during			
outcomes		the co	ourse							
	2.	. Abilit	y to critically eva	luate the obtained a	nd processed ex	perimen	tal data			
		and to	o compare the ob	otained values with t	he published refe	erential	data.			
	3.	. Abilit	y to make conclu	usions about the exa	amined physical	process	and to			
		prese	nt the report abo	out the analysed topi	с.					
Link between										
learning				A	Asses	sment				
outcomes,	Learning	Share	Form of	Activities of	Methods of	Gra	ding			
teaching and	outcome	of	teaching	learning and	monitoring		ints			
students'		ECTS	-	teaching	and					
activities					evaluation	min	max			
				Attendance of						
	6									
				classes;	Records					
				classes; Participation in	related to					
					related to attendance,					
	1-3	2	Laboratory	Participation in classes by asking	related to attendance, control of	5	10			
	1-3	2	Laboratory practices	Participation in classes by asking questions or	related to attendance, control of workbooks,	5	10			
	1-3	2	-	Participation in classes by asking questions or giving	related to attendance, control of workbooks, commenting	5	10			
	1-3	2	-	Participation in classes by asking questions or giving suggestions;	related to attendance, control of workbooks, commenting the obtained	5	10			
	1-3	2	-	Participation in classes by asking questions or giving	related to attendance, control of workbooks, commenting	5	10			
	1-3	2	-	Participation in classes by asking questions or giving suggestions; Experimental work	related to attendance, control of workbooks, commenting the obtained results	5	10			
	1-3	2	practices	Participation in classes by asking questions or giving suggestions; Experimental work Preparation for	related to attendance, control of workbooks, commenting the obtained results Preliminary	5	10			
	1-3	2	-	Participation in classes by asking questions or giving suggestions; Experimental work Preparation for laboratory	related to attendance, control of workbooks, commenting the obtained results Preliminary oral exams,	5	10			
			practices Periodical exams	Participation in classes by asking questions or giving suggestions; Experimental work Preparation for laboratory practices,	related to attendance, control of workbooks, commenting the obtained results Preliminary oral exams, Records					
	1-3	2	practices Periodical exams (preliminary	Participation in classes by asking questions or giving suggestions; Experimental work Preparation for laboratory practices, participation in	related to attendance, control of workbooks, commenting the obtained results Preliminary oral exams, Records related to	5	10 90			
			practices Periodical exams	Participation in classes by asking questions or giving suggestions; Experimental work Preparation for laboratory practices, participation in oral exams prior	related to attendance, control of workbooks, commenting the obtained results Preliminary oral exams, Records related to practical					
			practices Periodical exams (preliminary	Participation in classes by asking questions or giving suggestions; Experimental work Preparation for laboratory practices, participation in oral exams prior to or during	related to attendance, control of workbooks, commenting the obtained results Preliminary oral exams, Records related to practical assignments					
	1-3	3	practices Periodical exams (preliminary	Participation in classes by asking questions or giving suggestions; Experimental work Preparation for laboratory practices, participation in oral exams prior	related to attendance, control of workbooks, commenting the obtained results Preliminary oral exams, Records related to practical	55	90			
			practices Periodical exams (preliminary	Participation in classes by asking questions or giving suggestions; Experimental work Preparation for laboratory practices, participation in oral exams prior to or during	related to attendance, control of workbooks, commenting the obtained results Preliminary oral exams, Records related to practical assignments					
	1-3 Total	3	practices Periodical exams (preliminary	Participation in classes by asking questions or giving suggestions; Experimental work Preparation for laboratory practices, participation in oral exams prior to or during	related to attendance, control of workbooks, commenting the obtained results Preliminary oral exams, Records related to practical assignments	55	90			
	1-3 Total Final grade	3 5 e:	practices Periodical exams (preliminary oral exams)	Participation in classes by asking questions or giving suggestions; Experimental work Preparation for laboratory practices, participation in oral exams prior to or during	related to attendance, control of workbooks, commenting the obtained results Preliminary oral exams, Records related to practical assignments	55	90			
	1-3 Total Final grade 60-70 poir	3 5 e: nts: grade	practices Periodical exams (preliminary oral exams) e 2 (sufficient)	Participation in classes by asking questions or giving suggestions; Experimental work Preparation for laboratory practices, participation in oral exams prior to or during	related to attendance, control of workbooks, commenting the obtained results Preliminary oral exams, Records related to practical assignments	55	90			
	1-3 Total Final grade 60-70 poir 71-80 poir	3 5 e: nts: grado nts: grado	practices Periodical exams (preliminary oral exams) e 2 (sufficient) e 3 (good)	Participation in classes by asking questions or giving suggestions; Experimental work Preparation for laboratory practices, participation in oral exams prior to or during	related to attendance, control of workbooks, commenting the obtained results Preliminary oral exams, Records related to practical assignments	55	90			
	1-3 Total Final gradd 60-70 poir 71-80 poir 81-90 poir	3 5 e: nts: grade nts: grade nts: grade	practices Periodical exams (preliminary oral exams) e 2 (sufficient) e 3 (good) e 4 (very good)	Participation in classes by asking questions or giving suggestions; Experimental work Preparation for laboratory practices, participation in oral exams prior to or during	related to attendance, control of workbooks, commenting the obtained results Preliminary oral exams, Records related to practical assignments	55	90			
	1-3 Total Final grade 60-70 poir 71-80 poir 81-90 poir 91-100 po	3 5 e: nts: grado nts: grado ints: grado ints: grado	practices Periodical exams (preliminary oral exams) e 2 (sufficient) e 3 (good) e 4 (very good) de 5 (excellent)	Participation in classes by asking questions or giving suggestions; Experimental work Preparation for laboratory practices, participation in oral exams prior to or during practical classes	related to attendance, control of workbooks, commenting the obtained results Preliminary oral exams, Records related to practical assignments performance	55 60	90 100			
	1-3 Total Final grade 60-70 poir 71-80 poir 81-90 poir 91-100 po Final exam	3 5 e: nts: grado nts: grado ints: grado ints: grado ints: grado	practices Periodical exams (preliminary oral exams) e 2 (sufficient) e 3 (good) e 4 (very good) de 5 (excellent) ed minimum nun	Participation in classes by asking questions or giving suggestions; Experimental work Preparation for laboratory practices, participation in oral exams prior to or during	related to attendance, control of workbooks, commenting the obtained results Preliminary oral exams, Records related to practical assignments performance	55 60	90 100			

Consultation hours	Consultation hours are held	during the laboratory practices				
Teaching	Lectures	Seminars	Practices			
Hours - total	0 0 60					
Course content / teaching units	 Calorimetry (enthalpy of neutralisation) Equilibrium constant (Nernst's division law) Potentiometry 1 (pH measurement) Potentiometry 2 (potentiometric titration of NaOH with HCl) Conductometry (conductivity of electrolytes) Conductometric titration Transference number (the Hittorf method) Chemical kinetics (hydrogen peroxide decomposition) Spectrophotometry (the Lambert-Beer law) Physical properties of liquids 1 (viscosity) Physical properties of liquids 2 (surface tension) 					
Recommended reading	Medvidović-Kosanović M. (2	012) Praktikum fizikalne kemij nayera u Osijeku, Odjel za biolo				
Optional reading	Atkins P.W., Atkins J.de P. (2 Atkins P.W., Clugston M.J. (1	002) Physical Chemistry. Oxforo 989) Načela fizikalne kemije. Šk čke veličine i jedinice Međunaro	d University Press, Oxford. kolska knjiga, Zagreb.			
Conditions for obtaining teacher's signature	Students are obliged to parti	cipate in lectures actively and t g notes by using forms for prac	_			
Exam passing procedure	Preliminary oral exams are taken before each practice. The final grade refers to average grades achieved at individual practical classes (including results of preliminary exams, performance of practices and completed forms for practices). Final exam has to be taken if students did not achieve the minimum number of points during practical classes and preliminary exams.					
Main language of instruction; other languages		preliminary exams. Croatian language, English language				
Method of monitoring the quality and efficiency of teaching	Continuous communication l survey.	between teacher and students	and anonymous student			

Course title		in Meth	nodology of	Teaching Chemistr	y		
Code	K073		<u> </u>				
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education						
programme	II semester						
Semester Workload/ECTS	Il semeste	er					
credits	3						
Course status	Obligator	v					
Course teacher			ira Kovač-And	lrić			
Associate teachers	Nataša Bu						
Course entry requirements (Preceding courses)	courses:		_	uate study courses ar gogy 1, School Teach		semeste	r
Course objective	responsib	le perfor	mance of ex	ge and skills that a periments for the p e learning and teachir	urpose of natural	•	
Learning outcomes	n 2. A 3. A 4. A 1i 5. A 5. S 6. S	 measures in the chemical laboratory and the basic rules of handling chemicals and reagents. Ability to direct research-based learning and teaching to develop critical- and creative-thinking skills. Ability to understand basic chemical concepts by using models. Ability to choose appropriate experiments to develop students' natural science literacy. Ability to achieve learning outcomes prescribed by the curriculum through strategies, methods and procedures of teaching and evaluation. 					
Link between learning	Learning	Share	Form of	t teaching process. Activities of	Asses	sment	
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching	Methods of monitoring and evaluation		iding ints max
activities	1-6	2	Practices	Independent completion of an experiment, demonstration of inquiry-based learning, preparation of models	Records related to performance of laboratory practices and other activities, analysis with provision of feedback, critical review – evaluation as learning	35	60
	1-6	0.5	Written exam	Preparation for preliminary exam	Preliminary exam	20	30
	1-6	0.5	Oral exam	Preparation for oral exam	Oral exam	5	10
	Total	3				60	100
	Final grad 60-70 poi		e 2 (sufficient	:)			

	71-80 points: grade 3 (good 81-90 points: grade 4 (very g 91-100 points: grade 5 (exce	good)						
Consultation hours	By appointment							
Teaching	Lectures Seminars Practices							
Hours - total	0 0 60							
Course content / teaching units	 and protection mean chemicals and reage chemicals in chemis classes Experiments related Types of substances Salts; Non-metals a Chemical kinetics; C compounds with ox important compourd 	pratory work in school: Basic ru isures in chemical laboratory; E ents; First aid in chemical labor stry teaching; Preparation of so d to teaching units; Introductio s; Separation of mixtures; Meta nd their compounds; Water an Carbon and organic compounds sygen; Biologically important co nds of models in teaching chemisti	Basic rules for handling atory; Use of household dutions and reagents in n to school experiment; als and their compounds; d hydrogen; Oxygen and air; s; Hydrocarbons; Organic ompounds; Synthetically					
Recommended	Sikirica M. (2011) Zbirka kem	nijskih pokusa za osnovnu i srec						
reading Optional reading	Zagreb.	emistry Experiments. Association						
	Journal of Chemical Educatic Society, New York. Kostović-Vranješ V. (2015) N knjiga, Zagreb. Marin G., Ruić R., Cindrić M. Školska knjiga, Zagreb.	hinstry Experiments. Associated on, Division of Chemical Educat letodika nastave predmeta prir . (2009) Projektna nastava prir nastave kemije. Školska knjiga,	ion of the American Chemical odoslovnog područja. Školska ode, biologije, fizike i kemije.					
Conditions for obtaining teacher's signature	Students are obliged to part keep records on performed	icipate in lectures actively, to p practices.	ass preliminary exams and to					
Exam passing procedure	Monitoring and evaluation of students' performance by awarding points according to determined criteria. Students receive continuous feedback from the teacher after each practice class. Students can assess their learning progress within preparation of papers. Preliminary exams are taken prior to each practice class, and oral exam is taken after completion of practices. The final grade is determined according to the number of points awarded for preliminary and oral exam and the number of points obtained during lectures.							
Main language of instruction; other languages	Croatian language							
Method of monitoring the quality and efficiency of teaching	purpose of guiding and adjust	he learning process and of stu sting teaching process. Student used in improvements of futur	s provide feedback about the					

Course title Psychology in Education 1 Code BP798 Graduate University Study Programme in Biology and Chemistry Teacher Education programme Semester Semester I semester Workload/ECTS credits 3 Course status Obligatory Course teacher Associate Associate Marija Milić, Ph.D. Course entry requirements (Preceding courses) Completed undergraduate study Course ontry requirements objective To introduce students to the practical aspects of psychology of education. Learning outcomes 1. Ability to critically review the relevant scientific literature referring to psychology of education. 2. Ability to assess the importance of a scientific approach to the research into mental processe, characteristics and behaviours of students in learning and teaching. 3. Knowledge about correlation between biological basis of behaviour and theorie about learning and trie application in the process of learning and teaching. 4. Ability to analyse the relations among the cognitive development, personality traits and the educational process. 6. Ability to explain relations among the cognitive development, personality traits and the educational process. 7. Ability to predict possible difficulties in working with students with developmental disabilities and students with behavioural disorders.
Study programme Graduate University Study Programme in Biology and Chemistry Teacher Education Semester I semester Workload/ECTS credits 3 Course status Obligatory Course teacher Associate Associate Marija Milić, Ph.D. Course entry requirements courses) Completed undergraduate study Course objective To introduce students to the practical aspects of psychology of education. Learning outcomes 1. Ability to critically review the relevant scientific literature referring to psychology of education. 2. Ability to assess the importance of a scientific approach to the research into mental processes, characteristics and behaviours of students in learning and teaching. 3. Knowledge about correlation between biological basis of behaviour and theorie about learning and their application in the process of learning and teaching. 4. Ability to campare and differentiate between the development stages of an individual. 5. Ability to critically determine the appropriate teaching methods and the specifics of teaching students with learning disabilities, students with developmental disabilities and students with behavioural disorders. 8. Ability to critically determine the appropriate teaching methods and the specifics of teaching students with learning disabilities, students with developmental disabilities in working with students with disabilities and skills in finding possible obliticuties in working with students with disabilities
programme Semester I semester Semester I semester I semester Workload/ECTS 3 Course status Obligatory Course status Obligatory Associate Associate Associate Marija Milić, Ph.D. Course entry Course entry requirements (Preceding courses) Completed undergraduate study Completed undergraduate study Course objective To introduce students to the practical aspects of psychology of education. Learning outcomes 1. Ability to critically review the relevant scientific literature referring to psychology of education. 2. Ability to assess the importance of a scientific approach to the research into mental processes, characteristics and behaviours of students in learning and teaching. S. Knowledge about correlation between biological basis of behaviour and theorie about learning and their application in the process of learning and teaching. 4. Ability to compare and differentiate between the development, personality traits and the educational process. S. Ability to explain relations among the cognitive development, personality traits and the educational process. 3. Ability to predict possible difficulties in working with students with disabilities and skills in finding possible officulties in working with students with disabilities and skills in finding possible officulties in morking with students with disabilities and skills in finding possible officulties in morking methods and the specifics o
Semester I semester Workload/ECTS credits 3 Course status Obligatory Course teacher Assoc. Prof. Dr. Daniela Šincek Associate teachers Marija Milić, Ph.D. Course entry requirements (Preceding courses) To introduce students to the practical aspects of psychology of education. Course objective To introduce students to the practical aspects of psychology of education. Learning outcomes 1. Ability to critically review the relevant scientific literature referring to psychology of education. 2. Ability to assess the importance of a scientific approach to the research into mental processes, characteristics and behaviours of students in learning and teaching. 3. Knowledge about correlation between biological basis of behaviour and theorie about learning and their application in the process of learning and teaching. 4. Ability to analyse the relations among the cognitive development, personality traits and the educational process. 6. Ability to explain relations among the cognitive development, personality traits and the educational process. 7. Ability to ortically determine the appropriate teaching methods and the specifics of teaching students with learning disabilities, students with developmental disabilities and students with learning disabilities and skills in finding possible odificuities in working with students with disabilities and skills in finding possible odificuities in morking with students with disabilities and skills in finding possible solutons.
Workload/ECTS credits 3 Course status Obligatory Course status Obligatory Course teacher Associate teachers Marija Milić, Ph.D. Course entry requirements (preceding courses) Completed undergraduate study Course objective To introduce students to the practical aspects of psychology of education. Learning outcomes 1. Ability to critically review the relevant scientific literature referring to psychology of education. 2. Ability to assess the importance of a scientific approach to the research into mental processes, characteristics and behaviours of students in learning and teaching. 3. Knowledge about correlation between biological basis of behaviour and theorie about learning and their application in the process of learning and teaching. 4. Ability to compare and differentiate between the development stages of an individual. 5. Ability to analyse the relations among teaching process, memory process and learning outcomes. 6. Ability to critically determine the appropriate teaching methods and the specifics of teaching students with behavioural disorders. 8. Ability to predict possible difficulties in working with students with disabilities and skills in finding possible solutons. 1. Link between learning outcomes, teaching and Share of f of f corr of teaching Activities of learning and teaching
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 4. Ability to compare and differentiate between the development stages of an individual. 5. Ability to analyse the relations among teaching process, memory process and learning outcomes. 6. Ability to explain relations among the cognitive development, personality traits and the educational process. 7. Ability to critically determine the appropriate teaching methods and the specifics of teaching students with learning disabilities, students with developmental disabilities and students with behavioural disorders. 8. Ability to predict possible difficulties in working with students with disabilities and skills in finding possible solutions.
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8. Ability to predict possible difficulties in working with students with disabilities and skills in finding possible solutions. Link between learning outcomes, teaching and teaching and Share of ECTS Share of ECTS Form of teaching Activities of learning and teaching Methods of Grading Points
Link between learning outcomes, teaching and Learning outcome
Link between learning outcomes, Learning outcome Control outcome Share of ECTS ECTS Form of teaching and teaching monitoring Points
learning outcomes, teaching and Learning outcome Share of ECTS Form of teaching Activities of learning and teaching Assessment Methods of teaching Outcome Form of teaching Activities of teaching Methods of monitoring Grading
teaching and Learning Of Learning outcome Share Of ECTS Share Form of teaching and Learning and Learning and Learning and Learning and Methods of Grading Points
teaching and Outcome ECTS teaching teaching monitoring Points
teaching and ECTS teaching teaching monitoring Points
students' and evaluation min max
activities Critical
1-8 0.5 Lecture conversation Records
and discussion
Interpretation
of scientific
papers and Monitoring of
application of students'
1-8 0.75 Seminars obtained performance at 12 20
results in interpretations
concepts and tasks
learned within
lectures
Work on Monitoring of
1-8 0.5 Practices practical student 0 5

			Written	Preparation				
	1-8	0.75		for written	Written exam	36	55	
			exam	exam				
	1.0	0.5	Oral avera	Preparation	Oral avera	10	20	
	1-8	0.5	Oral exam	for oral exam	Oral exam	12	20	
	Total	3				60	100	
	Final grade:							
	All above-me	ntioned e	lements of mo	nitoring of studen	ts' performance a	re evalua	ated	
	-	-	o the publicly a	available evaluatio	on criteria that stu	dents ar	e	
	familiar with.							
	-			-	esting of knowled		-	
			-		the success at fina		-	
		-	-	-	ade, but it is add			
					f monitoring stud	ents' pr	ogress.	
	Records on st	udent act	ivity are taken	during each lectu	re.			
	Final grade:							
	-	nointe: a	rade 2 (sufficie	ant)				
			rade 3 (good)					
			rade 3 (good) rade 4 (very go	(boc				
			ade 5 (excelle					
Consultation				-	tment; written an	d oral		
hours	consultations				,			
Teaching		tures		Seminars	Pr	actices		
Hours - total					45			
	-	15		15		15		
Course content	Intro	duction t	o scientific psy	chology				
/ teaching units			ducational psy					
			s of behaviour					
	Deve	elopment	of an individua	al				
	Cogr	nitive abili	ties and creativ	vity				
	Pers	onality an	d individual di	fferences				
	 Men 	nory						
	 Lear 	ning						
	Stud	ents with	learning disab	ilities and special	educational needs			
Recommended	Vizek-Vidović	V., Vlaho	vić-Štetić V., Ri	javec M., Miljkovi	ć, D. (2003) Psihol	ogija		
reading	obrazovanja. IEP- VERN, Zagreb.							
					ition). Naklada Sla		ebarsko.	
Optional			· /		lada Slap, Jastreba	rsko.		
reading				ap, Jastrebarsko.	in the set of Xing	-1 1		
		кі D. (200	9) Primijenjena	i psinologija: pitar	ija i odgovori. Škol	ska knjig	ga,	
	Zagreb.	hović M (*	1001) Nadaron	oct: razumijovanje	e, prepoznavanje, I	razvijani	0	
	Školska knjiga	-	1991) Nauaren	Ust. Tazurnijevanje	e, prepoznavanje, i	azvijarij	с.	
		-	MI Wake W	K (1999) Intelige	ncija. Naklada Slap	lastrek	narsko	
			-		aklada Slap, Jastrel	-	Jui sko.	
). Naklada Slap, Jas		ko.	
					promijenile psiholo			
	Slap, Jastreba				, <u>,</u> ,	5,		
			elji psihologije	. Naklada Slap, Ja	strebarsko.			
		-		oteškoće. ITP For				
	· · ·	-			practice (10th ed.).	Pearsor	n, New	
	York.							
			/liller S.A. (2004	4) Dječja psihologi	ja (3rd edition). N	aklada S	lap,	
	Jastrebarsko.							
	Articles publi	shed in pe	eriodicals.					

Conditions for obtaining teacher's signature	Students are obliged to participate in lectures actively and to fulfil all assignments within the course.
Exam passing procedure	Preliminary exams during the course (assignments, homework). Final exam consists of written exam, of problem-solving task and of final oral exam.
Main language of instruction; other languages	Croatian language
Method of monitoring the quality and efficiency of teaching	Continuous communication between teacher and students and anonymous student survey.

Course title	Psycholog	y in Edu	cation 2						
Code	BP798-2								
Study	Graduate University Study Programme in Pielegy and Chemistry Teacher Education								
programme	Graduate University Study Programme in Biology and Chemistry Teacher Education								
Semester	Il semester								
Workload/ECTS credits	3								
Course status	Obligatory								
Course teacher	Assoc. Prof	. Dr. Dan	iela Šincek						
Associate teachers	Ivana Duvn	ijak, assis	tant						
Course entry requirements (Preceding courses)	Completed undergraduate study; attended course Psychology in Education 1 (or equivalent)								
Course	To introduo	ce studer	its to the pra	ctical aspects of psy	chology of educatio	on.			
objective			-						
Learning outcomes	 Ability to determine the correlation between different theories of motivation and emotions and theories of learning and their application in the process of learning and teaching. Skills required in analysis of teaching procedures that are directed to students' motivation. Ability to critically analyse various factors of success and failure. Ability to critically analyse processes related to classroom and discipline management. Knowledge about importance of different group processes and group dynamics for successful classroom and discipline management. Skills in planning different methods of knowledge assessment in individual academic domains. Ability to predict possible difficulties in achieving classroom discipline and skills in creating possible solutions. Ability to critically evaluate and compare alternative approaches to education. 								
learning		Share		Activities of	Asses	sment			
outcomes,	Learning	of	Form of	learning and	Methods of	Gra	ding		
teaching and	outcome	ECTS	teaching	teaching			rading Points		
students'		Leis		teaching	monitoring and				
activities	1-8	0.5	Lecture	Critical conversation and discussion	evaluation Records	min -	max -		
	1-8 0.75 1-8 0.5		Seminars	Interpretation of scientific papers and application of obtained results in concepts learned within lectures	Monitoring of students' performance at interpretations and tasks	12	20		
			Practices	Work on	Monitoring of student	0	5		
	1-8	0.75	Written exam		performance Written exam	36	55		
			Written	assignment Preparation for		36 12	55 20		

	All above-mentioned elements of monitoring of students' performance are evaluated and graded according to the publicly available evaluation criteria that students are							
	familiar with. The final grade refers to continuous monitoring and testing of knowledge (preliminary exams are taken in written and practical form) and to the success at final exam. Activity of students during lectures is not part of the final grade, but it is added to the total number of points achieved within other elements of monitoring students' progress. Records on student activity are taken during each lecture.							
	Final grade: Od 60-69.9 points: grade 2 (sufficient) Od 70-79.9 points: grade 3 (good) Od 80-89.9 points: grade 4 (very good) Od 90-100 points: grade 5 (excellent)							
Consultation hours	According to defined schedule consultations.	e and by individual appointmen	t; written and oral					
Teaching	Lectures	Seminars	Practices					
Hours - total								
	15	15	15					
Course content / teaching units	 Motivation Understanding of emotions - the role of emotions in the learning process Teaching Planning of lessons 							
	 Assessment and evaluation of knowledge Evaluation of teacher's performance Group processes and group dynamics Classroom management and discipline Inappropriate behaviour Alternative approaches to education. 							
Recommended reading	Vizek-Vidović V., Vlahović-Šte IEP- VERN, Zagreb.	tić V., Rijavec M., Miljković D. (2	003) Psihologija obrazovanja.					
Optional reading								
Conditions for obtaining teacher's signature	Students are obliged to partic the course.	ipate in lectures actively and to	o fulfil all assignments within					
Exam passing procedure		course (assignments, homework ving task and of final oral examination of the state	-					
Main language of instruction; other languages	Croatian language							

Method of monitoring the quality and efficiency of teaching	Continuous communication between teacher and students and anonymous student survey.
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Course title	Study Visit									
Code	BP9112									
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education									
programme	stadate onversity stady riogramme in biology and chemistry reacher Education									
Semester	III semester									
Workload/ECTS	ווו זכוווכזוכו									
credits										
Course status	Obligatory									
Course teacher			na Mlinarić							
			ta Galir Balk	ić						
Associate										
teachers										
Course entry										
requirements										
(Preceding										
courses)										
Course	To introdu	ce studer	nts to the or	ganisation and implen	nentatio	on of teachir	ng and to	facilitate		
objective				dy of the surrounding						
				ite observed occurre		•				
		-	ught in scho							
Learning			-	biology by performin	ng pract	ices on field	l.			
outcomes		-	-	sit within the field stu				visits to a		
		•	•	nument or a certain n	•					
				ces related to organi	•			xcursions		
		ith exper	-							
		•		ut the importance of s	school c	ooperatives	5.			
Link between				·						
learning	Share Activities of Assessment									
	learning Form of Form									
outcomes,	-	of			Met	hods of	Gra	ading		
-	Learning outcome		Form of teaching	learning and				ading bints		
outcomes,	-	of			monit	oring and		-		
outcomes, teaching and	outcome	of	teaching	learning and teaching	monit eva	oring and luation	Ро	oints		
outcomes, teaching and students'	-	of		learning and teaching Organisation of a	monit eva	oring and	Ро	oints		
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching	monit eva	oring and luation	Ро	oints		
outcomes, teaching and students'	outcome 1-4 Final grade	of ECTS	teaching Practices	learning and teaching Organisation of a study visit	monit eva	oring and luation	Ро	oints		
outcomes, teaching and students'	outcome 1-4 Final grade 60-70 poin	of ECTS e: its: grade	Practices	learning and teaching Organisation of a study visit	monit eva	oring and luation	Ро	oints		
outcomes, teaching and students'	outcome 1-4 Final grade 60-70 poin 71-80 poin	of ECTS e: its: grade its: grade	Practices 2 (sufficien 3 (good)	learning and teaching Organisation of a study visit	monit eva	oring and luation	Ро	oints		
outcomes, teaching and students'	outcome 1-4 Final grade 60-70 poin 71-80 poin 81-90 poin	of ECTS e: its: grade its: grade its: grade	Practices	learning and teaching Organisation of a study visit at)	monit eva	oring and luation	Ро	oints		
outcomes, teaching and students'	outcome 1-4 Final grade 60-70 poin 71-80 poin 81-90 poin	of ECTS e: its: grade its: grade its: grade ints: grade	Practices 2 (sufficient 3 (good) 4 (very good	learning and teaching Organisation of a study visit at)	monit eva	oring and luation	Ро	oints		
outcomes, teaching and students' activities	outcome 1-4 Final grade 60-70 poin 71-80 poin 81-90 poin 91-100 poi	of ECTS e: its: grade its: grade its: grade ints: grade	Practices 2 (sufficient 3 (good) 4 (very good	learning and teaching Organisation of a study visit at)	monit eva	oring and luation	Ро	oints		
outcomes, teaching and students' activities Consultation	outcome 1-4 Final grade 60-70 poin 71-80 poin 81-90 poin 91-100 poi By appoint	of ECTS e: its: grade its: grade its: grade ints: grade	Practices 2 (sufficient 3 (good) 4 (very good	learning and teaching Organisation of a study visit at)	monit eva	ecords	Ро	ints max -		
outcomes, teaching and students' activities Consultation hours Teaching	outcome 1-4 Final grade 60-70 poin 71-80 poin 81-90 poin 91-100 poi By appoint	of ECTS e: ts: grade ts: grade ts: grade ints: grade ints: grade ints: grade ints: grade	Practices 2 (sufficient 3 (good) 4 (very good	learning and teaching Organisation of a study visit at) od) nt) Seminars	monit eva	ecords	Po min - Practices	ints max -		
outcomes, teaching and students' activities Consultation hours	outcome 1-4 Final grade 60-70 poin 71-80 poin 81-90 poin 91-100 poi By appoint	of ECTS e: its: grade its: grade its: grade ints: grade ints: grade	Practices 2 (sufficient 3 (good) 4 (very good	learning and teaching Organisation of a study visit at) od) nt)	monit eva	ecords	Po min -	ints max -		
outcomes, teaching and students' activities Consultation hours Teaching	outcome 1-4 Final grade 60-70 poin 71-80 poin 81-90 poin 91-100 poi By appoint	of ECTS e: its: grade its: grade its: grade ints: grade ints: grade ment. ectures	teaching Practices 2 (sufficien 3 (good) 4 (very goo e 5 (excelle	learning and teaching Organisation of a study visit at) od) nt) Seminars 0	monit eva Re	ecords	Practices	ints max -		
outcomes, teaching and students' activities Consultation hours Teaching Hours - total Course content	outcome 1-4 Final grade 60-70 poin 71-80 poin 81-90 poin 91-100 poi By appoint L Field t	of ECTS e: tts: grade tts: grade tts: grade ints: grade	teaching Practices 2 (sufficient 3 (good) 4 (very good) 5 (excelle with the pu	learning and teaching Organisation of a study visit at) od) nt) Seminars 0 urpose of acquiring k	monit eva Re	ecords	Practices	ints max -		
outcomes, teaching and students' activities Consultation hours Teaching Hours - total	outcome 1-4 Final grade 60-70 poin 71-80 poin 81-90 poin 91-100 poi By appoint L Field t anima	of ECTS e: tts: grade tts: grade ints: gra	teaching Practices 2 (sufficien 3 (good) 4 (very good) 5 (excelle with the pu in the surro	learning and teaching Organisation of a study visit tt) od) nt) Seminars 0 urpose of acquiring k unding area	monit eva Re	ecords	Po min - Practices 30 fferent p	bints max -		
outcomes, teaching and students' activities Consultation hours Teaching Hours - total Course content	outcome 1-4 Final grade 60-70 poin 71-80 poin 81-90 poin 91-100 poi By appoint L Field t anima Observ	of ECTS ECTS e: tts: grade tts: grade ints: grade ints	teaching Practices 2 (sufficien 3 (good) 4 (very good) 5 (excelle) with the pu in the surro spatial distr	learning and teaching Organisation of a study visit at) od) nt) Seminars 0 urpose of acquiring k unding area ibution of plants and	monit eva Re nowleda	ecords ge about di in the envi	Practices 30 fferent p	olant and		
outcomes, teaching and students' activities Consultation hours Teaching Hours - total Course content	outcome 1-4 Final grade 60-70 poin 71-80 poin 81-90 poin 91-100 poi By appoint L Field t anima Observ Introd	of ECTS e: tts: grade tts: grade	teaching Practices Control Pra	learning and teaching Organisation of a study visit tt) od) nt) Seminars 0 urpose of acquiring k unding area	monit eva Re nowleda	ecords ge about di in the envi	Practices 30 fferent p	olant and		
outcomes, teaching and students' activities Consultation hours Teaching Hours - total Course content	outcome 1-4 Final grade 60-70 poin 71-80 poin 81-90 poin 91-100 poi By appoint L Field t anima Observ Introd of-clas	of ECTS e: tts: grade tts: grade	teaching Practices 2 (sufficient 3 (good) 4 (very good) 5 (excelle) with the put in the surro spatial distripted the princip	learning and teaching Organisation of a study visit at) od) nt) Seminars 0 urpose of acquiring k unding area ibution of plants and les of field work and	monit eva Re nowleda animals excursio	ecords ecords ge about di in the envi on teaching	Practices 30 fferent p ronment as a form	bints max -		
outcomes, teaching and students' activities Consultation hours Teaching Hours - total Course content	outcome 1-4 Final grade 60-70 poin 71-80 poin 91-100 poi By appoint L Field t anima Observ Introd of-clas Learni	of ECTS ECTS e: tts: grade tts: g	teaching Practices 2 (sufficient 3 (good) 4 (very good) 4 (very good) 5 (excelled) with the put in the surror spatial distription the princip eachingtic organisati	learning and teaching Organisation of a study visit (t) (d) (nt) Seminars 0 (urpose of acquiring k unding area ibution of plants and les of field work and (on of field excursio	monit eva Re nowleda animals excursio	soring and luation ecords ecords ge about di i in the envi on teaching participating	Practices 30 fferent pronment as a form	bints max - - - - - - - - - - - - - - - - - - -		
outcomes, teaching and students' activities Consultation hours Teaching Hours - total Course content	outcome 1-4 Final grade 60-70 poin 71-80 poin 91-100 poi By appoint L Field t anima Observ Introd of-class Learni planni	of ECTS ECTS e: tts: grade tts: grade ints: grade ints	teaching Practices 2 (sufficient 3 (good) 4 (very good) 4 (very good) 5 (excelle) with the put in the surro spatial distro the princip eaching t organisati ealization of	learning and teaching Organisation of a study visit tt) od) nt) Seminars 0 urpose of acquiring k unding area ibution of plants and les of field work and on of field excursio the excursion, and by	monit eva Re nowleda animals excursio	soring and luation ecords ecords ge about di i in the envi on teaching participating	Practices 30 fferent pronment as a form	bints max - - - - - - - - - - - - - - - - - - -		
outcomes, teaching and students' activities Consultation hours Teaching Hours - total Course content	outcome 1-4 Final grade 60-70 poin 71-80 poin 81-90 poin 91-100 poi By appoint L Field t anima Observ Introd of-class Learni planni classro	of ECTS ECTS e: tts: grade tts: grade tts: grade ints:	teaching Practices 2 (sufficient 3 (good) 4 (very good) 4 (very good) 5 (excelle) with the put in the surro spatial distre the princip eaching t organisati ealization of the excursi	learning and teaching Organisation of a study visit nt) od) nt) Seminars 0 urpose of acquiring k unding area ibution of plants and les of field work and on of field excursio the excursion, and by on	monit eva Re nowleda animals excursio rs by rtransfe	ecords ecords ge about di in the envi on teaching participating erring learne	Practices 30 fferent pronment as a form	bints max -		
outcomes, teaching and students' activities Consultation hours Teaching Hours - total Course content	outcome 1-4 Final grade 60-70 poin 71-80 poin 81-90 poin 91-100 poi By appoint L Field t anima Observ Introd of-class Learni planni classro Team	of ECTS ECTS e: tts: grade tts: grade tts: grade ints:	teaching Practices 2 (sufficient 3 (good) 4 (very good) 4 (very good) 5 (excelle) with the put in the surro spatial distre the princip eaching t organisati ealization of the excursi k division, a	learning and teaching Organisation of a study visit () () () () () () () () () () () () ()	monit eva Re nowleda animals excursion r transfe of study	ecords ecords ge about di in the envi on teaching participating erring learne	Practices 30 fferent pronment as a form	bints max -		
outcomes, teaching and students' activities Consultation hours Teaching Hours - total Course content	outcome 1-4 Final grade 60-70 poin 71-80 poin 81-90 poin 91-100 poi By appoint L Field t anima Observ Introd of-class Learni planni classro Team	of ECTS ECTS e: tts: grade tts: g	teaching Practices 2 (sufficient 3 (good) 4 (very good) 4 (very good) 5 (excelle) with the put in the surro spatial distre the princip eaching t organisati ealization of the excursi k division, a	learning and teaching Organisation of a study visit (t) od) nt) Seminars 0 urpose of acquiring k unding area ibution of plants and les of field work and on of field excursio the excursion, and by on nalysis and synthesis irk, zoo, park, meadow	monit eva Re nowleda animals excursion r transfe of study	ecords ecords ge about di in the envi on teaching participating erring learne	Practices 30 fferent pronment as a form	bints max -		

	Using a study visit concept to obtain theoretical knowledge in biology and to implement it in teaching content that will be taught out of classroom.
Recommended reading	Desforges C. (2001) Učenje izvan škole. Educa, Zagreb.
Optional reading	Eko škole u Hrvatskoj, http://www.hr/wwwhr/education/elementary/index.hr.html. Moja škola - Eko škola, http://skole.posluh.hr/cabar/eko-skola.htm.
Conditions for obtaining teacher's signature	Students are obliged to participate actively in the study visit / excursion.
Exam passing procedure	
Main language of instruction; other languages	Croatian language
Method of monitoring the quality and efficiency of teaching	After the course, an anonymous survey will be carried out among students to evaluate their subjective impression about the organisation and quality of teaching; during the lectures, students will have opportunity to make written or oral remarks; monitoring of students' success.

Course title	School Teaching Practice 1								
Code	BP7108								
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education								
programme	or addate on versity study i rogramme in biology and chemistry reacher Education								
Semester	l semester								
Workload/ECTS	i semester								
credits	2								
Course status	Obligatory								
	Obligatory Assist. Prof	Dr. Iron	a Labak						
Course teacher	Assist. Proi	. Dr. Iren	a ladak						
Associate teachers									
Course entry									
requirements									
(Preceding									
courses)									
Course				-	ation of schools withi		-		
objective					r with duties and oblig	gations of tead	cners, pro	tessional	
	associates								
Learning					cal documentation us				
outcomes		-			nt curricula and regu		sary for s	uccessful	
					nent of work obligation				
		•		-	ion of school jobs and	division of wo	ork respoi	nsibilities	
	ot	teachers	s and of pr	rofessio	onal associates.				
Link between						٨٥	essment		
learning						Assessment			
outcomes,	Learning	Share	Form	of	Activities of	Methods Grading		ding	
teaching and	outcome	of			learning and	of	Points		
students'	outcome	ECTS	teaching		teaching	monitoring			
activities						and	min	max	
						evaluation			
						evaluation			
					Work with a	evaluation			
					mentor in school,	evaluation			
					mentor in school, analysis of school	evaluation			
				Ī	mentor in school, analysis of school jobs,	evaluation			
					mentor in school, analysis of school jobs, responsibilities				
					mentor in school, analysis of school jobs, responsibilities and documents	Work			
	1-3	2	Observa		mentor in school, analysis of school jobs, responsibilities and documents used in direct	Work diary,			
	1-3	2	Observa in scho		mentor in school, analysis of school jobs, responsibilities and documents used in direct educational work.	Work diary, teaching			
	1-3	2			mentor in school, analysis of school jobs, responsibilities and documents used in direct educational work. Creation of a	Work diary,			
	1-3	2			mentor in school, analysis of school jobs, responsibilities and documents used in direct educational work. Creation of a teaching portfolio	Work diary, teaching			
	1-3	2			mentor in school, analysis of school jobs, responsibilities and documents used in direct educational work. Creation of a teaching portfolio (reflection forms	Work diary, teaching			
	1-3	2			mentor in school, analysis of school jobs, responsibilities and documents used in direct educational work. Creation of a teaching portfolio (reflection forms and professional	Work diary, teaching			
	1-3	2			mentor in school, analysis of school jobs, responsibilities and documents used in direct educational work. Creation of a teaching portfolio (reflection forms and professional development	Work diary, teaching			
	1-3	2			mentor in school, analysis of school jobs, responsibilities and documents used in direct educational work. Creation of a teaching portfolio (reflection forms and professional	Work diary, teaching			
					mentor in school, analysis of school jobs, responsibilities and documents used in direct educational work. Creation of a teaching portfolio (reflection forms and professional development	Work diary, teaching			
Concultation	Total	2			mentor in school, analysis of school jobs, responsibilities and documents used in direct educational work. Creation of a teaching portfolio (reflection forms and professional development	Work diary, teaching			
Consultation		2			mentor in school, analysis of school jobs, responsibilities and documents used in direct educational work. Creation of a teaching portfolio (reflection forms and professional development	Work diary, teaching			
hours	Total By appoint	2 ment			mentor in school, analysis of school jobs, responsibilities and documents used in direct educational work. Creation of a teaching portfolio (reflection forms and professional development plan)	Work diary, teaching portfolio			
hours Teaching	Total By appoint	2			mentor in school, analysis of school jobs, responsibilities and documents used in direct educational work. Creation of a teaching portfolio (reflection forms and professional development	Work diary, teaching portfolio	Practices		
hours	Total By appoint	2 ment			mentor in school, analysis of school jobs, responsibilities and documents used in direct educational work. Creation of a teaching portfolio (reflection forms and professional development plan)	Work diary, teaching portfolio	Practices 30		
hours Teaching	Total By appoint L	2 ment ectures 0	in scho		mentor in school, analysis of school jobs, responsibilities and documents used in direct educational work. Creation of a teaching portfolio (reflection forms and professional development plan) Seminars	Work diary, teaching portfolio	30	ne aim to	
hours Teaching Hours - total Course content	Total By appoint L	2 ment ectures 0 'ithin this	in scho	student	mentor in school, analysis of school jobs, responsibilities and documents used in direct educational work. Creation of a teaching portfolio (reflection forms and professional development plan) Seminars 0 s will be guided by a	Work diary, teaching portfolio	30 or with th		
hours Teaching Hours - total	Total By appoint L	2 ment ectures 0 'ithin this arn abou	in scho s course, s it: divisio	student n of sc	mentor in school, analysis of school jobs, responsibilities and documents used in direct educational work. Creation of a teaching portfolio (reflection forms and professional development plan) Seminars 0 s will be guided by a chool jobs and dutie	Work diary, teaching portfolio	30 or with th al docum	entation,	
hours Teaching Hours - total Course content	Total By appoint L • W le cu	2 ment ectures 0 'ithin this arn abou urricula a	in scho s course, s it: division nd other	student n of sc docum	mentor in school, analysis of school jobs, responsibilities and documents used in direct educational work. Creation of a teaching portfolio (reflection forms and professional development plan) Seminars 0 s will be guided by a	Work diary, teaching portfolio	30 or with th al docum educatio	entation, nal work	

	extracurricular activities and duties of a class teacher); teachers' obligations, curriculum-related obligations, annual executive curriculum, school curriculum and other documents, special obligations arising from the school organisation; duties of professional associates and other school employees; the role and tasks of school principal.
Recommended reading	Reading lists defined within all obligatory courses. Curriculum documents, applicable regulations and textbooks. Selected scientific and professional papers dealing with Biology.
Optional reading	
Conditions for obtaining teacher's signature	Students are obliged to participate in lectures actively and to fulfil all assignments.
Exam passing procedure	
Main language of instruction; other languages	Croatian language
Method of monitoring the quality and efficiency of teaching	A survey carried out among students and school mentors to evaluate their subjective impression about the teaching quality, in order to improve future teaching.

Course title	School Teaching Practice 2								
Code	BP8109								
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education								
programme	eraduate enversity stady riegiannie in biology and enemistry reacher Education								
Semester	II semester								
Workload/ECTS									
credits	2								
Course status	Obligatory								
Course teacher		Assist. Prof. Dr. Irena Labak							
Associate									
teachers									
Course entry									
requirements									
(Preceding									
courses)									
Course objective	To teach s	tudents	about the impo	ortance of communio	cation and cod	operatio	on to be		
			•	ts and other people of		•			
				e to the overall de		-			
				ng learning of studen [.]	-				
Learning				e and responsibilities		her in t	he direct		
outcomes	ed	lucationa	I work and to b	ecome familiar with	n duties arising	g from t	the class		
	te	acher's w	vork.						
	2. Kr	owledge	about roles and	tasks related to schoo	ol board, teache	ers' cour	ncil, class		
	 Knowledge about roles and tasks related to school board, teachers' council, class council, parents' council and pupils' council. 								
	3. Raised awareness on the importance of professional training as a way of								
	professional development of teachers.								
					essional trainir	iig as a	way of		
Link between									
Link between learning						ssment			
learning outcomes,	pr		al development c			ssment			
learning outcomes, teaching and	pr Learning	ofessiona	al development o	of teachers.	Asse	ssment Gra			
learning outcomes,	pr	ofessiona Share	al development c	of teachers. Activities of	Asse Methods	ssment Gra	ading		
learning outcomes, teaching and	pr Learning	ofessiona Share of	al development o	of teachers. Activities of learning and	Asse Methods of	ssment Gra	ading		
learning outcomes, teaching and students'	pr Learning	ofessiona Share of	al development o	of teachers. Activities of learning and	Asse Methods of monitoring	ssment Gra Po	ading bints		
learning outcomes, teaching and students'	pr Learning	ofessiona Share of	al development o	of teachers. Activities of learning and	Asse Methods of monitoring and	ssment Gra Po	ading bints		
learning outcomes, teaching and students'	pr Learning	ofessiona Share of	al development o	of teachers. Activities of learning and teaching	Asse Methods of monitoring and	ssment Gra Po	ading bints		
learning outcomes, teaching and students'	pr Learning	ofessiona Share of	al development o	of teachers. Activities of learning and teaching Work with a	Asse Methods of monitoring and	ssment Gra Po	ading bints		
learning outcomes, teaching and students'	pr Learning	ofessiona Share of	al development o	Activities of learning and teaching Work with a mentor in school,	Asse Methods of monitoring and	ssment Gra Po	ading bints		
learning outcomes, teaching and students'	pr Learning	ofessiona Share of	al development o	Activities of learning and teaching Work with a mentor in school, analysis of duties	Asse Methods of monitoring and	ssment Gra Po	ading bints		
learning outcomes, teaching and students'	pr Learning	ofessiona Share of	al development o	Activities of learning and teaching Work with a mentor in school, analysis of duties and responsibilities of class teacher and	Asse Methods of monitoring and evaluation	ssment Gra Po	ading bints		
learning outcomes, teaching and students'	pr Learning outcome	Share of ECTS	al development o	Activities of learning and teaching Work with a mentor in school, analysis of duties and responsibilities of class teacher and of school boards	Asse Methods of monitoring and evaluation Work diary,	ssment Gra Po	ading bints		
learning outcomes, teaching and students'	pr Learning	ofessiona Share of	Form of teaching	Activities of learning and teaching Work with a mentor in school, analysis of duties and responsibilities of class teacher and of school boards and councils.	Asse Methods of monitoring and evaluation Work diary, teaching	ssment Gra Po	ading bints		
learning outcomes, teaching and students'	pr Learning outcome	Share of ECTS	Form of teaching Observations	Activities of learning and teaching Work with a mentor in school, analysis of duties and responsibilities of class teacher and of school boards and councils. Creation of a	Asse Methods of monitoring and evaluation Work diary,	ssment Gra Po	ading bints		
learning outcomes, teaching and students'	pr Learning outcome	Share of ECTS	Form of teaching Observations	Activities of learning and teaching Work with a mentor in school, analysis of duties and responsibilities of class teacher and of school boards and councils. Creation of a teaching portfolio	Asse Methods of monitoring and evaluation Work diary, teaching	ssment Gra Po	ading bints		
learning outcomes, teaching and students'	pr Learning outcome	Share of ECTS	Form of teaching Observations	Activities of learning and teaching Work with a mentor in school, analysis of duties and responsibilities of class teacher and of school boards and councils. Creation of a teaching portfolio (reflection forms	Asse Methods of monitoring and evaluation Work diary, teaching	ssment Gra Po	ading bints		
learning outcomes, teaching and students'	pr Learning outcome	Share of ECTS	Form of teaching Observations	Activities of learning and teaching Work with a mentor in school, analysis of duties and responsibilities of class teacher and of school boards and councils. Creation of a teaching portfolio (reflection forms and professional	Asse Methods of monitoring and evaluation Work diary, teaching	ssment Gra Po	ading bints		
learning outcomes, teaching and students'	pr Learning outcome	Share of ECTS	Form of teaching Observations	Activities of learning and teaching Work with a mentor in school, analysis of duties and responsibilities of class teacher and of school boards and councils. Creation of a teaching portfolio (reflection forms	Asse Methods of monitoring and evaluation Work diary, teaching	ssment Gra Po	ading bints		
learning outcomes, teaching and students'	pr Learning outcome	Share of ECTS	Form of teaching Observations	Activities of learning and teaching Work with a mentor in school, analysis of duties and responsibilities of class teacher and of school boards and councils. Creation of a teaching portfolio (reflection forms and professional	Asse Methods of monitoring and evaluation Work diary, teaching	ssment Gra Po	ading bints		
learning outcomes, teaching and students'	pr Learning outcome	Share of ECTS	Form of teaching Observations	Activities of learning and teaching Work with a mentor in school, analysis of duties and responsibilities of class teacher and of school boards and councils. Creation of a teaching portfolio (reflection forms and professional development	Asse Methods of monitoring and evaluation Work diary, teaching	ssment Gra Po	ading bints		

Consultation hours	By appointment						
Teaching	Lectures Seminars Practices						
Hours - total	0 0 30						
Course content / teaching units	 Within this course, students will be introduced to educational work and to learn about duties of a class teacher, such as organisation of a homeroom class and other activities, organisation of information sessions for parents, other forms of cooperation with parents, organisation of parent meetings, planning and implementation of classroom work, keeping records on students in electronic registers (e-Records, e-Diary, etc.), keeping of class documentation, tasks related to the enrolment of children in the first grade of secondary school, transition from lower primary to upper primary grade, organisation of class council sessions, other tasks related to the implementation of executive curriculum and school curriculum, procedure for appointing and assigning tasks to school boards, teachers' councils, class councils, parents' councils and pupils' councils, realising the importance of professional trainings and professional development 						
Recommended		icable regulations and textboo					
reading Optional reading	Selected scientific and professional papers dealing with Biology.						
Conditions for obtaining teacher's signature	Students are obliged to participate in lectures actively and to fulfil all assignments.						
Exam passing procedure							
Main language of instruction; other languages	Croatian language						
Method of monitoring the quality and efficiency of teaching		students and school mentors ng quality, in order to improve	-				

Code										
	вругто				School Teaching Practice 3 BP9110					
Study	0.0110	niversity	Study Programm	e in Biology and Chemi	stry Teacher Fo	lucation	า			
programme		inversity	otady i rogramm				•			
	III semester									
Workload/ECTS	in semester									
credits	2									
	Obligatory									
	Assist. Prof.	Dr. Iron	Labak							
Associate	ASSISL PIUL	DI. ITella								
teachers										
Course entry										
requirements										
(Preceding										
courses)										
Course	To enable st	tudents t	o develop their p	rofessional teaching ski	lls within work	ing with	school			
ODIECTIVE			ucational enviror	-		-				
Learning	1 1	:::	مام معناق بالم	ing paints for me						
Learning		-	dentify the star	ing points for managi	ng of learning	; and te	eaching			
outcomes	•	ocess.								
		-	-	the observed educatio	nal strategies	and or	oserved			
			nanagement pro							
		-	-	kills necessary for work	-	nts with	special			
	needs by cooperating with the professional school services.4. Skills required for self-assessment of students' own positive aspects and areas									
		•			• •		d areas			
	for	improve	ement of their wo	ork in direct educationa	l environment.					
Link between					Asses	sment				
learning					7.0000					
outcomes,	Learning	Share	Form of	Activities of	Methods	Gra	ding			
teaching and	outcome	of	teaching	learning and	of	Poi	ints			
students'	outcome	ECTS	teaching	teaching	monitoring					
activities					and	min	max			
					evaluation					
				Observations of						
				school mentor's						
				work in direct						
				educational						
				environment and						
				continuous	Work diary,					
	1-4	2	Observations	(self)analysis of the	teaching					
			in schools	observed work.	portfolio					
				Creation of a						
				teaching portfolio						
				(reflection forms						
				and professional						
				development plan)						
	Total	2			1					

Consultation	By appointment		
hours			
Teaching	Lectures	Seminars	Practices
Hours - total	0	0	30
Course content / teaching units	educational environ classes, elective extracurricular activi with children with sp		and preparation for regular and additional teaching,
Recommended reading	Reading lists defined within a Curriculum documents, legal a and professional papers deali	acts, regulations and applicable	textbooks. Selected scientific
Optional reading			
Conditions for obtaining teacher's signature	Students are obliged to partic the course.	ipate in lectures actively and to	o fulfil all assignments within
Exam passing procedure			
Main language of instruction; other languages	Croatian language		
Method of monitoring the quality and efficiency of teaching		udents and school mentors to g quality, in order to improve fi	-

	Fundamentals of Physical Chemistry 1								
Code	K058								
Study	Graduate L	Graduate University Study Programme in Biology and Chemistry Teacher Education							
programme		, , , , , , , , , , , , , , , , , , , ,							
Semester	I semester	l semester							
Workload/ECTS	-								
credits	5								
Course status	Obligatory								
Course teacher			o Dutour Sik	iriá					
	ASSOC. Prot	. Dr. iviaj	a Dutour Sik	Inc					
Associate	General Ch	emistry							
teachers									
Course entry									
requirements									
(Preceding									
courses)									
Course objective	To teach st	udents a	bout basic p	rinciples of thermody	namics and quant	um chen	nistry; to		
	enable stu	dents to	o solve com	plex problems by li	nking theoretical	knowled	dge with		
	experimen	tal result	s, and by usir	ng scientific literature	; to train students	to apply (concepts		
	of thermod	lynamics	in biology.						
Learning	1. At	oility to c	ritically evaluation	uate the applicability	of state equations	of real a	and ideal		
outcomes		•	•	litions and in the envi	•				
				he relations betwee		namic qu	antities:		
		-		capacity, internal en	•	-			
		nergy.	actori, ficat	capacity, internal en		itiopy ai			
			nalyse nhysi	cal and chemical reac	tions by using there	nochom	icallaws		
		-		e diagrams of pure su					
		-				-			
		-		5. Knowledge about applicability of chemical equilibrium concepts to biologi					
	and environmental processes.								
	6. At	oility to	make compa	arison between elect	trochemical proces	sses in b	oiological		
	6. Al sy	oility to stems an	make compa nd chemical p	arison between elect parts.	-		-		
	6. Al sy 7. Al	oility to stems an pility to d	make compa nd chemical p	arison between elect	-		-		
	6. Al sy 7. Al	oility to stems an	make compa nd chemical p	arison between elect parts.	-		-		
Link between	6. Al sy 7. Al	oility to stems an pility to d	make compa nd chemical p	arison between elect parts.	n quantum theory	and the s	-		
Link between learning	6. Al sy 7. Al of	oility to stems an pility to d	make compa nd chemical p letermine the	arison between elect parts.	n quantum theory		-		
	6. Al sy 7. Al of	pility to stems an pility to d atoms.	make compa nd chemical p etermine the Form of	arison between elect parts. e connection between Activities of	n quantum theory Assess	and the s	structure		
learning outcomes,	6. Al sy 7. Al of	bility to stems an bility to d atoms. Share of	make compa nd chemical p letermine the	Arison between elector parts. e connection between Activities of learning and	n quantum theory Assess Methods of	and the s sment Gra	ding		
learning outcomes, teaching and	6. Al sy 7. Al of	bility to stems an bility to d atoms. Share	make compa nd chemical p etermine the Form of	arison between elect parts. e connection between Activities of	n quantum theory Assess Methods of monitoring	and the s sment Gra Po	ding ints		
learning outcomes, teaching and students'	6. Al sy 7. Al of	bility to stems an bility to d atoms. Share of	make compa nd chemical p etermine the Form of	Arison between elector parts. e connection between Activities of learning and	Assess Methods of monitoring and evaluation	and the s sment Gra	ding		
learning outcomes, teaching and	6. Al sy 7. Al of	bility to stems an bility to d atoms. Share of	make compa nd chemical p etermine the Form of	Arison between elector parts. e connection between Activities of learning and	Assess Methods of monitoring and evaluation Records	and the s sment Gra Po	ding ints		
learning outcomes, teaching and students'	6. Al sy 7. Al of Learning outcome	oility to a stems an oility to d atoms. Share of ECTS	make compa nd chemical p letermine the Form of teaching	Arison between elector parts. e connection between Activities of learning and teaching	Assess Methods of monitoring and evaluation Records related to	and the s sment Gra Po min	ding ints max		
learning outcomes, teaching and students'	6. Al sy 7. Al of	bility to stems an bility to d atoms. Share of	make compa nd chemical p etermine the Form of	Arison between elector parts. e connection between Activities of learning and	Assess Methods of monitoring and evaluation Records related to active	and the s sment Gra Po	ding ints		
learning outcomes, teaching and students'	6. Al sy 7. Al of Learning outcome	oility to a stems an oility to d atoms. Share of ECTS	make compa nd chemical p letermine the Form of teaching	Arison between elector parts. e connection between Activities of learning and teaching	Assess Methods of monitoring and evaluation Records related to active participation in	and the s sment Gra Po min	ding ints max		
learning outcomes, teaching and students'	6. Al sy 7. Al of Learning outcome	oility to a stems an oility to d atoms. Share of ECTS	make compa nd chemical p letermine the Form of teaching	Arison between elector parts. e connection between Activities of learning and teaching	Assess Methods of monitoring and evaluation Records related to active	and the s sment Gra Po min	ding ints max		
learning outcomes, teaching and students'	6. Al sy 7. Al of Learning outcome	oility to a stems an oility to d atoms. Share of ECTS	make compa nd chemical p letermine the Form of teaching	Arison between electoris parts. e connection between Activities of learning and teaching	Assess Methods of monitoring and evaluation Records related to active participation in	and the s sment Gra Po min	ding ints max		
learning outcomes, teaching and students'	6. Al sy 7. Al of Learning outcome	oility to a stems an oility to d atoms. Share of ECTS	make compa nd chemical p letermine the Form of teaching	Activities of learning and teaching Critical discussion	Assess Methods of monitoring and evaluation Records related to active participation in lectures	and the s sment Gra Po min	ding ints max		
learning outcomes, teaching and students'	6. Al sy 7. Al of Learning outcome	oility to o stems an oility to d atoms. Share of ECTS 1.5	make compared chemical pletermine the Form of teaching	Activities of learning and teaching Critical discussion Usage of theoretical	Assess Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students'	and the s sment Gra Po min	ding ints max 10		
learning outcomes, teaching and students'	6. Al sy 7. Al of Learning outcome	oility to a stems an oility to d atoms. Share of ECTS	make compa nd chemical p letermine the Form of teaching	Activities of learning and teaching Critical discussion Usage of theoretical knowledge in	Assess Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance	and the s sment Gra Po min 5	ding ints max		
learning outcomes, teaching and students'	6. Al sy 7. Al of Learning outcome	oility to o stems an oility to d atoms. Share of ECTS 1.5	make compared chemical pletermine the Form of teaching	Activities of learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving	Assess Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at solving of	and the s sment Gra Po min 5	ding ints max 10		
learning outcomes, teaching and students'	6. Al sy 7. Al of Learning outcome	oility to o stems an oility to d atoms. Share of ECTS 1.5	make compared chemical pletermine the Form of teaching	Activities of learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving tasks	Assess Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at solving of tasks	and the s sment Gra Po min 5	ding ints max 10		
learning outcomes, teaching and students'	6. Ał sy 7. Ał of Learning outcome 1-7	oility to o stems an oility to d atoms. Share of ECTS 1.5	make compared chemical pletermine the Form of teaching	Activities of learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving	Assess Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at solving of	and the s sment Gra Po min 5	ding ints max 10		
learning outcomes, teaching and students'	6. Al sy 7. Al of Learning outcome	oility to o stems an oility to d atoms. Share of ECTS 1.5	Form of teaching Lecture	Activities of learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving tasks	Assess Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at solving of tasks	and the s sment Gra Po min 5	ding ints max 10		
learning outcomes, teaching and students'	6. Ał sy 7. Ał of Learning outcome 1-7	oility to o stems an oility to d atoms. Share of ECTS 1.5	make compared chemical platermine the form of teaching Lecture Seminar Written exam	Activities of learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving tasks Preparation for written exam	Assess Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at solving of tasks Results of written exam	and the s sment Gra Po min 5	ding ints max 10		
learning outcomes, teaching and students'	6. Ał sy 7. Ał of Learning outcome 1-7	oility to o stems an oility to d atoms. Share of ECTS 1.5	Form of teaching Lecture Seminar Written exam Oral	Activities of learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving tasks Preparation for written exam	Assess Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at solving of tasks Results of written exam Results of oral	and the s sment Gra Po min 5	ding ints max 10		
learning outcomes, teaching and students'	6. Al sy 7. Al of Learning outcome 1-7 1-7	bility to of stems an oility to d atoms. Share of ECTS 1.5 1.5	make compared chemical platermine the form of teaching Lecture Seminar Written exam	Activities of learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving tasks Preparation for written exam	Assess Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at solving of tasks Results of written exam	and the s sment Gra Po min 5 5 20	ding ints max 10 10 40		
learning outcomes, teaching and students'	6. Al sy 7. Al of Learning outcome 1-7 1-7	bility to of stems an oility to d atoms. Share of ECTS 1.5 1.5	Form of teaching Lecture Seminar Written exam Oral	Activities of learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving tasks Preparation for written exam	Assess Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at solving of tasks Results of written exam Results of oral	and the s sment Gra Po min 5 5 20	ding ints max 10 10 40		

Consultation	Final grade: 50.0-62.5 points: grade 2 (sufficient) 62.6-75 points: grade 3 (good) 75.1-87.5 points: grade 4 (very good) 87.6-100 points: grade 5 (excellent)						
Teaching	Lectures Seminars Practices						
Hours - total	45	15	0				
Course content / teaching units	 Lectures refer to topics of thermodynamics and quantum chemistry: Properties of gases, the first and the second law of thermodynamics, physical changes of pure substances, phase diagrams, properties of solutions, simple mixtures, mixing thermodynamics, activity, chemical equilibrium, equilibrium electrochemistry, electrochemical cells, standard potentials Quantum theory, Schrödinger equation, atomic structure and atomic spectrum Each teaching unit is accompanied by seminar assignments, which are requiring students to apply basic concepts of thermodynamics to solving problems in chemistry, biology and environmental protection. 						
Recommended reading	Atkins P., de Paula J. (2017) Elements of Physical Chemistry. 7th ed. Oxford University Press. Atkins P., de Paula J., Keeler J. (2018) Atkins' Physical Chemistry. 11th ed. Oxford University Press.						
Optional reading	Simeon V. (1980) Termodina	Simeon V. (1980) Termodinamika. Školska knjiga, Zagreb.					
Conditions for obtaining teacher's signature	Obligatory active participation	on in lectures and performance	of all assignments.				
Exam passing procedure	Students are obliged to pass the written exam in order to proceed with the oral exam. The final grade is determined according to the number of points achieved at written and oral exams, and of points obtained during the course.						
Main language of instruction; other languages	oral exams, and of points obtained during the course. Croatian language						
Method of monitoring the quality and efficiency of teaching	their subjective impression	nous survey will be carried out about the organisation of te ity to make written or oral rem	eaching; during the lectures,				

Course title	Fundamen	Fundamentals of Physical Chemistry 2							
Code	К059								
Study	Graduate U	Graduate University Study Programme in Biology and Chemistry Teacher Education							
programme		-							
Semester	II semester								
Workload/ECTS									
credits	5								
Course status	Obligatory								
Course teacher		Dr Maia	Dutour Siki	rić					
Associate	A330C. FT01.	DI. Maja							
teachers	Fundament	als of Phy	sical Chemis	stry 1 (attended)					
Course entry									
requirements									
(Preceding									
courses)									
Course	To tooch stu	idonts ak	out the baci	cs of quantum theor	v and to dovelop th	oir skills	roquirod		
objective				theory to molecular					
objective			-	chemical kinetics an					
	-		ortant proce			i biologic	ally allu		
Learning		, ,		connection betwee	n quantum theory	and the c	tructuro		
outcomes		molecule					siluciule		
outcomes				eoretical basis of mo	locular cooctra (IP				
		-		ical quantities that					
		actions.	eview pilys	ical qualitities that	describe the kine		LITEIIICAI		
			odict the in	fluence of experimer	tal conditions on a	homical	roaction		
		es.	edict the in	indence of experimen		Inemical	reaction		
			nnly knowl	adra about cimpla d	homical reaction	rata an	complay		
		action rat		edge about simple o		Tale on	complex		
				abaractoristics of a	dependion that a	o impor	tant for		
		-	-	characteristics of a	ausorption that a	e impor	tant ior		
Link between	iie	leiogene	ous catalysis). 	heterogeneous catalysis.				
learning	Assessment								
learning				c	Asses	sment			
	Learning	Share	Form of	Activities of					
outcomes,	Learning outcome	of		learning and	Methods of	Gra	ding		
outcomes, teaching and	-		Form of teaching		Methods of monitoring and	Gra	ding ints		
outcomes, teaching and students'	-	of		learning and	Methods of	Gra	-		
outcomes, teaching and	-	of		learning and	Methods of monitoring and	Gra Po	ints		
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching	Methods of monitoring and evaluation	Gra Po min	ints max		
outcomes, teaching and students'	-	of		learning and	Methods of monitoring and evaluation Records related to active participation in	Gra Po	ints		
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching	Methods of monitoring and evaluation Records related to active	Gra Po min	ints max		
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching	Methods of monitoring and evaluation Records related to active participation in lectures	Gra Po min	ints max		
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical discussion	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of	Gra Po min	ints max		
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical discussion Usage of	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students'	Gra Po min	ints max		
outcomes, teaching and students'	outcome 1-6	of ECTS 1.5	teaching Lecture	learning and teaching Critical discussion Usage of theoretical	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at	Gra Po min	ints max 10		
outcomes, teaching and students'	outcome 1-6	of ECTS 1.5	teaching Lecture	learning and teaching Critical discussion Usage of theoretical knowledge in	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students'	Gra Po min	ints max 10		
outcomes, teaching and students'	outcome 1-6	of ECTS 1.5	teaching Lecture Seminar	learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving tasks	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at tasks	Gra Po min	ints max 10		
outcomes, teaching and students'	outcome 1-6	of ECTS 1.5	teaching Lecture Seminar Written	learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving tasks Preparation for	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at tasks Results of	Gra Po min	ints max 10		
outcomes, teaching and students'	outcome 1-6 1-6	of ECTS 1.5 1.5	teaching Lecture Seminar Written exam	learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving tasks Preparation for written exam	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at tasks Results of written exam	Gra Po min 5	ints max 10 10		
outcomes, teaching and students'	outcome 1-6 1-6 1-6	of ECTS 1.5 1.5 1	teaching Lecture Seminar Written	learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving tasks Preparation for written exam Preparation for	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at tasks Results of	Gra Po min 5 5 20	ints max 10 10 40		
outcomes, teaching and students'	outcome 1-6 1-6	of ECTS 1.5 1.5	teaching Lecture Seminar Written exam	learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving tasks Preparation for written exam	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at tasks Results of written exam	Gra Po min 5	ints max 10 10		
outcomes, teaching and students'	outcome 1-6 1-6 1-6	of ECTS 1.5 1.5 1	teaching Lecture Seminar Written exam Oral	learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving tasks Preparation for written exam Preparation for	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at tasks Results of written exam Results of oral	Gra Po min 5 5 20	ints max 10 10 40		
outcomes, teaching and students'	outcome 1-6 1-6 1-6 1-6	of ECTS 1.5 1.5 1 1 1 5	teaching Lecture Seminar Written exam Oral	learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving tasks Preparation for written exam Preparation for	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at tasks Results of written exam Results of oral	Gra Po min 5 5 20 20	ints max 10 10 40 40		
outcomes, teaching and students'	outcome 1-6 1-6 1-6 1-6 Total Final grade	of ECTS 1.5 1.5 1 1 1 1 5	teaching Lecture Seminar Written exam Oral	learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving tasks Preparation for written exam Preparation for oral exam	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at tasks Results of written exam Results of oral	Gra Po min 5 5 20 20	ints max 10 10 40 40		
outcomes, teaching and students'	outcome 1-6 1-6 1-6 1-6 Total Final grade	of ECTS 1.5 1.5 1.5 1 1 5 coints: gra	teaching Lecture Seminar Written exam Oral exam	learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving tasks Preparation for written exam Preparation for oral exam	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at tasks Results of written exam Results of oral	Gra Po min 5 5 20 20	ints max 10 10 40 40		
outcomes, teaching and students'	outcome 1-6 1-6 1-6 1-6 50.0-62.5 p 62.6-75 poi	of ECTS 1.5 1.5 1.5 1 1 1 5 coints: grad	teaching Lecture Seminar Written exam Oral exam de 2 (suffici e 3 (good)	learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving tasks Preparation for written exam Preparation for oral exam	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at tasks Results of written exam Results of oral	Gra Po min 5 5 20 20	ints max 10 10 40 40		
outcomes, teaching and students'	outcome 1-6 1-6 1-6 1-6 Total Final grade 50.0-62.5 p 62.6-75 poi 75.1-87.5 p	of ECTS 1.5 1.5 1.5 1 1 1 5 coints: grad oints: grad oints: grad	teaching Lecture Seminar Written exam Oral exam	learning and teaching Critical discussion Usage of theoretical knowledge in problem-solving tasks Preparation for written exam Preparation for oral exam	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students' performance at tasks Results of written exam Results of oral	Gra Po min 5 5 20 20	ints max 10 10 40 40		

Consultation hours							
Teaching	Lectures	Seminars	Practices				
Hours - total	30 15 0						
Course content / teaching units	 Lectures refer to topics of quantum chemistry and chemical kinetics: Molecular structures, Born-Oppenheimer approximation, molecular symmetry Spectroscopy: rotational and vibrational spectra, electron transitions, lasers, nuclear magnetic resonance Substance changes: kinetic theory of gases, diffusion, electrolyte solutions, order of chemical reactions, kinetics of complex reactions, catalysis - homogeneous, autocatalysis and heterogeneous, photochemistry, dynamics of molecular interactions, surface reactions, adsorption Each teaching unit is accompanied by seminar assignments within which students apply the basic concepts of quantum chemistry and chemical kinetics into solving of problems in chemistry, biology and environmental protection. 						
Recommended reading	Atkins P., de Paula J. (2017) Elements of Physical Chemistry. 7th ed. Oxford University Press. Atkins P., de Paula J., Keeler J. (2018) Atkins' Physical Chemistry. 11th ed. Oxford University Press.						
Optional reading							
Conditions for obtaining teacher's signature	Obligatory active participation in lectures and performance of all assignments.						
Exam passing procedure	Students are obliged to pass the written exam in order to proceed with the oral exam. The final grade is determined according to the number of points achieved at written and oral exams, and of points obtained during the course.						
Main language of instruction; other languages	Croatian language, English language						
Method of monitoring the quality and efficiency of teaching	their subjective impression	ous survey will be carried out about the organisation of te ty to make written or oral rem	aching; during the lectures,				

Course title	Aquatic E	Aquatic Ecosystems					
Code							
Study	Graduate L	Jniversity	/ Study Progr	amme in Biology and	Chemistry Teache	er Educat	ion
programme							
Semester	III semeste	r					
Workload/ECTS							
credits	3						
Course status	Obligatory						
Course teacher			ita Mihaljevio	5			
Associate							
teachers	Assist. Prof	r. Dr. Anit	a Galir Balkić				
Course entry							
requirements							
(Preceding							
courses)							
Course objective	To enable	student	s to develo	p an argument-bas	ed opinion abou	t functio	oning of
· · · · · · · · · · · · · · · · · · ·				ne biome. To teach s	•		•
				uatic biomes by linki		•	
	flora and fa						
Learning			ut the basic o	concepts of aquatic e	cosystems and the	eir distrib	ution on
outcomes	Earth.						
		to review	w the role an	d importance of aqua	atic ecosystems		
				es and differences of		าร	
		•		paper, which is w	•		scientific
	literati		i u seminu	paper, milen is m	inclusion by doing in	cicvant	Selemente
Link between							
learning		Chara		Activities of	Asses	sment	
outcomes,	Learning	Share	Form of				
teaching and	outcome	of ECTS	teaching	learning and	Methods of		ding
students'		ECIS		teaching	monitoring		ints
activities					and evaluation	min	max
				Lecture			
	1-3	0.5	Lecture	attendance and	Records,	10	20
	_			active	evaluation		_
				participation			
				Independent			
				search for and			
				critical revision of			
				scientific	Records and		
	1-4	1	Seminar	references used	assessment of	30	50
		-	ocimia	in preparation of	presented	30	
				a seminar paper,	seminar paper		
				and presentation			
				of a seminar			
				paper			
			Written	Preparation for			
	1-4	0.5	exam	written exam	Written exam	10	15
	1-4	1	Oral	Preparation for	Oral exam	10	15
		-	exam	oral exam			
	Total	3				60	100
	Final grade		•			•]
			2 /	\			
	60-70 poin	ts: grade	2 (sufficient)			
	60-70 poin 71-80 poin)			
	71-80 poin	ts: grade	3 (good)				
	71-80 poin 81-90 poin	ts: grade ts: grade		1)			

Consultation hours	By appointment						
Teaching	Lectures	Seminars	Practices				
Hours - total	30 10 0						
Course content / teaching units	 Lectures: Freshwater ecosystems – classification, water as a living medium, ecological classification of freshwater organisms; Basic biological and ecological characteristics of lentic systems; Lotic systems - longitudinal zonation; Littoral zone; Sediment; Eutrophication; Water pollution and water protection. Abiotic and biotic factors of marine ecosystems; Plankton and planktonic communities; Benthic population of phytal system; Seaweed communities; Ecology of the intertidal zone; Coasts; Estuaries; Tropical communities. Seminars: Presentation related to biological diversity of selected aquatic ecosystems Eutrophication and protection of freshwater ecosystems Human influence on marine ecosystems. 						
Recommended reading	Nybakken J.W. (2001) Marine biology: An ecological approach. San Francisco: Benjamin Cummings. Wetzel R.G. (2001) Limnology - Lake and River Ecosystems. 3rd ed. Academic Press, San Diego.						
Optional reading	Engelhardt W. (2003) Was lebt in Tümpel, Bach und Weiher? Kosmos, Stuttgart. Levinton J.S. (2017) Marine Biology: Function, Biodiversity, Ecology. Oxford University Press. Weigel M. (2009) Encyclopedia of biomes. Gale, Cengage Learning, Detroit.						
Conditions for obtaining teacher's signature	Active participation in lectures, preparation and presentation of seminar paper.						
Exam passing procedure	During lectures and seminars, the teachers monitor and evaluate performance of each student, which refers to 60% of the final grade. Achieved success at the written exam contributes to the final grade with 20%, while the remaining 20% of the final grade refers to success achieved at oral exam.						
Main language of instruction; other languages	to success achieved at oral exam. Croatian language / English language						
Method of monitoring the quality and efficiency of teaching	Evaluation form						

Elective Courses

Code Study Graduate University Study Programme in Biology and Chemistry Teacher Education programme Graduate University Study Programme in Biology and Chemistry Teacher Education Semester III semester Workload/ECTS 2 Course status Elective Course teacher Assist. Prof. Dr. Dubravka Špoljarić Maronić Associate Assist. Prof. Dr. Tanja Žuna Pfeiffer Nikolina Bek, assistant Nikolina Bek, assistant Course entry Algae, Fungi and Lichens (attended) (Preceding To teach students about the role and importance of algae as indicators of environme change and about their application in assessment of ecosystem conditions. Learning 1. Ability to assess the role of algae as biological indicators of environme changes. 2. Skills in sampling and analysing different algae in order to determine t structure, differences and adjustments to particular ecological conditions. 3. Ability to use professional literature and keys for determination of algae. 4. Ability to oassess ecological conditions of an aquatic biotope by using definethedology and regulations. 5. Ability to critically analyse various approaches and methodologies to assessmor of aquatic ecosystem status. 6. Skills in designing of an experiment related to using of algae as biologies to assessmor of aquatic ecosystem status.
programme Semester III semester Workload/ECTS 2 credits 2 Course status Elective Course teacher Assist. Prof. Dr. Dubravka Špoljarić Maronić Associate Assist. Prof. Dr. Filip Stević Assoc. Prof. Dr. Tanja Žuna Pfeiffer Nikolina Bek, assistant Course entry requirements (Preceding Algae, Fungi and Lichens (attended) courses) To teach students about the role and importance of algae as indicators of environme change and about their application in assessment of ecosystem conditions. Learning 1. Ability to assess the role of algae as biological indicators of environme changes. 2. Skills in sampling and analysing different algae in order to determine t structure, differences and adjustments to particular ecological conditions. 3. Ability to use professional literature and keys for determination of algae. 4. Ability to assess ecological conditions of an aquatic biotope by using defimethodology and regulations. 5. Ability to critically analyse various approaches and methodologies to assessm of aquatic ecosystem status. 6. Skills in designing of an experiment related to using of algae as biologies to assessment of aquatic ecosystem status.
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Workload/ECTS credits 2 Course status Elective Course teacher Assist. Prof. Dr. Dubravka Špoljarić Maronić Associate Assist. Prof. Dr. Filip Stević Assoc.ate Assoc. Prof. Dr. Tanja Žuna Pfeiffer Nikolina Bek, assistant Nikolina Bek, assistant Course entry requirements (Preceding courses) Algae, Fungi and Lichens (attended) Course objective To teach students about the role and importance of algae as indicators of environme change and about their application in assessment of ecosystem conditions. Learning outcomes 1. Ability to assess the role of algae as biological indicators of environme changes. 2. Skills in sampling and analysing different algae in order to determine t structure, differences and adjustments to particular ecological conditions. 3. Ability to use professional literature and keys for determination of algae. 4. Ability to assess ecological conditions of an aquatic biotope by using defi methodology and regulations. 5. Ability to critically analyse various approaches and methodologies to assess of aquatic ecosystem status. 6. Skills in designing of an experiment related to using of algae as biologies
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Associate teachers Assist. Prof. Dr. Filip Stević Assoc. Prof. Dr. Tanja Žuna Pfeiffer Nikolina Bek, assistant Course entry requirements (Preceding courses) Algae, Fungi and Lichens (attended) Course objective To teach students about the role and importance of algae as indicators of environme change and about their application in assessment of ecosystem conditions. Learning outcomes 1. Ability to assess the role of algae as biological indicators of environme changes. 2. Skills in sampling and analysing different algae in order to determine t structure, differences and adjustments to particular ecological conditions. 3. Ability to use professional literature and keys for determination of algae. 4. Ability to assess ecological conditions of an aquatic biotope by using defi methodology and regulations. 5. Ability to critically analyse various approaches and methodologies to assessm of aquatic ecosystem status. 6. Skills in designing of an experiment related to using of algae as biological
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of aquatic ecosystem status. 6. Skills in designing of an experiment related to using of algae as biolog
6. Skills in designing of an experiment related to using of algae as biolog
to discharge a set of the set of
indicators in assessment of environment and nature status.
Link between
learning Share Activities of Assessment
outcomes, Learning of Form of learning and Methods of Grading
teaching and outcome ECTS teaching teaching teaching monitoring and Points
students' evaluation min ma
activities Records related
Critical to active
1,4-6 0.5 Lecture conversation and participation in 5 1
discussion conversations
and discussions
Field research, Field work
designing and report, analysis
1-6 1 Practices simulation of of simulation 25 4
field research with provision
task of feedback
Vritten Preparation for
1-6 0.25 exam written exam Written exam 15 2.
1-6 0.25 Oral Preparation for Oral exam 15 2.
exam oral exam
Total 2 60 10
Final grade:

	71-80 points: grade 3 (good) 81-90 points: grade 4 (very good) 91-100 points: grade 5 (excellent)						
Consultation hours	By appointment						
Teaching	Lectures Seminars Practices						
Hours - total	15 0 15						
Course content / teaching units	 Lectures: Algae within the monitoring of water, soil and air quality Algal biomarkers - biomolecular, biochemical, physiological Monitoring of the community composition and metabolism - indicators and methods Analysis of population - indicator species, invasive species, growth potential, indices Algae as indicators of ecological status of waters - comparison of taxonomic approach and functional classifications Algae - indicators in paleolimnological research and forensic limnology Practices: Methods of sampling of algae (water, sediment, aerophytic communities) and monitoring of basic physical and chemical indicators Taxonomic analysis and functional classifications Designing and simulation of a research task - planning 						
Recommended reading	 Implementation, evaluation and connection with educational content in teaching Bellinger E.G., Sigee D.C. (2010) Freshwater algae: Identification and use as bioindicators. John Wiley & Sons, Ltd, Chichester, West Sussex, UK. Hrvatske vode (2016) Metodologija uzorkovanja, laboratorijskih analiza i određivanja omjera ekološke kakvoće bioloških elemenata kakvoće (https://www.voda.hr/hr/metodologije) 						
Optional reading	(https://www.voda.hr/hr/metodologije). Stoermer E.F., Smol J.P. (2004) The Diatoms: Applications for the Environmental and Earth Sciences. Cambridge University Press, Cambridge, UK. Keys for determination of algae, recent scientific publications (scientific papers and review articles) and logal acts related to course topics						
Conditions for obtaining teacher's signature	articles) and legal acts related to course topics. Active participation in lectures and fulfilment of all assignments within the course.						
Exam passing procedure	During the course, the teacher monitors and evaluates the activities of students by awarding points according to determined criteria. After lectures and practices, students shall pass the written exam, as well as oral exam. The final grade is determined according to the number of points gained during lectures and practices and the number of points achieved at written and oral exam.						
Main language of instruction; other languages	Croatian language, English lan	guage					
Method of monitoring the quality and efficiency of teaching		es; Carrying out of a student su anisation and realisation of ss at exams.	-				

Course title	Atmosphere and Environment							
Code	K082	K082						
Study	Graduate L	Jniversity	/ Study Prog	ramme in Biology and	d Chemistry Teache	r Educati	on	
programme								
Semester	III semeste	r						
Workload/ECTS credits	2							
Course status	Elective							
Course teacher	Assist. Prof	^f . Dr. Elviı	ra Kovač-An	drić				
Associate								
teachers								
Course entry								
requirements								
(Preceding								
courses)								
Course objective		To introduce students to the atmosphere and the environment in our surroundings and to teach them about possible pollution and its consequences.						
Learning	1. In	tegrated	knowledge	about concepts of	development and	propertie	es of the	
outcomes		mospher						
		-		portance of micro-co	nstituents present i	n the air	and their	
		terdeper			с I I с			
		-	-	mechanisms that af	fect the level of n	nicro-cor	istituents	
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teaching and	outcome	ECTS	teaching	teaching	monitoring and		ints	
students'					evaluation	min	max	
activities	1-5	0.5	Lecture	Critical conversation and discussion	Records related to student performance at discussions and analyses	15	30	
	1-5	0.5	Seminar	Interpretation of scientific papers	Monitoring of students' performance at interpretations and tasks	20	40	
	1-5	0.5	Written exam	Preparation for written exam	Written exam	10	20	
	1-5	0.5	Oral exam	Preparation for oral exam	Oral exam	5	10	
	Total	2				50	100	
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	Final exam: minimum number of points refers to the lowest grade (sufficient), and maximum number of points refers to the highest grade (excellent).						
Consultation hours	By appointment						
Teaching	Lectures Seminars Practices						
Hours - total	15 15 0						
Course content / teaching units	 Evolution of Earth atmosphere, climate Layers of the atmosphere atmospheric micro-constituents, cycles: sulphur, nitrogen and carbon-halogen compounds; atmospheric ozone; particulate matter; aerosols Photochemical reactions; chemistry of the stratosphere and troposphere Air pollution; pollution sources, types of pollutants and their influence (climate, environment, health) Influence of meteorological parameters on atmospheric micro-constituents Ozone holes; global warming; acid rain; human influence on atmospheric 						
Recommended reading Optional	pollution, consequences and prevention Hewit C.N., Jackson A.V. (2009) Atmospheric Science for Environmental Scientists. Wiley & Blackwel. Jacob D.J. (1999) Intoducttion of Atmospheric Chemisty. Prenston University Press, Prenston, New Jersey. Seinfeld J.H., Pandis S.N. (2006) Atmospheric Chemistry and Phisics. John Wiley and Sons, Inc., New Jersey.						
reading	Finlayson-Pitts B.J., Pitts J.N.Jr. (1986) Atmospheric Chemistry. John Wiley, New York. Seinfeld J.H. (1986) Atmospheric Chemistry and Physics of Air Pollution. John Wiley and Sons, Inc., New York.						
Conditions for obtaining teacher's signature	Attendance of lectures with minimum 5 points obtained, oral presentation (seminar paper) with minimum 5 points obtained; minimum 10 points required.						
Exam passing procedure	During the course, the teacher monitors and evaluates performance of each student (preparation of a seminar paper), which refers to 20% of the final grade. Passing of written exam refers to 30% of the final grade and passing of oral exam refers to the remaining 50% of the final grade.						
Main language of instruction; other languages	of the final grade. Croatian language						
Method of monitoring the quality and efficiency of teaching	-	rse; reviews during the course s; monitoring of student succes					

Code BM282 Study programme Semester Graduate University Study Programme in Biology and Chemistry Teacher Education Workload/ECT Semester III semester Course status Elective Prof. Dr. Vera Cesar Course status Elective Assist. Prof. Dr. Jasenka Antunović Dunić Assist. Prof. Dr. Lidija Begović Assist. Prof. Dr. Selma Milinarić Course objective To develop students' knowledge and skills required for the preparation of cytological and histological specimens and for usage of light and fluorescence microscope. Learning outcomes, courses) To develop students' knowledge and skills required for the preparation of cytological and histological specimens and for usage of light and fluorescence microscope. Learning outcomes, teaching and students' To develop students' knowledge about the structure of solility to evaluate the quality of prepared material. Link between learning outcomes, teaching and students' Solility to evaluate the quality of prepared material. Assessment (critical interpretation of scientific research results. Link between learning outcomes, teaching and students' Solility for prepared material. Assessment of prelated to acritical interpretatiscon or active preparation and mi	Course title	Plant Mic	Plant Microtechnique and Microscopy								
programme Graduate University Study Programme in Biology and Lemistry Leacher Education Semester III semester 2 2 Course status Elective Course status Ford. Dr. Udia Begović Assist. Prof. Dr. Selma Milnarić Assist. Prof. Dr. Selma Milnarić Course objective To develop students' knowledge and skills required for the preparation of cytological and histological specimens and for usage of light and fluorescence microscope. Learning outcomes 1. Skills required for application of methods of fixation and tissue preparation as appropriate to the plant material structure. 2. Skills to prepare materials that are suitable for planned experiment and to make photographic documentation. 3. Ability to outcome of scientific research results. Link between learning outcomes, activities of contribution to the development of professional knowledge by making critical interpretation of scientific research results. 1, 3, 4, 5 1 2, 3 0.5 9 1 2, 3 0.5 Practices	Code	BMZ82									
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1, 3, 4, 51LectureCritical conversation and discussionactive participation in conversations and discussions12202, 30.5PracticesIndependent preparation and microscopic examination of materialRecords related to students' performance at preparing and examining of materials12201 - 50.25Written examPreparation for written exam oral examRecords related to students' performance at preparing and examining of material12201 - 50.25Oral examPreparation for written exam oral examAssessment of presentation18301 - 50.25Oral examPreparation for oral examOral exam915	learning outcomes, teaching and students'	Learning	Share of	Form of	Activities of learning and	Methods of monitoring and evaluation	Gra Po	ints			
1, 3, 4, 51Lectureconversation and discussionactive participation in conversations and discussions12202, 30.5PracticesIndependent preparation and microscopic examination of materialRecords related to students' performance at preparing and examining of materials12201 - 50.25Written examPreparation for written exam oral examAssessment of presentation18301 - 50.25Oral examPreparation for oral examOral exam915	learning outcomes, teaching and students'	Learning	Share of	Form of	Activities of learning and	Methods of monitoring and evaluation Records	Gra Po	ints			
2,30.5PracticesIndependent preparation and microscopic examination of materialRecords related to students' performance at preparing and examining of materials21351 - 50.25Written examPreparation for written examAssessment of practical work, written exam and/or delivered presentation18301 - 50.25Oral examPreparation for oral examOral exam915Total2000100	learning outcomes, teaching and students'	Learning	Share of	Form of	Activities of learning and teaching	Methods of monitoring and evaluation Records	Gra Po	ints			
2,30.5PracticesIndependent preparation and microscopic examination of materialRecords related to students' preparing and examining of materials21351 - 50.25Written examPreparation for written exam oral examAssessment of practical work, written exam and/or delivered presentation18301 - 50.25Oral examPreparation for oral examOral exam9151 - 50.25Oral examPreparation for oral examOral exam915	learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical	Methods of monitoring and evaluation Records related to	Gra Po min	ints max			
2, 30.5PracticesIndependent preparation and microscopic examination of materialRecords related to students' performance at preparing and examining of materials21351 - 50.25Written examPreparation for written examAssessment of practical work, written exam and/or delivered presentation18301 - 50.25Oral examPreparation for oral examOral exam915Total200100	learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and	Methods of monitoring and evaluation Records related to active	Gra Po min	ints max			
2,30.5PracticesIndependent preparation and microscopic examination of materialrelated to students' performance at preparing and examining of materials21351 - 50.25Written examPreparation for written examAssessment of practical work, written exam and/or delivered presentation18301 - 50.25Oral examPreparation for oral examOral exam915Total20.25 </th <th>learning outcomes, teaching and students'</th> <th>Learning outcome</th> <th>Share of ECTS</th> <th>Form of teaching</th> <th>Activities of learning and teaching Critical conversation and</th> <th>Methods of monitoring and evaluation Records related to active participation in</th> <th>Gra Po min</th> <th>ints max</th>	learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and	Methods of monitoring and evaluation Records related to active participation in	Gra Po min	ints max			
2,30.5Practicespreparation and microscopic examination of materialstudents' performance at preparing and examining of materials21351-50.25Written examPreparation for written exam examAssessment of practical work, written exam and/or delivered presentation18301-50.25Oral examPreparation for oral examOral exam915Total200100	learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and	Methods of monitoring and evaluation Records related to active participation in conversations	Gra Po min	ints max			
2,30.5Practicespreparation and microscopic examination of materialstudents' performance at preparing and examining of materials21351-50.25Written examPreparation for written exam examAssessment of practical work, written exam and/or delivered presentation18301-50.25Oral examPreparation for oral examOral exam915Total200100	learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and	Methods of monitoring and evaluation Records related to active participation in conversations and discussions	Gra Po min	ints max			
2, 30.5Practicesmicroscopic examination of materialperformance at preparing and examining of materials21351 - 50.25Written examPreparation for written examAssessment of practical work, written exam and/or delivered presentation18301 - 50.25Oral examPreparation for oral examOral exam9151 - 50.25Oral examPreparation for oral examOral exam915	learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and discussion	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Records	Gra Po min	ints max			
1 - 50.25Written examPreparation of materialpreparing and examining of materialsAssessment of practical work, written examAssessment of practical work, written exam301 - 50.25Oral examPreparation for written examAssessment of practical work, written exam18301 - 50.25Oral examPreparation for oral examOral exam915Total200100	learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and discussion Independent	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Records related to	Gra Po min	ints max			
1 - 50.25Written examPreparation for written examAssessment of practical work, written exam18301 - 50.25Oral examPreparation for written examOral exam1818301 - 50.25Oral examPreparation for oral examOral exam915Total2000100	learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching Lecture	Activities of learning and teaching Critical conversation and discussion Independent preparation and	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Records related to students'	Gra Po min 12	ints max 20			
1 - 50.25Written examPreparation for written examAssessment of practical work, written exam and/or delivered presentation18301 - 50.25Oral examPreparation for oral examOral exam9151 - 50.25Oral examPreparation for oral examOral exam915Total2Image: Constraint of the examImage: Constraint of the examImage: Constraint of the exam100	learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching Lecture	Activities of learning and teaching Critical conversation and discussion Independent preparation and microscopic	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Records related to students' performance at	Gra Po min 12	ints max 20			
1 - 50.25Written examPreparation for written examAssessment of practical work, written exam18301 - 50.25Oral examPreparation for oral examOral exam915Total2000100	learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching Lecture	Activities of learning and teaching Critical conversation and discussion Independent preparation and microscopic examination of	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Records related to students' performance at preparing and	Gra Po min 12	ints max 20			
1 - 50.25Written examPreparation for written exampractical work, written exam and/or delivered presentation18301 - 50.25Oral examPreparation for oral examOral exam915Total2Image: Comparison for oral examImage: Comparison for oral exam0100	learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching Lecture	Activities of learning and teaching Critical conversation and discussion Independent preparation and microscopic examination of	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Records related to students' performance at preparing and examining of	Gra Po min 12	ints max 20			
1 - 50.25Written examPreparation for written examwritten exam and/or delivered presentation18301 - 50.25Oral examPreparation for oral examOral exam915Total2Image: Constraint of the examImage: Constraint of the examTotal2Image: Constraint of the examImage: Constraint of the examImage: Constraint of the examImage: Constraint	learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching Lecture	Activities of learning and teaching Critical conversation and discussion Independent preparation and microscopic examination of	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Records related to students' performance at preparing and examining of materials	Gra Po min 12	ints max 20			
1-50.25examwritten examand/or delivered presentation18301-50.25Oral examPreparation for oral examOral exam915Total260100	learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching Lecture	Activities of learning and teaching Critical conversation and discussion Independent preparation and microscopic examination of	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Records related to students' performance at preparing and examining of materials Assessment of	Gra Po min 12	ints max 20			
examwritten examand/or delivered presentation1 - 50.25Oral examPreparation for oral examOral exam915Total200100	learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching Lecture Practices	Activities of learning and teaching Critical conversation and discussion Independent preparation and microscopic examination of material	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Records related to students' performance at preparing and examining of materials Assessment of practical work,	Gra Po min 12	ints max 20			
Image: constraint of the symbolImage: constraint of the symbo	learning outcomes, teaching and students'	Learning outcome	Share of ECTS 1 0.5	Form of teaching Lecture Practices Written	Activities of learning and teaching Critical conversation and discussion Independent preparation and microscopic examination of material Preparation for	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Records related to students' performance at preparing and examining of materials Assessment of practical work, written exam	Gra Po min 12 21	ints max 20 35			
1 - 50.25Oral examPreparation for oral examOral exam915Total2000100	learning outcomes, teaching and students'	Learning outcome	Share of ECTS 1 0.5	Form of teaching Lecture Practices Written	Activities of learning and teaching Critical conversation and discussion Independent preparation and microscopic examination of material Preparation for	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Records related to students' performance at preparing and examining of materials Assessment of practical work, written exam and/or	Gra Po min 12 21	ints max 20 35			
1 - 5 0.25 exam oral exam Oral exam 9 15 Total 2 60 100	learning outcomes, teaching and students'	Learning outcome	Share of ECTS 1 0.5	Form of teaching Lecture Practices Written	Activities of learning and teaching Critical conversation and discussion Independent preparation and microscopic examination of material Preparation for	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Records related to students' performance at preparing and examining of materials Assessment of practical work, written exam and/or delivered	Gra Po min 12 21	ints max 20 35			
exam oral exam Total 2 60 100	learning outcomes, teaching and students'	Learning outcome	Share of ECTS 1 0.5	Form of teaching Lecture Practices Written	Activities of learning and teaching Critical conversation and discussion Independent preparation and microscopic examination of material Preparation for	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Records related to students' performance at preparing and examining of materials Assessment of practical work, written exam and/or delivered	Gra Po min 12 21	ints max 20 35			
	learning outcomes, teaching and students'	Learning outcome 1, 3, 4, 5 2, 3 1 - 5	Share of ECTS	Form of teaching Lecture Practices Written exam	Activities of learning and teaching Critical conversation and discussion Independent preparation and microscopic examination of material Preparation for written exam	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Records related to students' performance at preparing and examining of materials Assessment of practical work, written exam and/or delivered presentation	Gra Po min 12 21 21	ints max 20 35 30			
	learning outcomes, teaching and students'	Learning outcome 1, 3, 4, 5 2, 3 1 - 5	Share of ECTS	Form of teaching Lecture Practices Written exam Oral	Activities of learning and teaching Critical conversation and discussion Independent preparation and microscopic examination of material Preparation for written exam	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Records related to students' performance at preparing and examining of materials Assessment of practical work, written exam and/or delivered presentation	Gra Po min 12 21 21	ints max 20 35 30			
i mui si unci	learning outcomes, teaching and students'	Learning outcome 1, 3, 4, 5 2, 3 1 - 5 1 - 5	Share of ECTS 1 0.5 0.25 0.25	Form of teaching Lecture Practices Written exam Oral	Activities of learning and teaching Critical conversation and discussion Independent preparation and microscopic examination of material Preparation for written exam	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Records related to students' performance at preparing and examining of materials Assessment of practical work, written exam and/or delivered presentation	Gra Po min 12 21 18 18	ints max 20 35 30 15			

Consultation	60-70 points: grade 2 (sufficient) 71-80 points: grade 3 (good) 81-90 points: grade 4 (very good) 91-100 points: grade 5 (excellent) By appointment						
hours							
Teaching	Lectures	Seminars	Practices				
Hours - total	30	0	15				
Course content / teaching units	30 0 15 Lectures: Introduction to plant microtechniques Sampling of plant material Fixation Dehydration Infiltration and fitting Histochemical and cytochemical reactions: fresh sections, sections in paraffin, methacrylate and epoxy resins Usage of rotating microtome and cryostat Immunolocalisation In situ hybridisation of nucleic acids Light microscopy: microscope with phase and differential-interference contrast, fluorescence microscope, confocal microscope Electron microscopy: TEM and SEM (ESEM) Practices: Preparation of cytological and histological material, staining and microscopy						
Recommended reading	Ambriović Ristov A. (2007) Zagreb.	e microscopy methods to analys Metode u molekularnoj biolog otechnique and Microscopy. C	giji. Institut Ruđer Bošković,				
Optional reading	Maliga P., Klessig D.F., Cashr Molecular Biology. A Laborat New York. O'Brien T.P., McCully M.E. (1 Methods. Termercarphi Pty. Van De Graaf K.M., Rushfort	h S.R., Crawely, J.L. (1998) A Pho Norton Publishing Company, Co	J.E. (1995) Methods in Plant g Harbor Laboratory Press, re. Princples and Selected otographic Atlas for the				
Conditions for obtaining teacher's signature		nd lectures and practices, to pa	articipate in lectures actively				
Exam passing procedure	During the course, the teacher monitors and evaluates the activities of students by awarding points according to determined criteria. The final grade is determined according to the number of points collected during the lectures and the points achieved in written and oral exams.						
Main language of instruction; other languages	Croatian language, English la	nguage					
Method of monitoring the quality and efficiency of teaching	Survey carried out during t remarks and/or suggestions Monitoring of students' succ Carrying out a uniform Unive	ess at exams.	o students to make written				

Course title	Plant Pathoanatomy								
Code	BMZ80		-						
Study	Graduate	Iniversity		commo in Diology and	Chomistry Toool	oor Educat	ion		
programme	Graduate C	Graduate University Study Programme in Biology and Chemistry Teacher Education							
Semester	III semeste	r							
Workload/ECTS	2								
credits	2								
Course status	Elective								
Course teacher	Assoc. Prof	. Dr. Ljilja	ana Krstin						
Associate	Assoc Prof	Dr Tan	ja Žuna Pfeif	for					
teachers	A3300.1101	. Dr. ran	ja Zuna i Ten						
Course entry									
requirements	Diant Anat	amy Dlar		gy with Field Work (at	ttondod)				
(Preceding		Jiliy, Fiai		gy with Field Work (a	(lended)				
courses)									
Course objective	To teach st	udents h	now to recog	nise changes in the a	natomical struct	ure of plar	nt organs		
	caused by	<u> </u>							
Learning		•		most common cause			•		
outcomes				of environmental fa	actors on their	occurre	nce and		
		•	ent of disease						
			redict chang	es in the anatomical	structure of plan	t organs ca	aused by		
	-	seases.							
		-		thological changes in	plant cells and ti	issues on f	reshly		
		•		preparations.		_			
			velopment.						
		-		ence literacy of stud			research		
	ta	sks relate	ed to monito	tasks related to monitoring of pathological changes in plant tissues.					
Link between									
leanning					Asse				
learning		Share		Activities of	Asse	essment			
outcomes,	Learning	Share of	Form of		Methods of	essment Grad	-		
outcomes, teaching and	Learning outcome		Form of teaching	learning and		essment	-		
outcomes, teaching and students'	-	of			Methods of monitoring and	essment Grad Poi	ints		
outcomes, teaching and	-	of		learning and	Methods of monitoring and evaluation	essment Grad	-		
outcomes, teaching and students'	-	of		learning and	Methods of monitoring and evaluation Records	essment Grad Poi	ints		
outcomes, teaching and students'	-	of		learning and	Methods of monitoring and evaluation Records related to	essment Grad Poi	ints		
outcomes, teaching and students'	-	of		learning and teaching	Methods of monitoring and evaluation Records related to active and	essment Grad Poi	ints		
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical	Methods of monitoring and evaluation Records related to active and independent	essment Grad Poi min	max		
outcomes, teaching and students'	-	of		learning and teaching Critical conversation and	Methods of monitoring and evaluation Records related to active and independent participation	essment Grad Poi	ints		
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical	Methods of monitoring and evaluation Records related to active and independent participation in	essment Grad Poi min	max		
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and	Methods of monitoring and evaluation Records related to active and independent participation in conversation	essment Grad Poi min	max		
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and	essment Grad Poi min	max		
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions	essment Grad Poi min	max		
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records	essment Grad Poi min	max		
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to	essment Grad Poi min	max		
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion Independent preparation of microscopic	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to students'	essment Grad Poi min	max		
outcomes, teaching and students'	outcome	of ECTS 0.5	Lecture	learning and teaching Critical conversation and discussion Independent preparation of microscopic samples,	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to students' activities	essment Grad Poi min	nts max 10		
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion Independent preparation of microscopic samples, comparison of	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to students' activities within	essment Grad Poi min	max		
outcomes, teaching and students'	outcome	of ECTS 0.5	Lecture	learning and teaching Critical conversation and discussion Independent preparation of microscopic samples, comparison of structures of	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to students' activities within practices	essment Grad Poi min	nts max 10		
outcomes, teaching and students'	outcome	of ECTS 0.5	Lecture	learning and teaching Critical conversation and discussion Independent preparation of microscopic samples, comparison of structures of healthy and	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to students' activities within practices with	essment Grad Poi min	nts max 10		
outcomes, teaching and students'	outcome	of ECTS 0.5	Lecture	learning and teaching Critical conversation and discussion Independent preparation of microscopic samples, comparison of structures of healthy and diseased plant	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to students' activities within practices with provision of	essment Grad Poi min	nts max 10		
outcomes, teaching and students'	outcome	of ECTS 0.5	teaching Lecture Practices	learning and teaching Critical conversation and discussion Independent preparation of microscopic samples, comparison of structures of healthy and diseased plant tissues	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to students' activities within practices with	essment Grad Poi min	nts max 10		
outcomes, teaching and students'	outcome	of ECTS 0.5	Lecture	learning and teaching Critical conversation and discussion Independent preparation of microscopic samples, comparison of structures of healthy and diseased plant	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to students' activities within practices with provision of	essment Grad Poi min	nts max 10		

	1-5	0.5	Oral	Preparation for	Oral exam	15	25
			exam	oral exam			
	Total Final grade	2				60	100
	60-70 point 71-80 point 81-90 point 91-100 point	ts: grade ts: grade ts: grade	3 (good) 4 (very goo	od)			
Consultation hours	By appoint	ment					
Teaching	Le	ectures		Seminars		Practices	
Hours - total		15		0		15	
Course content / teaching units	 At Pa Pa Practices: Pr Ar 	 Anatomical structure of plants Abiotic and biotic factors as causes of pathogenic changes in cellular structures and plant tissues Pathological changes of cellular structures and organelles Pathological changes of plant tissues 					
Recommended reading	Trigiano R.I Laboratory	N., Wind Exercise	ham M.T., \ s, Taylor &		006 Plant Patholo	ogy: Conce	-
Optional reading	Osijeku, Pe Lepeduš H. Sveučilište Žuna Pfeiff anatomije Osijek.	dagoški f , Cesar V Josipa Ju er T., Krs biljaka, S	fakultet, Os V. (2010) O Irja Strossm tin Lj., Štolf Sveučilište	anatomija bilja, Sveu ijek. snove biljne histologij ayera u Osijeku, Odjel a I., Lovaković T., Tikas Josipa Jurja Strossma ing to the subject area	e i anatomije ve za biologiju, Osij s,V., Lepeduš,H. (yera u Osijeku,	egetativnik ek. 2014) Pra	n organa. ktikum iz
Conditions for obtaining teacher's signature		e oblige		pate in lectures actively		assignmen	its within
Exam passing procedure	which refer	rs to 40%	of the fina	r monitors and evalua I grade. Passing of writh I refers to the remaini	tten exam refers	to 30% of	
Main language of instruction; other languages	Croatian la	nguage, I	English lang	uage			
Method of monitoring the quality and efficiency of teaching	assure and During the	continuo last wee ne overa	ously impro ek of lecture	s and teachers is plan ve the quality of teach es, an anonymous stu of the course. Studer	ning and of the s dent survey will	tudy prog be carriec	ramme. d out to

Course title	Biofilms								
Code									
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education								
programme			Judy 110	Brainine in biology and	renemistry redene	Laacati	on		
Semester	III semeste	r							
Workload/ECTS credits	2								
Course status	Elective								
Course teacher	Assist. Pro	f. Dr. Gor	an Palijan						
Associate									
teachers									
Course entry requirements (Preceding courses)	Microbiolo	gy							
Course									
objective	To teach st	udents a	bout the st	ructure and function o	f biofilms.				
Learning outcomes	2. Al 3. Al	oility to v oility to	alorise the predict the	about the role of biofil interaction of biofilms ne changes in biofilm mental effects and spe	and environment. n populations in		ronment		
				fessional literature.					
Link between learning	Looming	Share Activities of Assessment							
outcomes,	Learning of Form of learning and Methods of Grading								
teaching and	outcome	ECTS	cedening	teaching	monitoring and	Ро	ints		
students' activities					evaluation	min	max		
activities	1-3	0.5	Lecture	Critical conversation and discussion	Records related to active participation in conversations and discussions	5	10		
	1-4	0.5	Seminar	Interpretation of scientific papers and application of obtained results at concepts learned within lectures	Monitoring of	10	15		
	1-4	1	Written exam	Preparation for written exam	Written exam	20	32,5		
		1	Oral exam	Preparation for oral exam	Oral exam	25	42,5		
	Total	3				60	100		
	60-70 poin 71-80 poin 81-90 poin	Final grade: 60-70 points: grade 2 (sufficient) 71-80 points: grade 3 (good) 81-90 points: grade 4 (very good) 91-100 points: grade 5 (excellent)							
Consultation hours	By appoint			,					

Hours - total	15	15	0			
Course content / teaching units	Competitive strategies of Interactions between mid Soil biofilms Biofilms of the sea and od Inland water biofilms Extreme habitats Practices: • Within seminars, stu- teaching units	-	he topics related to individual			
Recommended reading	Costerton JW. (2007) The Bio					
Optional reading	Microbiology. McGraw-Hill, B	∕licrobiological Applications – L oston.) Microbial Ecology. Wiley-Blac	-			
Conditions for obtaining teacher's signature		cipate in lectures actively and t				
Exam passing procedure	Before taking oral exam, stud	ents are obliged to pass writter	n exam.			
Main language of instruction; other languages	Croatian language					
Method of monitoring the quality and efficiency of teaching	out after the course; during th	ression about the organisation ne course, students will be given er monitors students' success a	n an opportunity to make oral			

Course title	Biomolecules in Food						
Code	BMZ77						
Study	Graduate L	Jniversity	/ Study Prog	ramme in Biology and	d Chemistry Teache	r Educat	ion
programme							
Semester	III semeste	r					
Workload/ECTS		-					
credits	2						
Course status	Elective						
Course teacher		. Dr. Vale	entina Pavić				
Associate							
teachers							
Course entry							
requirements							
(Preceding							
courses)							
Course	To teach	students	about the	structure and prop	erties of food bio	molecul	es about
objective				ations that are crucial			
objective		•	•	nciples of modulatio			
			•	gical and pathophysic			
Learning				ical structure of natu			
outcomes		-	antioxidant		in an and synthetic co	mpound	
cuttomes				dination of catabolic	and anabolic proce	SSES	
	•			oncept of deficient nu	•		v life.
				ailability of biomolecu		-	
			-	ailability of particula			inne the
				nutrition on the dev			fsnecific
			inditions.	nutrition on the dev	elopinent and prev	ention o	specific
Link between							
learning		Share		Activities of	Asses	sment	
outcomes,	Learning	of	Form of	learning and	Methods of	Gr	ading
teaching and	outcome	ECTS	teaching	teaching	monitoring and		oints
students'		Lens		teaching	evaluation	min	
activities					Records related		max
				Critical	to active		
	1-5	0.5	Locturo	conversation and		10	15
	1-5	0.5	Lecture		participation in	10	15
				discussion	conversations and discussions		
				Interpretation of			
				Interpretation of	Monitoring of		
				scientific papers	•		
	1 5	1	Cominar	and application of obtained	students'	40	60
	1-5	1	Seminar		performance at	40	60
				results at	interpretations		
				concepts learned	and tasks		
				within lectures			
	1-5	0.5	Final	Preparation for	Oral exam	10	20
	15	0.5	exam	oral exam	orarexam	10	20
	Total	2				60	100
	71-80 poin	ts: grade ts: grade ts: grade	4 (very goo	d)			

Consultation hours	By appointment						
Teaching	Lectures	Seminars	Practices				
Hours - total	15	15	0				
Course content / teaching units	 Biomolecular interact Secondary metabolit Damages caused by a Antioxidant propertia Assessment of the propertion Oxidative stress and The role of nutrition The role of nutrition Seminar: Membrane lipids of s Natural isothiocyana Function of soy lecith Recovery of biomole Influence of food on Phytosterols 	es of plants free radicals es of natural metabolites rotective role of phytochemical diseases in the prevention of various dis in gene expression skeletal muscle and insulin resis te sulforaphane in cancer cell a nin phospholipids in emulsions cules from food residues	seases stance apoptosis				
Recommended reading	Belitz H.D., Grosch W., Schieb	erle P. (2004) Food Chemistry. Iemistry. Marcel Dekker, Inc, N	Springer-Verlag, Berlin.				
Optional reading		icants in Food. Sheffield Acade 3) Flavonoids in Health and Disc					
Conditions for obtaining teacher's signature	Students are obliged to partic the course.	cipate in lectures actively and t	o fulfil all assignments within				
Exam passing procedure	-	Prior to taking oral exam, students are obliged to prepare and present the seminar paper. The final grade consists of points achieved at oral exam and of points obtained during the course					
Main language of instruction; other languages	Croatian language						
Method of monitoring the quality and efficiency of teaching	out after the course; during th	ression about the organisation ne course, students will be given er monitors students' success a	n an opportunity to make oral				

programmeSemesterIIWorkload/ECTS credits2Course statusECourse teacherAAssociateAteachersA	Il semester Elective Assist. Prof. Assoc. Prof.	Dr. Anita Dr. Tanja Dr. Dubr	a Galir Balkić a Žuna Pfeiffer avka Špoljarić		hemistry Teacher I	Educati	on
programmeSemesterIIWorkload/ECTS credits2Course statusECourse teacherAAssociateAteachersACourse entry requirements (PrecedingA	Il semester Elective Assist. Prof. Assoc. Prof. Assist. Prof.	Dr. Anita Dr. Tanja Dr. Dubr	a Galir Balkić a Žuna Pfeiffer avka Špoljarić		hemistry Teacher I	Educati	on
SemesterIIWorkload/ECTS credits2Course statusECourse teacherAAssociateAteachersACourse entry requirements (PrecedingA	lective Assist. Prof. Assoc. Prof. Assist. Prof.	Dr. Anita Dr. Tanja Dr. Dubr	a Žuna Pfeiffer avka Špoljarić				
Workload/ECTS credits2Course statusECourse teacherAAssociateAteachersACourse entry requirements (PrecedingA	lective Assist. Prof. Assoc. Prof. Assist. Prof.	Dr. Anita Dr. Tanja Dr. Dubr	a Žuna Pfeiffer avka Špoljarić				
credits2Course statusECourse teacherAAssociateAteachersACourse entry requirements (PrecedingA	Elective Assist. Prof. Assoc. Prof. Assist. Prof.	Dr. Tanja Dr. Dubr	a Žuna Pfeiffer avka Špoljarić				
credits E Course status E Course teacher A Associate A teachers A Course entry N Course entry requirements (Preceding A	Elective Assist. Prof. Assoc. Prof. Assist. Prof.	Dr. Tanja Dr. Dubr	a Žuna Pfeiffer avka Špoljarić				
Course teacher A Associate A teachers A Course entry requirements (Preceding	Assist. Prof. Assoc. Prof. Assist. Prof.	Dr. Tanja Dr. Dubr	a Žuna Pfeiffer avka Špoljarić				
Associate A teachers A Course entry requirements (Preceding	Assoc. Prof. Assist. Prof.	Dr. Tanja Dr. Dubr	a Žuna Pfeiffer avka Špoljarić				
teachers A N Course entry requirements (Preceding	ssist. Prof.	Dr. Dubr	avka Špoljarić				
teachers A N Course entry requirements (Preceding	ssist. Prof.	Dr. Dubr	avka Špoljarić				
Course entry requirements (Preceding			• •				
Course entry requirements (Preceding							
requirements (Preceding							
(Preceding							
-							
Course objective T	o enable st	tudents t	o acquire kno	wledge and develop	skills that are usef	ul in sc	lving of
-			-	mistry in the local			-
				n an association or so			
	olutions to				·		
Learning	1. Sup	oported	cooperation o	f students and the I	ocal community w	ith the	aim to
outcomes	-	-	-	ons and contribution			
		-		ent social issues and o			hildren.
			-	ng appropriate proble			
				e's own professiona	-		oming a
		•		e local community.	. p. 68. 666 to the		
Link between				· · · · · · · · · · · · · · · · · · ·			
learning					Assessn	nent	
outcomes,	Learning	Share	Form of	Activities of			
	outcome	of	teaching	learning and	Methods of		ding
students'		ECTS		teaching	monitoring	Ро	ints
activities					and evaluation	min	max
				Active			
				participation in	Records,	_	
	1-4	0,2	Lectures	critical discussion	evaluation	5	10
				and in teaching			
F					Records,		
				Active	assessment of		
	1-3	0,8	Seminars	participation in	participation in	25	35
	10	0,0	Serimars	all project	project		33
				activities	activities		
				Keeping a work	activities		
				diary about the			
	1-4	0.5	Written	socially useful	Assessment of	15	25
	1-4	0.5	exam	learning	work diary	13	25
				experience			
				Final oral			
	3-4	0.5	Oral exam	presentation	Oral exam	15	25
-	Total	2		presentation		60	95
	inal grade:			I			
6 6 7	0-68 point 9-77 point 8-86 point	ts: grade ts: grade ts: grade	2 (sufficient) 3 (good) 4 (very good) 5 (excellent)				

Consultation hours	By appointment					
Teaching	Lectures	Seminars	Practices			
Hours - total	3	27	0			
Course content / teaching units	 Lectures: Socially useful learning in higher education - definition and purpose Forms of socially useful learning Socially useful learning procedure - project planning (project goal, project duration, distribution of activities, end-user function), determination of project teams, project management and implementation of project activities) Assessment of achieved project results and experiences. Seminars: Examples of good practice Developing a project with a local community partner in order to solve specific problems of a local community target group Project report - activities, sustainability, knowledge transfer, description of 					
Recommended reading	measurable and objec Mikelić Preradović N. (2009) U Odsjeka za informacijske znano		vod za informacijske studije			
Optional reading	Begić J., Berbić K.E., Brajković L (2019) Od realizacije do prom učenja. Institut za razvoj obraz Brubaker D.C., Ostraff J.H. (ed models for service-learning in Kazmer M.M. (2005) Commun 212. Original scientific and professio	ijene: Vodič za pokretanje pr ovanja, Zagreb. ds.) (2006) Life, learning, and biology. Sterling, VA: Stylus Pu hity-Embedded Learning. The	ograma društveno korisnog d community: Concepts and iblishing, LLC. Library Quarterly, 75: 190-			
Conditions for obtaining teacher's signature	Regular attendance of lectures					
Exam passing procedure	The teacher evaluates the activ at final exam. Active participat participation in project activit grade. Final oral presentation	ion in lectures refers to 10% of ies and keeping of work diar	of the final grade, and active y refers to 70% of the final			
Main language of instruction; other languages	grade. Final oral presentation refers to 20% of the final grade. Croatian language, English language					
Method of monitoring the quality and efficiency of teaching	Communication with students students to make oral or writte phases, evaluation of the final	n remarks, monitoring of the i				

Course title	Ecology in	Educatio	on					
Code	BBZ50							
Study	Graduato I	Craduate University Study Programme in Dielegy and Chemistry Teacher Education						
programme		Graduate University Study Programme in Biology and Chemistry Teacher Education						
Semester	III semeste	r						
Workload/ECTS	2							
credits	2							
Course status	Elective							
Course teacher	Assist. Prof	. Dr. Irena	Labak					
Associate								
teachers								
Course entry								
requirements								
(Preceding								
courses)								
Course objective			-	ently and effectively	manage the edu	ucational	process	
				ment issues.				
Learning			-	erish the natural and o	-			
outcomes		-		inctioning of eco-scho	ols for the purp	ose of n	nanaging	
		ch a schoo		c · · · · ·				
		•		ays of integrating env	ronmental educ	cation in	to direct	
		lucational	-					
		•	•	ects and opportunitie	s to improve th	e knowle	edge and	
Link batura an	SK	ills needeo	d for environ	mental education.				
Link between					Asse	ssment		
learning		Share		Activities of				
outcomes, teaching and	Learning	of	Form of	learning and	Methods of		ding	
students'	outcome	ECTS	teaching	teaching	monitoring	Po	ints	
activities					and	min	max	
activities					evaluation			
				Critical	Decende			
				conversation and discussion	Records			
					related to active			
				Flipped classroom: analysis of	participation			
				relevant curricula;	in			
	1-4	0.5	Lecture	collaborative	discussions,	10	20	
	1-4	0.5	Lecture	learning and a	analysis and	10	20	
				debate within	in			
				analysis of	collaborative			
				different types of	learning;			
				information	portfolio			
				sources	portiono			
					Analysis of a		ļ	
					proposal			
					referring to			
				Visit to an eco-	active		40	
	1-5	1	Practices	Visit to an eco- school workshop	active engagement	25	40	
	1-5	1	Practices	Visit to an eco- school, workshop	engagement	25	40	
	1-5	1	Practices		engagement in a	25	40	
	1-5	1	Practices		engagement in a workshop;	25	40	
	1-5	1		school, workshop	engagement in a workshop; portfolio	25	40	
			Practices	school, workshop Preparation of a	engagement in a workshop; portfolio Simulation			
	1-5	1		school, workshop	engagement in a workshop; portfolio Simulation of a	25 25	40	
			Written	school, workshop Preparation of a	engagement in a workshop; portfolio Simulation			

Consultation	Final grade: 60-70 points: grade 2 (suffic 71-80 points: grade 3 (good) 81-90 points: grade 4 (very s 91-100 points: grade 5 (exce By appointment) good)			
Teaching	Lectures	Seminars	Practices		
Hours - total	15	0	15		
Course content / teaching units	 Ecological education in Croatian curriculum Ecological education in the teaching of biology Raising awareness on environmental issues through the curriculum Raising consciousness of children and youth toward a complex experience of the environment Activities in the development of ecological sensitivity of children Nature and cultural heritage in different subject curricula in primary and secondary school The importance of developing ecological and creative abilities in the process of education Integration and correlation of environmental education through the curriculum The importance of student activities in preserving the environment Projects that contribute to preservation of school environment in subject teaching Cooperation in environmental education programs that involves: children/pupils - teacher - school - family - experts - scientists - professional and cultural institutions Learning, teaching and the role of teachers in education for sustainable development Introduction to eco-schools, classes, eco-projects Simulation of various activities and situations related to environmental 				
Recommended reading	zaštite i prostornog uređenja Uzelac V. (2002) Stanje i v	alnu ekologiju. Hrvatska sveuč a, Zagreb. vizija obrazovanja studenata u pedagoško-književni zbor, Zagre	učiteljskih škola/nastavničkih		
Optional reading	153. Uzelac V., Starčević I. (1999)	vi obrazovnom kurikulumu. Dru Djeca i okoliš. Adamić, Rijeka. vebsite containing articles relat			
Conditions for obtaining teacher's signature	Students are obliged to parti	icipate in lectures actively.			
Exam passing procedure	awarding points according to feedback, which students us their learning process and po are obliged to perform a sin	cher monitors and evaluates to o determined criteria. The teac se to assess their learning prog rofessional development. At the nulation of a developed worksh rshop and to points obtained du	her thus provides continuous ress with the aim to improve e end of the course, students nop. The final grade refers to		
Main language of instruction; other languages	Croatian language				

Method of	During the course, the teacher performs evaluation for learning by continuous monitoring
monitoring the	of the learning process and student achievement, thus determining and adapting his/her
quality and	teaching. After the course, the teacher conducts a survey among students to evaluate
efficiency of	their subjective impression about the teaching quality, all with the aim to improve future
teaching	teaching.

Course title	Ecological	Immun	ology				
Code							
Study							
programme	Graduate University Study Programme in Biology and Chemistry Teacher Education						
Semester	III semeste	r					
Workload/ECTS							
credits	2						
Course status	Elective						
Course teacher	Assist. Prof	. Dr. Sen	ka Blažetić				
	Assist. Prof						
Associate							
teachers							
Course entry							
requirements	,			- /			
(Preceding	Ecology (at	tended),	Biochemistr	y 3 (attended)			
courses)							
Course objective	To enable s	students	to understar	nd the natural varia	tions in the body's in	nmune r	esponse
					biotic factors and the		-
Learning					mplexity of the im		
outcomes		•	roups of orga	•	inplexity of the in	indire 5	
outcomes		-			ences of the immune	system	diversitv
				ion and ecology.		2 System	arversity
					nvironmental factors	and the	immune
		sponse.	indryse the re			und the	innanc
		•	latarmina th	ne consequences th	nat ecosystem disord	dore hav	o on tha
		nmune re		ie consequences ti			e on the
Link between							
learning		Share		Activities of	Assess	ment	
outcomes,	Learning	of	Form of	learning and	Methods of	Gra	ding
teaching and	outcome	ECTS	teaching	teaching	monitoring and		ints
students'		Leis		teaching	evaluation	min	max
activities					Records related		шах
				Critical	to student		
	1-4	0.5	Lecture	conversation	performance	10	20
				and discussion	during lectures		
					Assessment of presentation and		
				Marking on a			
	1-4	0.75	Seminar	Working on a	interpretation of obtained results	35	50
				case study			
					with provision of		
					feedback		
	1-4	0.25	Written	Preparation for	Written exam	5	10
			exam	written exam		-	
	1.4	0.5	Oral	Preparation for	Oral avam	10	20
	1-4	0.5	exam	oral exam	Oral exam	10	20
	Total	2				60	100
	Final grade	e: ts: grade			·		

Consultation hours	By appointment						
Teaching	Lectures	Seminars	Practices				
Hours - total	15	15	0				
Course content / teaching units	 Mechanisms of inte Intraspecific selection Influence of environ Integration of the integration of the integrat	opment of the immune respons eraction between the host and t ve limitations nmental factors on the diversity nmune response and collective velopment of tolerance and res	the pathogen y of the immune response e immunity within community				
Recommended reading		Ecoimmunology 1st ed. Oxford 4) Eco-immunology: Evolutive	-				
Optional reading	Ulvestad E. (2007) Defending	Ulvestad E. (2007) Defending Life: The Nature of Host-Parasite Relations. Springer.					
Conditions for obtaining teacher's signature	Students are obliged to part within the course.	icipate in lectures actively and t	to fulfil all assignments				
Exam passing procedure	During the course, the teacher monitors and evaluates the activities of students by awarding points according to determined criteria. After the course, students take a written exam and then oral exam.						
Main language of instruction; other languages	Croatian language						
Method of monitoring the quality and efficiency of teaching	students the opportunity to are given a survey in whi	her continuously evaluates stu make oral or written commen ch they give their subjective with the aim to improve future	ts. After the course, students opinion about quality and				

Course title	Ecologica	l Projects						
Code								
Study	Graduate I	Iniversity Stu	dy Programm	e in Biology and Cl	nemistry Teacher I	ducatio	n	
programme	Graduate	Shiversity Stu	uy i logi allilli		iennisci y reacher i	uucatio	11	
Semester	III semester							
Workload/ECTS credits	3							
Course status	Elective							
Course teacher	Assoc. Prof. Dr. Melita Mihaljević							
Associate								
teachers								
Course entry								
requirements								
(Preceding								
courses)	T 11				·	• •		
Course				nent and manages	scientific and profe	essional	projects	
objective			d environmer	•	from its proper	ation	through	
Learning outcomes			n and final eva	management,	from its prepar	ation,	through	
outcomes		-		tal studies and pro	vierts			
		•		onmental protecti	•	d soluti	ions for	
				project proposal in		u solut		
Link between	рі							
learning				Activities of	Assess	ment		
outcomes,	Learning	Share of	Form of	learning and	Mathadaaf	Gra	ding	
teaching and	outcome E	ECTS	teaching	teaching	Methods of		iding ints	
students'				teaching	monitoring and evaluation	min	1	
activities				Lecture			max	
				attendance	Records,			
	1-3	0.5	Lectures	and active	evaluation	10	15	
				participation	evaluation			
				Attendance at				
				the seminar,				
				prepared				
				seminar paper	Records,			
	1-3	0.5	Seminar	containing	evaluation of	15	20	
				results and	seminar paper			
				conclusions of				
				the performed				
				analyses				
				Preparation for				
	1-3	1	Written	written	Written exam	15	20	
			exam	preliminary				
				exam				
		1	Final exam	Exam	Oral exam	20	45	
		_		preparation				
	Total	2				60	100	
	71-80 poin	e: its: grade 2 (s its: grade 3 (g its: grade 4 (v	good)					

Consultation hours	As agreed with students.							
Teaching	Lectures	Seminars	Practices					
Hours - total	15	15	0					
Course content / teaching units	 Scientific research projects, development projects - planning, specifics, application procedure, project management and implementation. European Union funds, financial programs and calls for proposals Application of projects for financial support from European Union and national funds Preparation of project documentation and project application process Proposal evaluation procedure The role of individuals, non-governmental organisations, scientific community and authorised institutions in the application and implementation of projects Legal framework. 							
Recommended reading	Kerzner H. (2003) Project man Controlling. John Wiley & Sons Martinić I. (2010) Upravljanje održivost. Šumarski fakultet, S	 Independent preparation of project documentation Kerzner H. (2003) Project management, A systems Approach to Planning, Scheduling and Controlling. John Wiley & Sons, Inc. Martinić I. (2010) Upravljanje zaštićenim područjima prirode - planiranje, razvoj i održivost. Šumarski fakultet, Sveučilište u Zagrebu. 						
Optional reading	McCarthy S. (2013) How to Write a Competitive Proposal for Horizon 2020. Seán McCarthy Hyperion Ltd. McCarthy S. (2008) How to Write a Competitive Proposal for Framework 7. Seán McCarthy Hyperion Ltd.							
Conditions for obtaining teacher's signature	Attendance at lectures and seminars by obtaining minimum 25 points and by achieving at least 40% of the total number of points at the preliminary exam. A report written in the form of a scientific project application is a prerequisite for proceeding with the written exam.							
Exam passing procedure	The teacher evaluates the activities of students during the course and their achievements at final exam. The final grade consists of preparation of a written report by a share of 30%, of written exam by a share of 40%, and of oral exam by a share of 30%.							
Main language of instruction; other languages	Croatian language							
Method of monitoring the quality and efficiency of teaching	and continuously improve the last week of lectures, an ano	s and teachers is planned to be quality of teaching and of the s nymous student survey will be he analysis of students' success	study programme. During the e carried out to evaluate the					

Course title	Genome I	Evolutio	n				
Code	BMZ79						
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education						
programme	Graduate University Study Programme in Biology and Chemistry Teacher Education						
Semester	III semeste	r					
Workload/ECTS	2						
credits							
Course status	Elective						
Course teacher	Assist. Pro	f. Dr. Zora	ana Katanić				
Associate							
teachers							
Course entry							
requirements	Genetics, N	Nolecula	r Biology, Evo	olution			
(Preceding							
courses) Course objective	To onable	ctudonto	to undorstar	nd the basic concept	s of gonomo ovolui	tion and	to make
course objective				methodology used ir	•		to make
Learning				basics of genome or		-	different
outcomes		rganisms.	-	ousies of genome of	banisation and full		ancient
		-		tion and significance	of different mecha	nisms of	genome
		/olution.		0			0
	3. Sk	kills in ap	plying resea	rch methods related	to the size, organ	isation, f	unction,
			ion of the ge				
	4. Al	bility to c	ritically revie	w relevant scientific	literature.		
Link between					Accord	mont	
learning	Learning	Share	Form of	Activities of	Assess	sment	
outcomes,	outcome	of	teaching	learning and	Methods of	Gra	ding
toaching and	outcome		teating	A second stream		_	:
teaching and		ECTS	_	teaching	monitoring	Po	ints
students'		ECTS		teaching	monitoring and evaluation	Po min	max
-		ECIS			and evaluation Records related		
students'				Critical	and evaluation Records related to active	min	max
students'	1-4	0.5	Lecture	Critical conversation and	and evaluation Records related to active participation in		
students'	1-4		Lecture	Critical	and evaluation Records related to active participation in conversations	min	max
students'	1-4		Lecture	Critical conversation and discussion	and evaluation Records related to active participation in conversations and discussions	min	max
students'	1-4		Lecture	Critical conversation and discussion Critical	and evaluation Records related to active participation in conversations and discussions Monitoring of	min	max
students'	1-4		Lecture	Critical conversation and discussion Critical interpretation	and evaluation Records related to active participation in conversations and discussions Monitoring of students'	min	max
students'	1-4		Lecture	Critical conversation and discussion Critical interpretation and presentation	and evaluation Records related to active participation in conversations and discussions Monitoring of students' interpretations	min	max
students'	1-4			Critical conversation and discussion Critical interpretation and presentation of scientific	and evaluation Records related to active participation in conversations and discussions Monitoring of students' interpretations and	min 10	max 20
students'		0.5	Lecture	Critical conversation and discussion Critical interpretation and presentation of scientific research;	and evaluation Records related to active participation in conversations and discussions Monitoring of students' interpretations	min	max
students'		0.5		Critical conversation and discussion Critical interpretation and presentation of scientific	and evaluation Records related to active participation in conversations and discussions Monitoring of students' interpretations and presentation of	min 10	max 20
students'		0.5		Critical conversation and discussion Critical interpretation and presentation of scientific research; preparation and	and evaluation Records related to active participation in conversations and discussions Monitoring of students' interpretations and presentation of scientific	min 10	max 20
students'		0.5		Critical conversation and discussion Critical interpretation and presentation of scientific research; preparation and presentation of a	and evaluation Records related to active participation in conversations and discussions Monitoring of students' interpretations and presentation of scientific research;	min 10	max 20
students'	1-4	0.5		Critical conversation and discussion Critical interpretation and presentation of scientific research; preparation and presentation of a seminar paper	and evaluation Records related to active participation in conversations and discussions Monitoring of students' interpretations and presentation of scientific research; analysis of a seminar paper	min 10 30	max 20 50
students'		0.5	Seminar	Critical conversation and discussion Critical interpretation and presentation of scientific research; preparation and presentation of a	and evaluation Records related to active participation in conversations and discussions Monitoring of students' interpretations and presentation of scientific research; analysis of a	min 10	max 20
students'	1-4	0.5	Seminar Final	Critical conversation and discussion Critical interpretation and presentation of scientific research; preparation and presentation of a seminar paper Preparation for	and evaluation Records related to active participation in conversations and discussions Monitoring of students' interpretations and presentation of scientific research; analysis of a seminar paper	min 10 30	max 20 50 30
students'	1-4	0.5	Seminar Final	Critical conversation and discussion Critical interpretation and presentation of scientific research; preparation and presentation of a seminar paper Preparation for	and evaluation Records related to active participation in conversations and discussions Monitoring of students' interpretations and presentation of scientific research; analysis of a seminar paper	min 10 30 20	max 20 50
students'	1-4	0.5 1 0.5 2	Seminar Final	Critical conversation and discussion Critical interpretation and presentation of scientific research; preparation and presentation of a seminar paper Preparation for	and evaluation Records related to active participation in conversations and discussions Monitoring of students' interpretations and presentation of scientific research; analysis of a seminar paper	min 10 30 20	max 20 50 30
students'	1-4 1-4 Total Final grade	0.5 1 0.5 2	Seminar Final	Critical conversation and discussion Critical interpretation and presentation of scientific research; preparation and presentation of a seminar paper Preparation for oral exam	and evaluation Records related to active participation in conversations and discussions Monitoring of students' interpretations and presentation of scientific research; analysis of a seminar paper	min 10 30 20	max 20 50 30
students'	1-4 1-4 Total Final grade	0.5 1 0.5 2 e: ts: grade	Seminar Final exam	Critical conversation and discussion Critical interpretation and presentation of scientific research; preparation and presentation of a seminar paper Preparation for oral exam	and evaluation Records related to active participation in conversations and discussions Monitoring of students' interpretations and presentation of scientific research; analysis of a seminar paper	min 10 30 20	max 20 50 30
students'	1-4 1-4 Final grade 60-70 poin 71-80 poin 81-90 poin	0.5 0.5 1 0.5 2 ts: grade ts: grade ts: grade	Seminar Final exam 2 (sufficient 3 (good) 4 (very good	Critical conversation and discussion Critical interpretation and presentation of scientific research; preparation and presentation of a seminar paper Preparation for oral exam	and evaluation Records related to active participation in conversations and discussions Monitoring of students' interpretations and presentation of scientific research; analysis of a seminar paper	min 10 30 20	max 20 50 30
students'	1-4 1-4 Final grade 60-70 poin 71-80 poin 81-90 poin	0.5 0.5 1 0.5 2 ts: grade ts: grade ts: grade	Seminar Final exam 2 (sufficient 3 (good)	Critical conversation and discussion Critical interpretation and presentation of scientific research; preparation and presentation of a seminar paper Preparation for oral exam	and evaluation Records related to active participation in conversations and discussions Monitoring of students' interpretations and presentation of scientific research; analysis of a seminar paper	min 10 30 20	max 20 50 30

Consultation hours	By appointment						
Teaching	Lectures	Seminars	Practices				
Hours - total	15	15	0				
Course content / teaching units	 Lectures: Size and organisation of genomes in different organisms Genetic control of cell size Mechanisms of genome evolution Evolution of gene structure and gene expression Basic differences of mitochondrial DNA Evolution of plastid DNA B-chromosomes Sex chromosomes Mechanism and significance of chromatin reduction and chromosome elimination Methods for investigating the size, structure, function and evolution of the genome 						
Recommended reading Optional reading	Zagreb Scientific papers referring to Gregory T.R. (2005) The Evolu Alberts B., Bray D., Lewis J., F the cell. 5th ed. Garland Publ	(2010) Stanica: Molekularni	Academic Press. . (2007) Molecular biology of n.				
Conditions for obtaining teacher's signature Exam passing	Students are obliged to partie the course.	the Human Genome I. Springe cipate in lectures actively and t ther monitors and evaluates	o fulfil all assignments within				
procedure	During the course, the teacher monitors and evaluates the activities of students by awarding points according to determined criteria. After the lectures, students proceed with the oral exam. The final grade consists of points achieved at the oral exam and of points obtained during the course.						
Main language of instruction; other languages	Croatian language						
Method of monitoring the quality and efficiency of teaching	their subjective impression a	nous survey will be carried out about the organisation and qu opportunity to make written o	ality of teaching; during the				

Course title	Fauna Diversity of Croatia						
Code	BBZ52						
Study							
programme	Graduate University Study Programme in Biology and Chemistry Teacher Education						
Semester	III semeste	r					
Workload/ECTS credits	3						
Course status	Elective						
Course teacher	Assist. Prof	. Dr. Alm	a Mikuška				
Associate	Assist Drof		a Cudariá Da	vzelović			
teachers	ASSIST. PLOT	. Dr. IVIII	a Sudarić Bo	igojevic			
Course entry							
requirements							
(Preceding							
courses)							
Course			•	ible members of the		•	-
objective				eir knowledge and ski			
	•	-	oatia and by	raising their aware	ness of Croatian fa	auna valu	ue at the
	internation						
Learning	1.			knowledge and skills	needed for respor	sible beł	naviour in
outcomes				diversity in Croatia.			
	2.			e the relation betwe		influence	e and the
	-	•		e fauna diversity of C		_	
	3.	-	-	protocol for indepe	indent research of	certain g	groups of
			s living in Cr				
	4.	-		cientific and professi			
	5.		-	calculations of biodiv	ersity indexes for d	Interent	groups of
Link between		anima	s and areas i				
					Asses	sment	
learning outcomes,	Learning	Share	Form of	Activities of			
teaching and	outcome	of	teaching	learning and	Methods of		ding
students'		ECTS	-	teaching	monitoring and		ints
activities					evaluation	min	max
utilities				Critical	Monitoring of		
				conversation and	students'		
	1-4	0.5	Lecture	discussion,	activity during	15	20
				Flipped	lectures		
				classroom			
					Analysis of the		
		essay by					
				Independent	provision of		
	1-4	0.5	Seminars	Independent writing of an	provision of feedback on	10	20
	1-4	0.5	Seminars		provision of feedback on student's	10	20
	1-4	0.5	Seminars	writing of an	provision of feedback on student's progress in the	10	20
	1-4	0.5	Seminars	writing of an	provision of feedback on student's progress in the learning	10	20
	1-4	0.5	Seminars	writing of an	provision of feedback on student's progress in the learning process	10	20
	1-4	0.5	Seminars	writing of an	provision of feedback on student's progress in the learning process Analysis of	10	20
	1-4	0.5	Seminars	writing of an	provision of feedback on student's progress in the learning process Analysis of completed	10	20
	1-4	0.5	Seminars	writing of an essay	provision of feedback on student's progress in the learning process Analysis of completed tasks by	10	20
				writing of an essay Calculation of	provision of feedback on student's progress in the learning process Analysis of completed tasks by provision of		
	1-4	0.5	Seminars Practices	writing of an essay Calculation of biodiversity	provision of feedback on student's progress in the learning process Analysis of completed tasks by provision of feedback on	10	20
				writing of an essay Calculation of	provision of feedback on student's progress in the learning process Analysis of completed tasks by provision of feedback on student's		
				writing of an essay Calculation of biodiversity	provision of feedback on student's progress in the learning process Analysis of completed tasks by provision of feedback on		

		1	Written	Preparation for			[[]
	1-5	0.5	exam	written exam	Seminar	15	20
	1-5	0.5	Oral exam	Preparation for oral exam	Oral exam	10	20
	Total	3				60	100
	71-80 poin 81-90 poin	its: grade its: grade its: grade	2 (sufficien 3 (good) 4 (very goo e 5 (excelle	od)			
Consultation hours	By appoint	ment					
Teaching	Le	ctures		Seminars		Practices	5
Hours - total							<u> </u>
		15		15		15	
Course content / teaching units	• • • • • • • • • •	Introduct What is b Fauna - w Factors th Confirmed Character Factors th Regional Habitat d Natura 20 Research Endanger Overview Methods Introduct Biodivers Indexes o Using of t of fauna i	iodiversity? hy we need hat influence d taxa of ani- istics of Eur- nat influence division of C iversity in C 000 species into Croatia ment and p of individua of inventory ion to litera ity indexes f fauna simi- he Primer si- n various ha	In fauna rotection of Croatian al groups of vertebrate y and monitoring of fa ture and databases or larity oftware to calculate the abitats	Fauna, the ratio of rope and Croatia f Mediterranean fa al classification of t fauna es and invertebrat nuna in Croatia n fauna ne indexes of diver	evaluated auna Croatian h res in Croa	l and nabitats atia imilarity
Recommended reading	of fauna in various habitats Clarke K.R., Gorely R.N. (2020) Primer 7. User Manual/ Tutoral. Primer-E Ltd. Plymouth. Holcer D., Pavlinić I. (2008) Fauna, Priručnik za inventarizaciju i praćenje stanja. Ministarstvo kulture, Državni zavod za zaštitu prirode, Zagreb. Purger J. (2007) Priručnik za istraživanje biološke raznolikosti duž rijeke Drave. Sveučilište u Pečuhu, Pečuh. Izvješće o stanju okoliša u RH za razdoblje 2013-2016 http://www.haop.hr/sites/default/files/uploads/dokumenti/06_integrirane/dokumenti/ niso/IZVJ_OKOLIS_2013-2016.pdf						
Optional reading	Hamidović kulture, Dr Belančić A. knjiga vret Jardas I., P Hrvatske. N Jelić D., Ku Hutinec Lj.	D., Pavliı žavni zav , Bogdan enaca Hru allaoro A Ministarsi ıljerić M. , Bogdan	nić I., Tvrtko od za zaštiti ović T., Fran vatske. Mini ., Vrgoč N., . tvo kulture, , Koren T., ović T., Mek	šić M., Holcer D., Vu vić N. (2006) Crvena k u prirode, Zagreb. ković M., Ljuština M., starstvo kulture, Drža lukić-Peladić S., Dadić Državni zavod za zašti Treer D., Šalamon D., inić S., Jelić K. (2013) (rirode i okoliša i Držav	Mihoković N., Vita Mihoković N., Vita vni zavod za zaštit V. (2008) Crvena itu prirode, Zagrek , Lončar M., Podn Crvena knjiga vodo	atske. Mir as B. (2003 tu prirode knjiga mo o. ar-Lešić N ozemaca i	histarstvo 8) Crvena , Zagreb rskih riba 1., Janev- gmazova

	Mrakovčić M., Brigić A., Buj I., Ćaleta M., Mustafić P., Zanella D. (2006) Crvena knjiga slatkovodnih riba Hrvatske. Ministarstvo kulture, Državni zavod za zaštitu prirode, Zagreb. Ozimec R., Bedek J., Gottstein S., Jalžić B., Slapnik R., Štamol V., Bilandžija H., Dražina T., Kletečki E. Komerički A., Lukić M., Pavlek M. (2009) Crvena knjiga špiljske faune Hrvatske. Ministarstvo kulture, Državni zavod za zaštitu prirode, Zagreb. Tutiš V, Kralj J, Čiković D, Barišić S (2013) Crvena knjiga ptica Hrvatske. Ministarstvo zaštite prirode i okoliša i Državni zavod za zaštitu prirode, Zagreb.
Conditions for obtaining teacher's signature	Active participation in the teaching process and fulfilment of all assignments.
Exam passing procedure	The teacher evaluates the activities of students by awarding points according to determined criteria (points are awarded for solving of practical tasks and for seminar paper presentation). In this way, students can assess and improve their learning progress and advance their own professional development. At the end of the course, students prepare the seminar paper. During the oral exam, the teacher asks questions that are related to learning outcomes. The final grade is determined according to the number of points that students obtain at practices, for the seminar paper and at the oral exam.
Main language of instruction; other languages	Croatian language
Method of monitoring the quality and efficiency of teaching	The teacher continuously monitors the learning process and student achievements, thus determining and adapting his/her teaching. After the course, the teacher and students analyse the efficiency of the teaching process and carry out a survey to evaluate students' subjective impression about the teaching quality, all with the aim to improve future teaching.

Course title	Herpetol	ogy						
Code								
Study	Creducte University Study Dreamannes in Dielery and Chemistry Teacher Education							
programme	Graduate University Study Programme in Biology and Chemistry Teacher Education							
Semester	III semeste	er						
Workload/ECTS								
credits	2							
Course status	Elective							
Course teacher		f Dr Olg	a Jovanović Gla	avaš				
Associate	7.001011110							
teachers								
Course entry								
requirements								
(Preceding								
courses)								
Course	To teach s	tudants	about the bio	logy of amphibians	and rentiles and	their svs	tematics	
objective				n and causes of end		then sys	iematics,	
-								
Learning		-		atomy and morpho	logy of amphibians	and rept	iles and	
outcomes			ays of their re					
				tion of amphibians	and reptiles based	on the a	cquired	
		nowledge						
				ons for the endange			-	
		-		ate methods for res			eptiles.	
		-		ina of amphibians a		tia.		
	6. SI	kills in sea	arching databa	ses of amphibians a	and reptiles.			
Link between					٨٠٠٥٢	sment		
learning		Share		Activities of	A3363	Sment		
-	Learning Form of Learning							
outcomes,	-	of	Form of	learning and	Methods of	Gra	ding	
teaching and	Learning outcome		Form of teaching				ding ints	
teaching and students'	-	of		learning and	Methods of monitoring and evaluation		-	
teaching and	-	of		learning and	monitoring and	Ро	ints	
teaching and students'	outcome	of ECTS	teaching	learning and teaching Lecture	monitoring and	Po min	ints max	
teaching and students'	-	of		learning and teaching Lecture attendance and	monitoring and evaluation	Ро	ints max	
teaching and students'	outcome	of ECTS	teaching	Lecture attendance and active	monitoring and evaluation Student	Po min	ints max	
teaching and students'	outcome	of ECTS	teaching	learning and teaching Lecture attendance and active participation	monitoring and evaluation Student	Po min	ints max	
teaching and students'	outcome	of ECTS	teaching	Lecture attendance and active participation Practical classes	monitoring and evaluation Student	Po min	ints max	
teaching and students'	outcome	of ECTS	teaching	Lecture attendance and active participation Practical classes attendance and	monitoring and evaluation Student	Po min	ints max	
teaching and students'	outcome 1-5	of ECTS 0.5	teaching Lectures	learning and teaching Lecture attendance and active participation Practical classes attendance and active	monitoring and evaluation Student attendance	Po min 5	ints max 10	
teaching and students'	outcome	of ECTS	teaching	learning and teaching Lecture attendance and active participation Practical classes attendance and active participation,	monitoring and evaluation Student attendance Records,	Po min	ints max	
teaching and students'	outcome 1-5	of ECTS 0.5	teaching Lectures	learning and teaching Lecture attendance and active participation Practical classes attendance and active participation, written report	monitoring and evaluation Student attendance	Po min 5	ints max 10	
teaching and students'	outcome 1-5	of ECTS 0.5	teaching Lectures	learning and teaching Lecture attendance and active participation Practical classes attendance and active participation, written report containing	monitoring and evaluation Student attendance Records,	Po min 5	ints max 10	
teaching and students'	outcome 1-5	of ECTS 0.5	teaching Lectures	learning and teaching Lecture attendance and active participation Practical classes attendance and active participation, written report containing obtained	monitoring and evaluation Student attendance Records,	Po min 5	ints max 10	
teaching and students'	outcome 1-5	of ECTS 0.5	teaching Lectures Practices	learning and teaching Lecture attendance and active participation Practical classes attendance and active participation, written report containing	monitoring and evaluation Student attendance Records,	Po min 5	ints max 10 15	
teaching and students'	outcome 1-5	of ECTS 0.5 0.5	teaching Lectures Practices Knowledge	learning and teaching Lecture attendance and active participation Practical classes attendance and active participation, written report containing obtained results	monitoring and evaluation Student attendance Records,	Po min 5	ints max 10	
teaching and students'	outcome 1-5	of ECTS 0.5	teaching Lectures Practices Knowledge assessment	learning and teaching Lecture attendance and active participation Practical classes attendance and active participation, written report containing obtained results Preparation for	monitoring and evaluation Student attendance Records,	Po min 5	ints max 10 15	
teaching and students'	outcome 1-5 1-6	of ECTS 0.5 0.5	teaching Lectures Practices Knowledge assessment (written	learning and teaching Lecture attendance and active participation Practical classes attendance and active participation, written report containing obtained results	monitoring and evaluation Student attendance Records, evaluation	Po min 5 10	ints max 10 15	
teaching and students'	outcome 1-5 1-6	of ECTS 0.5 0.5	teaching Lectures Practices Knowledge assessment	learning and teaching Lecture attendance and active participation Practical classes attendance and active participation, written report containing obtained results Preparation for written exam	monitoring and evaluation Student attendance Records, evaluation	Po min 5 10	ints max 10 15 40	
teaching and students'	outcome 1-5 1-6	of ECTS 0.5 0.5	teaching Lectures Practices Knowledge assessment (written	learning and teaching Lecture attendance and active participation Practical classes attendance and active participation, written report containing obtained results Preparation for written exam	monitoring and evaluation Student attendance Records, evaluation	Po min 5 10	ints max 10 15	
teaching and students'	outcome 1-5 1-6 1-6	of ECTS 0.5 0.5 0.5	teaching Lectures Practices Knowledge assessment (written exam)	learning and teaching Lecture attendance and active participation Practical classes attendance and active participation, written report containing obtained results Preparation for written exam	monitoring and evaluation Student attendance Records, evaluation Written exam	Po min 5 10 20	ints max 10 15 40	
teaching and students'	outcome 1-5 1-6 1-6	of ECTS 0.5 0.5 0.5	teaching Lectures Practices Knowledge assessment (written exam)	learning and teaching Lecture attendance and active participation Practical classes attendance and active participation, written report containing obtained results Preparation for written exam	monitoring and evaluation Student attendance Records, evaluation Written exam	Po min 5 10 20	ints max 10 15 40	
teaching and students'	outcome 1-5 1-6 1-6 1-6	of ECTS 0.5 0.5 0.5 0.5 0.5 2	teaching Lectures Practices Knowledge assessment (written exam)	learning and teaching Lecture attendance and active participation Practical classes attendance and active participation, written report containing obtained results Preparation for written exam	monitoring and evaluation Student attendance Records, evaluation Written exam	<u>Ро</u> min 5 10 20 25	ints max 10 15 40 35	
teaching and students'	outcome 1-5 1-6 1-6 1-6 Total Final grade	of ECTS 0.5 0.5 0.5 0.5 0.5 2 2	teaching Lectures Practices Knowledge assessment (written exam)	learning and teaching Lecture attendance and active participation Practical classes attendance and active participation, written report containing obtained results Preparation for written exam	monitoring and evaluation Student attendance Records, evaluation Written exam	<u>Ро</u> min 5 10 20 25	ints max 10 15 40 35	
teaching and students'	outcome 1-5 1-6 1-6 1-6 Total Final grade	of ECTS 0.5 0.5 0.5 0.5 0.5 2 2	teaching Lectures Practices Knowledge assessment (written exam) Final exam	learning and teaching Lecture attendance and active participation Practical classes attendance and active participation, written report containing obtained results Preparation for written exam	monitoring and evaluation Student attendance Records, evaluation Written exam	<u>Ро</u> min 5 10 20 25	ints max 10 15 40 35	
teaching and students'	outcome 1-5 1-6 1-6 1-6 Final grade 60-70 poin 71-80 poin	of ECTS 0.5 0.5 0.5 0.5 0.5 0.5 2 e: tts: grade	teaching Lectures Practices Knowledge assessment (written exam) Final exam	learning and teaching Lecture attendance and active participation Practical classes attendance and active participation, written report containing obtained results Preparation for written exam Preparation for oral exam	monitoring and evaluation Student attendance Records, evaluation Written exam	<u>Ро</u> min 5 10 20 25	ints max 10 15 40 35	
teaching and students'	outcome 1-5 1-6 1-6 1-6 Total Final grade 60-70 poin 71-80 poin 81-90 poin	of ECTS 0.5 0.5 0.5 0.5 0.5 0.5 2 e: tts: grade tts: grade	teaching Lectures Practices Practices Knowledge assessment (written exam) Final exam Final exam 2 (sufficient) 3 (good)	learning and teaching Lecture attendance and active participation Practical classes attendance and active participation, written report containing obtained results Preparation for written exam Preparation for oral exam	monitoring and evaluation Student attendance Records, evaluation Written exam	<u>Ро</u> min 5 10 20 25	ints max 10 15 40 35	

Consultation hours	By appointment		
Teaching	Lectures	Seminars	Practices
Hours - total	15	0	15
Course content / teaching units	 Anatomy and morphe Sounds of the Anura Identification of Croa Anatomy and morphe Identification of Croa Methods of researchi Collection and proces amphibians and repti 	ians ology of amphibians ology of amphibians ibians ibians ology of reptiles iles es rpetofauna ing herpetofauna atia for identification of amphibian ology of amphibians order tian amphibians ology of reptiles tian reptiles tian reptiles sing herpetofauna ssing of data on the distribution	
Recommended reading		Reptiles and Amphibians of Bri 2013) Herpetology: An Introdu : Press.	-
Optional reading	Duellman W.E., Trueb L. (1994) Biology of Amphibians. Johns	s Hopkins University Press.
Conditions for obtaining teacher's signature	Regular attendance at lecture	s, successfully completed pract	ices.
Exam passing procedure	-	r monitors and evaluates the p final grade. Written exam con up to 30% of the final grade.	
Main language of instruction; other languages	Croatian language, English lan	·	
Method of monitoring the quality and efficiency of teaching	Student survey to evaluate the the exams.	e overall quality of the course. /	Analysis of student success at

Course title	Immunocompetence and Transplantation								
Code	BMZ84	BMZ84							
Study	Graduate University Study Programme in Pieleny and Chemistry Teacher Education								
programme	Graduate University Study Programme in Biology and Chemistry Teacher Education								
Semester	III semester								
Workload/ECTS credits	2								
Course status	Elective								
Course teacher	Assist. Prof.	Dr. Lidija	Begović						
Associate teachers									
Course entry									
requirements (Preceding courses)	Biochemistr								
Course objective	system read	ction dur	ing transplant	the concepts and impo ation, the role and in transplantation of tis	nportance of tissue				
Learning outcomes	1. Im det 2. Ab blc um 3. Ab the cor	 determining immunocompetence during organ transplantation. 2. Ability to determine methods of isolation of individual cell populations from peripheral blood, spleen and lymph nodes, and methods of cell storage from peripheral and umbilical blood. 							
Link between	4. 715			uate problems related			itation.		
learning	Learning	Share	Form of	Activities of	Assess	ment			
outcomes, teaching and	outcome	ot	teaching	learning and teaching	Methods of Grading monitoring and Points		-		
students'		2010			evaluation	min	max		
activities			Lecture	Critical	Records related to active		10		
	1-4	0.5	Lecture	conversation and discussion	participation in conversations and discussions	5	10		
	2-3	0.5	Practices		· ·	25	30		
				discussion Work on experimental	conversations and discussions Monitoring of student performance within experimental				
	2-3	0.5	Practices Written	discussion Work on experimental assignment Preparation for	conversations and discussions Monitoring of student performance within experimental assignment Written	25	30		
	2-3 1-4 1-4 Total	0.5 0.5 0.5 2	Practices Written exam	discussion Work on experimental assignment Preparation for written exam Preparation for	conversations and discussions Monitoring of student performance within experimental assignment Written exam	25	30 30		
	2-3 1-4 1-4 Final grade: 60-70 point 71-80 point 81-90 point	0.5 0.5 0.5 2 s: grade 2 s: grade 2 s: grade 2	Practices Written exam Oral exam 2 (sufficient) 3 (good) 4 (very good)	discussion Work on experimental assignment Preparation for written exam Preparation for	conversations and discussions Monitoring of student performance within experimental assignment Written exam	25 15 15	30 30 30		
Consultation	2-3 1-4 1-4 Final grade: 60-70 point 71-80 point 81-90 point	0.5 0.5 0.5 2 s: grade 2 s: grade 2 s: grade 4	Practices Written exam Oral exam 2 (sufficient) 3 (good)	discussion Work on experimental assignment Preparation for written exam Preparation for	conversations and discussions Monitoring of student performance within experimental assignment Written exam	25 15 15	30 30 30		

Teaching	Lectures	Seminars	Practices				
Hours - total	15	0	15				
Course content / teaching units	 transplantation, probl Immune system: the r granulocytes, mediator response (cellular, hur Main tissue matching polymorphism, imbalar terminology, application Molecular structure of region), HLA class I and (structure, role) Minor systems of tissue Transplant reaction, recipient, criteria of recipient, criteria	Transplantation of cells, tissues and organs: history, application, types of transplantation, problems (immunobiological, surgical, ethical, legal) Immune system: the role, organs (primary, secondary), cells (lymphocytes, granulocytes, mediators), immunity (congenital, acquired, active, passive), immune response (cellular, humoral) Main tissue matching system (HLA system): basic characteristics, role, location, polymorphism, imbalance of matching, products, tissue representation, crossing-over, terminology, application Molecular structure of the HLA region (HLA class I region, central region, HLA class II region), HLA class I and class II genes (structure, role), HLA class I and class II molecules (structure, role) Minor systems of tissue tolerance (system H-Y, HA-2) Transplant reaction, recipient reaction against transplant, transplant reaction against recipient, criteria of recipient selection for transplantation of solid organs (kidney, liver, heart, pancreas), tissues and hematopoietic cells, waiting lists Chimerism: application, importance, prognostic value, methods of determination s: Isolation of individual cell populations from peripheral blood, spleen, lymph nodes Methods of storing cells from peripheral and umbilical cord blood Determination of HLA class I antigen (Microlymphocytotoxicity test: MLCT) Determination of a panel of reactive HLA antibodies in serum (% P RA) Cross-match test (CM) Class II HLA gene determination (Polymerase Chain Reaction -Sequence Specific					
Recommended reading Optional	Andreis I., Batinić D., Čulo F., G Medicinska naklada, Zagreb. Marsh S.G.E., Parham P., Barbe	Grčević D., Marušić M., Taradi I r L.D. (2000) The HLA facts book	M., Višnjić D. (2004) Imunologija.				
reading	monitor chimerism after alloge 35, 107-119. Janeway C.A., Travers P., Wal system in health and disease. G	eneic stem cell transplantation port M., Shlomchik M.J. (2001) Garland Publishing, New York. and tolerance in transplantati	 Bone Marrow Transplantation, Immunobiology 5, The Immune Colloquium of the National 				
Conditions for obtaining teacher's signature			o fulfil all assignments within the				
Exam passing procedure	points according to determine exam and then an oral exam. F	d criteria. After lectures and p Points achieved at written and c	ctivities of students by awarding ractices, students take a written oral exam are added to the points of points to be converted to final				
Main language of instruction; other languages	Croatian language						

Method of	
monitoring the	Survey on the subjective impression about the organisation of the course will be carried out after
quality and	the course; during the course, students will be given an opportunity to make oral or written
efficiency of	remarks; the teacher monitors students' success at exams.
teaching	

Course title	Inquiry-based Teaching of Biology							
Code	BBZ49							
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education							
programme								
Semester	III semester							
Workload/ECTS credits	2							
Course status	Elective							
Course teacher	Assist. Prof.	Dr. Irena	Labak					
Associate								
teachers								
Course entry								
requirements (Preceding courses)								
Course	To develop	student	s' skills require	ed to apply the meth	nod of inquiry-base	d learnin	in their	
objective				se scientific methodol			-	
Learning outcomes	 Adopted knowledge on natural science concepts by applying the inquiry-based learning method. Ability to adjust the inquiry-based learning method to pupils' age. Developed skills for assessment of the inquiry-based learning process and achievements by applying evaluation approaches. Skills to manage self-regulated professional development by applying scientific methodology. Ability to review scientific and professional literature dealing with research in the field of education. 							
Link between learning	Learning	Share	Form of	Activities of	Asses	sment		
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching	Methods of monitoring and		ding ints	
activities					evaluation	min	max	
	1-5	0.75	Lecture	Critical conversation and discussion; inquiry-based learning	Records related to active and independent participation in conversations and discussions; monitoring of student performance at inquiry-based learning with provision of feedback; portfolio	20	30	
	1-5	1	Practices	Independent simulation of inquiry-based learning and assessment; journal club	Analysis of simulation with provision of feedback; Records related to student activity in the journal club; portfolio	30	50	

		Г		Planning of	Professional				
	1-5	0.25	Written	professional	development	10	20		
	1-5	0.25	exam	development	plan	10	20		
	Total	2		development	pian	60	100		
	Final grade					00	100		
			(sufficient)						
		-							
	71-80 point								
			(very good)						
Consultation	By appointr		5 (excellent)						
hours	ву арропти	nem							
Teaching		ectures		Seminars		Practices			
				Seminars		inactices			
Hours - total		15		0		15			
Course content	• Na	tural scier	nce literacy, sci	entific approach and	biological literacy - o	changing	the		
/ teaching units			-	eaching of the science		00			
		-	-	periential learning, in	-	of biolog	gical		
		• ·	•	evelopment of natura	• •	,	5		
				e (analysis, interpreta		xplanatio	n		
			-	drawing based on ob		-			
	-	-		istemological knowle			,		
				cteristics, conditions,		es and sta	atistical		
		ethods			variables, hypothes				
			nodel for the c	levelonment of natur	al science literacy				
	 5E learning model for the development of natural science literacy Degrees of students' independence in learning by using the method of scientific 								
		search			y using the method	or scienci			
			nnroaches to i	nquiry-based learning	т				
				ary topics for the dev		science l	iteracy		
				arning of a scientific la		Science	relacy		
			-	, technology and soci		n respon	sibility for		
			of society	, teennology and seen		mespon	isionity for		
			ethods in educa	ation					
				netacognitive skills ar	nd self-regulated lea	rning			
		-	-	g and teaching					
		-	nce of lifelong						
Recommended		-	-	2007) Metode istraživ	ania u obrazovaniu	Naklada	Slan		
reading				DUCA, Zagreb.	anja u obrazovariju.	i vaniaua .	Jup.		
		-		goškog istraživanja. Za	avod za izdavanie ud	žhenika	Saraievo		
		-		(2012) Orchestrating	-		-		
Optional				es N.J., Notari M.,					
reading				d Learning From Theo			cury skins		
0		-		vremenom odgojno-c		-	čko učenie		
				venog obrazovanja:			-		
				ske, Zagreb, 258-275					
Conditions for					- F '				
obtaining	Students ar	e obliged	to participate	in lectures actively	and to fulfil all assig	gnments	within the		
teacher's	course.		is participate						
signature									
Exam passing	During the	course th	ne teacher mo	nitors and evaluates	the activities of stu	idents h	awarding		
procedure	-			eria. The teacher thu		-	-		
				g progress and to cre					
				development. At the					
				ment plan. The final					
		-		course and at the wr	-				
		Source Ball							

Main language of instruction; other languages	Croatian language
Method of monitoring the quality and efficiency of teaching	During the course, the teacher performs evaluation for learning by continuous monitoring of the learning process and student achievement, thus determining and adapting his/her teaching. After the course, the teacher conducts a survey among students to evaluate their subjective impression about the teaching quality, all with the aim to improve future teaching.

Course title	Research Work in Teaching Chemistry								
Code	K075								
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education								
programme									
Semester	III semester								
Workload/ECTS credits	2								
Course status	Elective								
Course teacher	Assoc. Prof.	Dr. Valent	tina Pavić						
Associate teachers									
Course entry requirements (Preceding courses)									
Course objective	teaching, an	id to enab	le them to i	ntegrate scientif	thod of inquiry-based ic methodology into i and teamwork skills.	-	-		
Learning outcomes	1. Ada me 2. Abi 3. Abi coo	 methodology. Ability to adjust the inquiry-based learning method to pupils' age. Ability to search for information about European projects and international cooperation opportunities. 							
Link between learning	Loorning	Share	Form of	Activities of	Assessm	ent			
outcomes,	Learning outcome	of	teaching	learning and	Methods of	Grading			
teaching and	outcome	ECTS	teaching	teaching	monitoring and	Ро	ints		
students'					evaluation	min	max		
activities	1-2	0.25	Lecture	Critical conversation and discussion; inquiry-based learning	Records related to active and independent participation in conversations and discussions; monitoring of student performance at inquiry-based learning with provision of feedback	20	30		
	1-4	1.5	Practices	Independent simulation of inquiry-based learning and assessment	Analysis of simulation with provision of feedback; Records related to student activity	30	50		

		0.25	Written exam	Planning of professional	Professional development plan	10	20	
	Total	2		development		60	100	
	Final grade: 60-70 points 71-80 points 81-90 points 91-100 poin	s: grade 2 s: grade 3 s: grade 4	(good) (very good))				
Consultation hours	By appointm	nent						
Teaching	Leo	tures		Seminars	Pi	ractices		
Hours - total		15		0		45		
Course content / teaching units	 Nat Cur lite Res Scie The 	 Learning by discovering, experiential learning, inquiry-based learning Natural science competence Curriculum of interdisciplinary topics for the development of natural science literacy Research methods in education Scientific methods in teaching of the science subjects 						
Recommended reading	Klipert H. (2 Mužić V. (2 Sarajevo. Sikirica M. (2 Sikirica M. (2	001) Kako 001) Met 2003) Met 2011) Zbir	učiti u timu odologija pe codika nasta ka kemijskil	1. EDUCA, Zagreb. edagoškog istraži ve kemije. Školsk 1 pokusa za OŠ i S	vanja. Zavod za izda	vanje ud		
Optional reading	www.scineti Ristić Dedio Istraživačko	x.eu ć Z. (20 učenje k	13) Metod ao sredstvo	i cilj prirodozna	nom odgojno-obrazo anstvenog obrazovar sti Hrvatske, Zagreb,	ija: psiho	ologijska	
Conditions for obtaining teacher's signature	Students are the course.	e obliged 1	o participat	e in lectures activ	ely and to fulfil all as	signment	ts within	
Exam passing procedure	During the course, the teacher monitors and evaluates the activities of students by awarding points according to determined criteria. The teacher thus provides continuous feedback, which students use to assess their learning progress with the aim to improve their learning process and professional development. At the end of the course, students are required to develop a professional development plan. The final grade is determined according to the number of points gained during the course and at the written exam.							
Main language of instruction; other languages	Croatian lan	guage						
Method of monitoring the quality and efficiency of teaching	of the learni teaching. Af	ng proces ter the co	s and stude ourse, the te	nt achievement, t eacher conducts	for learning by contir hus determining and a survey among stud lity, all with the aim t	adapting ents to e	g his/her evaluate	

Course title	Chemistry in Everyday Life							
Code	K083							
Study	Graduate University Study Programme in Pielesy and Chemistry Teacher Education							
programme	Graduate University Study Programme in Biology and Chemistry Teacher Education							
Semester	III semester							
Workload/ECTS credits	2							
Course status	Elective							
Course teacher		f. Dr. Oliv	era Galović					
Associate								
teachers								
Course entry								
requirements (Preceding courses)	Obligatory	courses	related to cl	hemistry				
Course	To enable	students	to understa	nd basic concepts in c	hemistry that ar	e annlicable	to	
objective	everyday s				inemistry that ar		0	
Learning				daily activities of hum	ans and chemics	Innocesses	that take	
outcomes	pl 2. Al pr 3. Al	processes.3. Ability to analyse the relevant scientific literature.						
Link between learning						essment		
outcomes,	Learning	Share	Form of	Activities of				
teaching and	outcome	of	teaching	learning and	Methods of		ding	
students'		ECTS		teaching	monitoring an		ints	
activities					evaluation	min	max	
	1-3	1	Lecture	Discussion	Records relate to students' engagement in discussions	6	10	
	1-4	0.5	Practices	Working on tasks by applying knowledge acquired during lectures	Records relate to performanc at solving of tasks		10	
	1-4	0.5	Written exam	Preparation for written exam	Written exam	48	80	
	Total	2				60	100	
	Final grade: 60-70.9 points: grade 2 (sufficient) 71-80.9 points: grade 3 (good) 81-90.9 points: grade 4 (very good) 91-100 points: grade 5 (excellent)							
Consultation hours	By appoint				T			
Teaching	L	ectures		Seminars		Practices		
Hours - total		15		0		15		
Course content	15 0 15 • By using examples from everyday life (medications, detergents, plastics, food additives, cosmetic products, fertilisers), as well as by elaborating selected							

	 issues and solutions, students will be introduced to the role of chemistry in criminology, ecology, technology, transport, waste management, food production and other industries. Better understanding of chemistry and chemistry laws for better control of chemicals in everyday life situations and for achievement of maximum benefit and minimum risk of their usage.
Recommended	American Chemical Society (2018) Chemistry in context - Applying Chemistry to Society,
reading	9th ed.
	Hill J. W., McCreary T.W., Kolb D.K. (2016) Chemistry for Changing Time (Global Edition). Pearson Higher Ed.
Optional	Lee H.C., Gaensslen R.E. (2013) Advances in Fingerprint Technology, 3rd ed. CRC Press,
reading	New York.
	Journal of Chemical Education
Conditions for obtaining teacher's signature	Active participation in classes and completion of all assignments within the course.
Exam passing	Passed two preliminary exams during the course or final written exam after the attended
procedure	lectures. The final grade also includes the points obtained for active participation in lectures and seminars.
Main language of instruction; other languages	Croatian language
Method of monitoring the quality and efficiency of teaching	Conversation with students during lectures, student survey after the course.

Course title	Colloid and Interfacial Chemistry							
Code	K054							
Study	Conducte University Study Decomposed in Dislams and Chamister Teacher Education							
programme	Graduate University Study Programme in Biology and Chemistry Teacher Education							
Semester	III semeste	r						
Workload/ECTS								
credits	2							
Course status	Elective							
Course teacher	Assoc. Prof	. Dr. Beri	slav Markov	ić				
Associate								
teachers								
Course entry								
requirements	Descedence	macuuithi	n tha aguraa	s Fundamentals of P	husiaal Chamistry	1 and 2		
(Preceding	rasseu exa		in the course		nysical chemistry	I anu Z		
courses)								
Course	To teach st	udents a	bout proper	ties and wide applic	ation of various c	olloidal sys	stems and	
objective	about the b	basics of	surface reac	tions.				
Learning		•		ification of colloidal	•			
outcomes		• •	-	e of colloidal system		•••		
			•	cific properties of dif	ferent colloidal sy	stems in d	ifferent	
		plication						
		•	•	ole of surface thermo	odynamics: surfac	e tension,	surface	
		•	sorption on					
				priate methods for d	letermination of c	olloid		
		aracteris						
	6. De	eveloped	skills in oral	and written present	ation of scientific	work.		
Link between					Asse	essment		
learning	Assessment							
-		Share		Activities of				
outcomes,	Learning	Share of	Form of	Activities of learning and	Methods of	Gra	-	
teaching and	Learning outcome		Form of teaching	learning and	monitoring	Gra Poi	-	
teaching and students'		of			monitoring and		-	
teaching and		of		learning and teaching	monitoring	Poi	nts	
teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical	monitoring and evaluation	Poi min	nts max	
teaching and students'		of		learning and teaching Critical conversation and	monitoring and	Poi	nts	
teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion	monitoring and evaluation	Poi min	nts max	
teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion Independent	monitoring and evaluation	Poi min	nts max	
teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion Independent analysis and	monitoring and evaluation	Poi min	nts max	
teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion Independent analysis and interpretation of	monitoring and evaluation	Poi min	nts max	
teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion Independent analysis and interpretation of scientific papers	monitoring and evaluation	Poi min	nts max	
teaching and students'	outcome 1-6	of ECTS 0.5	Lecture	learning and teaching Critical conversation and discussion Independent analysis and interpretation of scientific papers by applying	monitoring and evaluation Records	Poi min 7	nts max 10	
teaching and students'	outcome 1-6	of ECTS 0.5	Lecture	learning and teaching Critical conversation and discussion Independent analysis and interpretation of scientific papers by applying knowledge	monitoring and evaluation Records	Poi min 7	nts max 10	
teaching and students'	outcome 1-6	of ECTS 0.5	Lecture	learning and teaching Critical conversation and discussion Independent analysis and interpretation of scientific papers by applying knowledge acquired within	monitoring and evaluation Records	Poi min 7	nts max 10	
teaching and students'	outcome 1-6	of ECTS 0.5	teaching Lecture Seminars	learning and teaching Critical conversation and discussion Independent analysis and interpretation of scientific papers by applying knowledge	monitoring and evaluation Records	Poi min 7	nts max 10	
teaching and students'	outcome 1-6 1-6	of ECTS 0.5 0.5	teaching Lecture Seminars	learning and teaching Critical conversation and discussion Independent analysis and interpretation of scientific papers by applying knowledge acquired within lectures	monitoring and evaluation Records Presentation	Poi min 7 10	nts max 10 20	
teaching and students'	outcome 1-6	of ECTS 0.5	teaching Lecture Seminars Exam (prelimin	learning and teaching Critical conversation and discussion Independent analysis and interpretation of scientific papers by applying knowledge acquired within lectures Preparation for	monitoring and evaluation Records	Poi min 7	nts max 10	
teaching and students'	outcome 1-6 1-6	of ECTS 0.5 0.5	teaching Lecture Seminars Exam (prelimin ary	learning and teaching Critical conversation and discussion Independent analysis and interpretation of scientific papers by applying knowledge acquired within lectures	monitoring and evaluation Records Presentation	Poi min 7 10	nts max 10 20	
teaching and students'	outcome 1-6 1-6 1-6	of ECTS 0.5 0.5 0.5	teaching Lecture Seminars Exam (prelimin	learning and teaching Critical conversation and discussion Independent analysis and interpretation of scientific papers by applying knowledge acquired within lectures Preparation for written exam	monitoring and evaluation Records Presentation Written exam	Poi min 7 10 20	nts max 10 20 30	
teaching and students'	outcome 1-6 1-6	of ECTS 0.5 0.5	teaching Lecture Seminars Exam (prelimin ary exam)	learning and teaching Critical conversation and discussion Independent analysis and interpretation of scientific papers by applying knowledge acquired within lectures Preparation for	monitoring and evaluation Records Presentation	Poi min 7 10	nts max 10 20	
teaching and students'	outcome 1-6 1-6 1-6	of ECTS 0.5 0.5 0.5	teaching Lecture Seminars Exam (prelimin ary exam) Oral	learning and teaching Critical conversation and discussion Independent analysis and interpretation of scientific papers by applying knowledge acquired within lectures Preparation for written exam Preparation for	monitoring and evaluation Records Presentation Written exam	Poi min 7 10 20	nts max 10 20 30	
teaching and students'	outcome 1-6 1-6 1-6 1-6	of ECTS 0.5 0.5 0.5 0.5 2	teaching Lecture Seminars Exam (prelimin ary exam) Oral	learning and teaching Critical conversation and discussion Independent analysis and interpretation of scientific papers by applying knowledge acquired within lectures Preparation for written exam Preparation for	monitoring and evaluation Records Presentation Written exam	Poi min 7 10 20 23	nts max 10 20 30 40	
teaching and students'	outcome 1-6 1-6 1-6 1-6 Total Final grade	of ECTS 0.5 0.5 0.5 0.5 0.5 2	teaching Lecture Seminars Exam (prelimin ary exam) Oral exam	learning and teaching Critical conversation and discussion Independent analysis and interpretation of scientific papers by applying knowledge acquired within lectures Preparation for written exam Preparation for oral exam	monitoring and evaluation Records Presentation Written exam	Poi min 7 10 20 23	nts max 10 20 30 40	
teaching and students'	outcome 1-6 1-6 1-6 1-6 Total Final grade	of ECTS 0.5 0.5 0.5 0.5 0.5 2 :: ts: grade	teaching Lecture Seminars Exam (prelimin ary exam) Oral exam 2 (sufficien	learning and teaching Critical conversation and discussion Independent analysis and interpretation of scientific papers by applying knowledge acquired within lectures Preparation for written exam Preparation for oral exam	monitoring and evaluation Records Presentation Written exam	Poi min 7 10 20 23	nts max 10 20 30 40	
teaching and students'	outcome 1-6 1-6 1-6 1-6 Final grade 60-70 point 71-80 point	of ECTS 0.5 0.5 0.5 0.5 0.5 2 :: ts: grade ts: grade	teaching Lecture Seminars Exam (prelimin ary exam) Oral exam 2 (sufficien	learning and teaching Critical conversation and discussion Independent analysis and interpretation of scientific papers by applying knowledge acquired within lectures Preparation for written exam Preparation for oral exam	monitoring and evaluation Records Presentation Written exam	Poi min 7 10 20 23	nts max 10 20 30 40	
teaching and students'	outcome 1-6 1-6 1-6 1-6 5 1-6 1-7 1-8 1-9	of ECTS 0.5 0.5 0.5 0.5 0.5 0.5 2 :: ts: grade ts: grade ts: grade	teaching Lecture Seminars Seminars Exam (prelimin ary exam) Oral exam Oral exam 2 (sufficient 3 (good)	learning and teaching Critical conversation and discussion Independent analysis and interpretation of scientific papers by applying knowledge acquired within lectures Preparation for written exam Preparation for oral exam	monitoring and evaluation Records Presentation Written exam	Poi min 7 10 20 23	nts max 10 20 30 40	

	Final avana, achieved minimu		(aufficient)						
	Final exam: achieved minimum number of points refers to the lowest grade (sufficient), and maximum number of points refers to the highest grade (excellent).								
Consultation hours	One hour a week during a semester, according to schedule announced in advance.								
Teaching	Lectures Seminars Practices								
Hours - total	15 15 0								
Course content / teaching units Recommended	 Colloid systems: systematic review of colloids, diffusion, the Brown's motion, technological and biological significance of colloids Thermodynamics of surfaces: surface energy, the Gibbs equation, nucleation, contact angle and surface tension; Sedimentation and viscosity of suspensions Particles and their characterisation: particle size and shape determination methods Adsorption at interfaces: adsorption isotherms, polymer adsorption Surface charge: development of surface potential, electrical double-layer, electrokinetics and zeta-potential Association colloids: micelles, liquid crystals, membranes Interaction of colloid particles: coagulation kinetics, effects of polymers on colloidal stability Modern methods for investigating colloidal dispersions 								
reading	Blackwell, Chichester. Hunter R.J. (2001) Foundation York.	ns of Colloid Science, 2nd ed. C	xford University Press, New						
Optional reading	Oxford. Hiemenz P.C., Rajagopalan R. Marcel Dekker, New York.	n to Modern Colloid Science, 2n (1997) Principles of Colloid ar emistry applications in modern	nd Surface Chemistry, 3rd ed.						
Conditions for obtaining teacher's signature		ipate in lectures actively and t							
Exam passing procedure	Students' knowledge is evalu semester. Final exam is taken	lated within one preliminary e in form of oral exam.	exam taken in the middle of						
Main language of instruction; other languages	Croatian language, English lar	guage							
Method of monitoring the quality and efficiency of teaching	Continuous communication survey.	between teacher and student	ts and anonymous student						

Course title	Medicinal	Plants								
Code	BBZ51									
Study	Graduata	nivorcity	Study Drogs	amme in Biology and	Chomistry Toosha		ion			
programme	Graduate O	niversity	Study Progr	amme in Biology and	a chemistry reache	r Euucal	ion			
Semester	III semester									
Workload/ECTS	2									
credits	3	5								
Course status	Elective	Elective								
Course teacher	Assoc. Prof.	Assoc. Prof. Dr. Ljiljana Krstin								
Associate	Assist Drof	Assist. Prof. Dr. Zorana Katanić								
teachers	ASSIST. PLOT.	Dr. Zora								
Course entry										
requirements										
(Preceding										
courses)										
Course objective	To teach st	udents a	bout the m	ost important medic	inal plants and the	ways of	f making			
	and using m	nedicinal	preparation	S.						
Learning	1. Ab	ility to co	mpare mor	phological and anato	mical characteristi	cs and				
outcomes		-		es of some medicina						
		-		e professional and sci	entific literature in	the				
	de	terminati	ion of medic	inal plants.						
	3. Ab	ility to se	lect approp	riate method for coll	ecting and storing	of medic	inal			
	pla	nts.								
	4. Ab	ility to de	etermine ph	ytochemical content	of medicinal plants	s and its	effect			
	on	human h	nealth.							
	5. Ab	ility to us	se scientific	literature for critical	evaluation of using	medicin	al			
	pla	nts.	-							
Link between				plants.						
	Assessment									
learning	Learning	Share	Form of	Activities of	Asses	sment				
outcomes,	Learning	of	Form of	learning and	Asses: Methods of		ding			
outcomes, teaching and	Learning outcome		Form of teaching			Gra	ding ints			
outcomes, teaching and students'	-	of		learning and	Methods of	Gra	-			
outcomes, teaching and	-	of		learning and	Methods of monitoring and	Gra Po	ints			
outcomes, teaching and students'	-	of		learning and	Methods of monitoring and evaluation	Gra Po	ints			
outcomes, teaching and students'	-	of		learning and teaching	Methods of monitoring and evaluation Records related	Gra Po	ints			
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical	Methods of monitoring and evaluation Records related to active	Gra Po min	ints max			
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and	Methods of monitoring and evaluation Records related to active participation in	Gra Po min	ints max			
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and	Methods of monitoring and evaluation Records related to active participation in conversations and discussions	Gra Po min	ints max			
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Monitoring of	Gra Po min	ints max			
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion Interpretation of	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Monitoring of student's	Gra Po min	ints max			
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion Interpretation of scientific papers	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Monitoring of student's interpretations	Gra Po min	ints max			
outcomes, teaching and students'	outcome 1-5	of ECTS 0.5	Lecture	learning and teaching Critical conversation and discussion Interpretation of scientific papers and application	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Monitoring of student's interpretations and	Gra Po min 10	ints max 20			
outcomes, teaching and students'	outcome 1-5	of ECTS 0.5	Lecture	learning and teaching Critical conversation and discussion Interpretation of scientific papers and application of obtained	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Monitoring of student's interpretations and performance at	Gra Po min 10	ints max 20			
outcomes, teaching and students'	outcome 1-5	of ECTS 0.5	Lecture	learning and teaching Critical conversation and discussion Interpretation of scientific papers and application of obtained results in	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Monitoring of student's interpretations and	Gra Po min 10	ints max 20			
outcomes, teaching and students'	outcome 1-5	of ECTS 0.5	teaching Lecture Seminar	learning and teaching Critical conversation and discussion Interpretation of scientific papers and application of obtained results in concepts learned	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Monitoring of student's interpretations and performance at	Gra Po min 10	ints max 20			
outcomes, teaching and students'	outcome 1-5	of ECTS 0.5	teaching Lecture Seminar Practice	learning and teaching Critical conversation and discussion Interpretation of scientific papers and application of obtained results in concepts learned within lectures	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Monitoring of student's interpretations and performance at tasks	Gra Po min 10	ints max 20			
outcomes, teaching and students'	outcome 1-5 1-5	of ECTS 0.5	teaching Lecture Seminar	learning and teaching Critical conversation and discussion Interpretation of scientific papers and application of obtained results in concepts learned within lectures Work on	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Monitoring of student's interpretations and performance at tasks Monitoring of	Gra Po min 10 20	ints max 20 30			
outcomes, teaching and students'	outcome 1-5 1-5 1-3	of ECTS 0.5 1 0.5	teaching Lecture Seminar Practice	learning and teaching Critical conversation and discussion Interpretation of scientific papers and application of obtained results in concepts learned within lectures Work on experimental task	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Monitoring of student's interpretations and performance at tasks Monitoring of student performance	Gra Po min 10 20 10	ints max 20 30 20			
outcomes, teaching and students'	outcome 1-5 1-5	of ECTS 0.5	teaching Lecture Seminar Practice	learning and teaching Critical conversation and discussion Interpretation of scientific papers and application of obtained results in concepts learned within lectures Work on experimental	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Monitoring of student's interpretations and performance at tasks Monitoring of student	Gra Po min 10 20	ints max 20 30			
outcomes, teaching and students'	outcome 1-5 1-5 1-3	of ECTS 0.5 1 0.5	teaching Lecture Seminar Practice S Written exam	learning and teaching Critical conversation and discussion Interpretation of scientific papers and application of obtained results in concepts learned within lectures Work on experimental task Preparation for written exam	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Monitoring of student's interpretations and performance at tasks Monitoring of student performance	Gra Po min 10 20 10	ints max 20 30 20			
outcomes, teaching and students'	outcome 1-5 1-5 1-3	of ECTS 0.5 1 0.5	teaching Lecture Seminar Practice s Written exam Oral	learning and teaching Critical conversation and discussion Interpretation of scientific papers and application of obtained results in concepts learned within lectures Work on experimental task Preparation for written exam	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Monitoring of student's interpretations and performance at tasks Monitoring of student performance	Gra Po min 10 20 10	ints max 20 30 20			
outcomes, teaching and students'	outcome 1-5 1-5 1-3 1-5 1-5	of ECTS 0.5 1 0.5 0.5 0.5	teaching Lecture Seminar Practice S Written exam	learning and teaching Critical conversation and discussion Interpretation of scientific papers and application of obtained results in concepts learned within lectures Work on experimental task Preparation for written exam	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Monitoring of student's interpretations and performance at tasks Monitoring of student performance Written exam	Gra Po min 10 20 10 10 10	ints max 20 30 20 15 15			
outcomes, teaching and students'	outcome 1-5 1-5 1-3 1-5 1-5 Total	of ECTS 0.5 1 0.5 0.5 0.5 0.5 3	teaching Lecture Seminar Practice s Written exam Oral	learning and teaching Critical conversation and discussion Interpretation of scientific papers and application of obtained results in concepts learned within lectures Work on experimental task Preparation for written exam	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Monitoring of student's interpretations and performance at tasks Monitoring of student performance Written exam	Gra Po min 10 20 10 10	ints max 20 30 20 15			
outcomes, teaching and students'	outcome 1-5 1-5 1-3 1-5 1-5 1-5 Total Final grade:	of ECTS 0.5 1 0.5 0.5 0.5 0.5 3	teaching Lecture Seminar Practice s Written exam Oral exam	learning and teaching Critical conversation and discussion Interpretation of scientific papers and application of obtained results in concepts learned within lectures Work on experimental task Preparation for written exam Preparation for oral exam	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Monitoring of student's interpretations and performance at tasks Monitoring of student performance Written exam	Gra Po min 10 20 10 10 10	ints max 20 30 20 15 15			
outcomes, teaching and students'	outcome 1-5 1-5 1-3 1-5 1-5 Total	of ECTS 0.5 1 0.5 0.5 0.5 0.5 3 s: grade	teaching Lecture Seminar Practice s Written exam Oral exam 2 (sufficient	learning and teaching Critical conversation and discussion Interpretation of scientific papers and application of obtained results in concepts learned within lectures Work on experimental task Preparation for written exam Preparation for oral exam	Methods of monitoring and evaluation Records related to active participation in conversations and discussions Monitoring of student's interpretations and performance at tasks Monitoring of student performance Written exam	Gra Po min 10 20 10 10 10	ints max 20 30 20 15 15			

	81-90 points: grade 4 (very g 91-100 points: grade 5 (exce	-					
Consultation hours	By appointment						
Teaching	Lectures Seminars Practices						
Hours - total	15 15 15						
Course content / teaching units	 The most common n Calendar of harvesti Processing and stora Bioactive substances Phytochemical conte Seminars: Each teaching unit professional literatu Practices: 	ge of medicinal plants in medicinal plants ent of medicinal plants and the t will be accompanied by re, based on which students w ection of some medicinal plan	eir modes of action appropriate scientific and vill prepare seminar papers				
Recommended reading	Chevallier A. (2016) Encyclo Common Ailments. Penguin F Galle Toplak K. (2015) Domać	tiji prirodni lijekovi. Selman d. pedia of Herbal Medicine: 5 andom House, DK. e ljekovito bilje. Mozaik knjiga a domaćeg ljekovitog bilja. Ce	50 Herbs and Remedies for a, Zagreb.				
Optional reading	Frances Lincoln in association Wyk B.E., Wink M. (2017) Me	rving J. (2017) Gardener s Con with RBG Kew edicinal Plants of the World - A s and Their Uses. Revised Editi	An Illustrated Scientific Guide				
Conditions for obtaining teacher's signature	Students are obliged to partic the course.	ipate in lectures actively and t	to fulfil all assignments within				
Exam passing procedure	awarding points according to exam after they have atten	o determined criteria. Studer ded lectures, practices and s ded to the points obtained up t	the activities of students by its can take written and oral seminars. Points achieved at to the final exam, thus making				
Main language of instruction; other languages	Croatian language						
Method of monitoring the quality and efficiency of teaching	of delivered lectures within a		It the organisation and quality ake oral or written comments exams.				

Code K				– Technology and					
Study	K026								
programme	braduate C	Iniversity	/ Study Progr	amme in Biology and	Chemistry Teac	ner Edu	cation		
	II semeste	r							
Workload/FCTS	2								
credits 2	-								
	lective								
	ssoc. Prof. Dr. Berislav Marković								
Associate									
teachers									
Course entry									
requirements									
(Preceding									
courses)									
	o onable s	tudonts	to understar	d the relation betwee	an structure and	nroner	ties of new		
				ologies and to assess					
	he enviror		ouernitechni	biogles and to assess	the impact of su	cirinate			
Learning			dontify the re	lationship between n	natorial structur	a and n	roperties		
outcomes		•	•	correlation between n		•			
outcomes		-	and the envir		nouern materiai	s, then	production		
	•			concept of renewabl	o raw matorials	on Eart	h		
		•		modern materials that					
		st centur				the the	ange of the		
				owledge and moder	n aide within th	no proc	ontation of		
		minar pa	-	owieuge and moder	ii alus withini ti	ie pres			
Link between	30		iper.						
learning					Ass	essmen	t		
		Share		Activities of					
	Learning	of	Form of	learning and	Methods of		rading		
students'	outcome	ECTS	teaching	teaching	monitoring	- 1	Points		
activities					and	mi	max		
					evaluation	n			
				Critical					
	1-6	0.5	Lecture	conversation and	Records,	5	10		
	-			discussion	evaluation		_		
_									
	5-6	0.5	Seminars	Preparation of	Evaluation	20	40		
_	50	0.5	Serimars	presentation	Evaluation	20	-10		
	1-6	1	Oral	Preparation for	Oral exam	30	50		
	10	1	exam	oral exam	Ordrexam		50		
	Total	2				55	100		
	inal grade								
5	5-65 point	ts: grade	2 (sufficient	:)					
6	6-80 poin	ts: grade	3 (good)						
8	81-90 poin [:]	ts: grade	4 (very goo	d)					
9	01-100 poi	nts: grad	le 5 (exceller	it)					
	inal ovam	: achieve	d minimum ı	number of points refe	ers to the lowest	grade (sufficient),		
F	Final exam: achieved minimum number of points refers to the lowest grade (sufficient),								
		nd maximum number of points refers to the highest grade (excellent).							
а		um num	ber of points	refers to the highest	grade (excellent	:).			

Teaching	Lectures	Seminars	Practices
Hours - total	15	15	0
Course content / teaching units	 materials science ar Determination and properties of mater Correlation betwee recycling and waste Usage of primary ar environment Renewable resource Modern materials t photonic materials, biomaterials, biome for clean energy, re 	role of mechanical, electrical, r rials n materials and environment in disposal nd secondary raw materials and es of raw materials on Earth hat will transform the life in th materials for information stora edical materials, porous materi newable materials s, students will select a topic of	magnetic, and optical n manufacturing, processing, d their impact on e 21 st century: new polymers, age, smart materials, als, hard materials, materials
Recommended	Ball P. (1999) Made to Measu	ure: New Materials for the 21st	Century. Princeton University
reading	Press, Princeton.	Molecular World. Princeton Un	
Optional reading	Heinemann, Oxford.	996) Engineering Materials Vo als Science and Engineering: A	
Conditions for obtaining teacher's signature Exam passing	Students are obliged to parti the course (practices, semina	icipate in lectures actively and t ar tasks). taken after the attended lectu	
procedure	regular attendance and activ	re participation in lectures – 10 success at the final exam – 50 %	%, written seminar paper and
Main language of instruction; other languages	Croatian language, English la	inguage	
Method of monitoring the quality and efficiency of teaching	-	rse; reviews during the course es; monitoring of student succe	

Course title	Neuroimn	nunology	,						
Code		0/							
Study	Craduate		Ctudy Dragers	nmo in Dielesus	d Chamistry . Taa-b-	r Eduart	ion		
programme	Graduate U	Iniversity	Study Program	nme in Biology and	d Chemistry Teache	r Educat	ion		
Semester	III semester	r							
Workload/ECTS	2	2							
credits	Z								
Course status	Elective								
Course teacher	Assist. Prof	Assist. Prof. Dr. Senka Blažetić							
	Assist. Prof	. Dr. Irena	Labak						
Associate									
teachers									
Course entry									
requirements	Human An	atomy (at	ttended), Ani	mal Physiology (a	ttended), Biochem	istry 1,	2 and 3		
(Preceding	(attended)								
courses)									
Course objective					ns of the immune				
			s for mainta	ining the organi	sm homeostasis a	and for	disease		
	developme								
Learning					nce of neuroimmun		a		
outcomes		•		isic immune respo	nses in the brain ar	id their i	nfluence		
			of the body.	a b b b b b b b b b b					
		-		fluence of the imn	nune system on the	e preserv	vation of		
			n function.						
		-	-		he immune respor	nse in t	ne brain		
Link between	be	l ween the	l nearrny and	the diseased orga					
learning		Share		Activities of	Assess	ment			
outcomes,	Learning	of	Form of	learning and	Methods of	Gra	ding		
teaching and	outcome	ECTS	teaching	teaching	monitoring and		ints		
students'					evaluation	min	max		
activities					Records related				
				Critical	to student	10			
	1-4	0.5	Lecture	conversation	performance	10	20		
				and discussion	during lectures				
					Assessment of				
					presentation				
					and				
	1.4	0.75	Cominan	Working on a	interpretation	25	F.0		
	1-4	0.75	Seminar	case study	of obtained	35	50		
					results with				
					provision of				
					feedback				
			Written	Preparation for					
	1-4	0.25	exam	written exam	Written exam	5	10		
	1-4	0.5	Oral exam	Preparation for	Oral exam	10	20		
	± -r			oral exam			20		
	Total	2				60	100		
	Final grade 60-70 point 71-80 point	ts: grade 2	2 (sufficient) 3 (good)						

	81-90 points: grade 4 (very good) 91-100 points: grade 5 (excellent)							
Consultation hours	By appointment							
Teaching	Lectures	Lectures Seminars Practices						
Hours - total	15 15 0							
Course content / teaching units	nervous systems Biochemical mecha Regulation of inflam Neuroimmune mec Inflammation and ro Stem cells and neur Inflammatory proce	eristics and cell components of nisms of the neuroinflammatio matory processes in brain and hanisms during brain developm egeneration of axons oinflammation ess in neurodegenerative and a	n process I spinal cord nent utoimmune diseases					
Recommended reading	Kuby Immunology W. H. Free Phillips M. I., Dwight E. (199	uroimunologija. Medicinska nal eman and Company, New York 95) Neuroimmunology, Volume	24, 1st ed. Academic Press.					
Optional reading). The Immune-Neuroendocrin e Biology). Amsterdam: Elsevie						
Conditions for obtaining teacher's signature	Students are obliged to parti within the course.	cipate in lectures actively and	to fulfil all assignments					
Exam passing procedure		cher monitors and evaluates to determined criteria. After exam.						
Main language of instruction; other languages	Croatian language							
Method of monitoring the quality and efficiency of teaching	students the opportunity to are given a survey in which t	er continuously evaluates stud make oral or written comment hey give their subjective opinic with the aim to improve future	s. After the course, students on about quality and					

Course title	Areas of I	mportar	nce for Croa	atian Flora						
Code										
Study	Graduate L	Jniversity	/ Study Prog	ramme in Biology and	Chemistry Teach	ner Edu	ucation			
programme										
Semester	III semeste	III semester								
Workload/ECTS										
credits	2	2								
Course status	Elective	lective								
Course teacher	Assoc. Prof	. Dr. Tan	ja Žuna Pfeif	fer						
Associate				-						
teachers	Nikolina Be	ek, assista	ant							
Course entry										
requirements										
(Preceding										
courses)										
	To raise aw	areness	of students :	about the importance	of preserving na	aturala	and/or semi-			
Course objective				terised by unique and			and/or serii			
Learning				documents that def		mnort	ant areas in			
outcomes		oatia.	i cview iegal	uscuments that del		προιτ				
outcomes			compare cha	aracteristics and dive	rsity of flora and	l the n	nanagement			
		-	-	nportant areas in Cro			nanagement			
				ices for flora determi			nrofessional			
		-	fic papers.			101130	professional			
				importance of pro	otection and th	ne no	ssibilities of			
		-		ally valuable areas in		ie po.	55151111125 01			
				nts' science literacy l		nlar ra	sparch tasks			
		-		on of plant species						
							agement of			
Link between		Jeanneany	Vuluubic uit	botanically valuable areas.						
Link between										
learning					Asse	essmer	nt			
learning outcomes	Looming	Share	Form of	Activities of			-			
outcomes,	Learning	Share of	Form of	Activities of learning and	Methods of	(Grading			
outcomes, teaching and	Learning outcome		Form of teaching		Methods of monitoring	(-			
outcomes, teaching and students'	-	of		learning and	Methods of monitoring and	mi	Grading			
outcomes, teaching and	-	of		learning and	Methods of monitoring and evaluation	(Grading Points			
outcomes, teaching and students'	-	of		learning and	Methods of monitoring and evaluation Records	mi	Grading Points			
outcomes, teaching and students'	-	of		learning and	Methods of monitoring and evaluation Records related to	mi	Grading Points			
outcomes, teaching and students'	-	of		learning and teaching	Methods of monitoring and evaluation Records related to active and	mi	Grading Points			
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical	Methods of monitoring and evaluation Records related to active and independent	mi n	Grading Points max			
outcomes, teaching and students'	-	of		learning and teaching Critical conversation and	Methods of monitoring and evaluation Records related to active and independent participation	mi	Grading Points			
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical	Methods of monitoring and evaluation Records related to active and independent participation in	mi n	Grading Points max			
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and	Methods of monitoring and evaluation Records related to active and independent participation in conversation	mi n	Grading Points max			
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and	mi n	Grading Points max			
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions	mi n	Grading Points max			
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records	mi n	Grading Points max			
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to	mi n	Grading Points max			
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to active and	mi n	Grading Points max			
outcomes, teaching and students'	outcome	of ECTS	Lecture	learning and teaching Critical conversation and discussion	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to active and independent	mi n 5	Grading Points max 10			
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to active and independent preparation	mi n	Grading Points max			
outcomes, teaching and students'	outcome	of ECTS	Lecture	learning and teaching Critical conversation and discussion	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to active and independent preparation of seminar	mi n 5	Grading Points max 10			
outcomes, teaching and students'	outcome	of ECTS	Lecture	learning and teaching Critical conversation and discussion	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to active and independent preparation of seminar paper with	mi n 5	Grading Points max 10			
outcomes, teaching and students'	outcome	of ECTS	Lecture	learning and teaching Critical conversation and discussion	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to active and independent preparation of seminar paper with provision of	mi n 5	Grading Points max 10			
outcomes, teaching and students'	outcome	of ECTS	Lecture	learning and teaching Critical conversation and discussion Independent preparation of seminar paper	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to active and independent preparation of seminar paper with	mi n 5	Grading Points max 10			
outcomes, teaching and students'	outcome	of ECTS	Lecture	learning and teaching Critical conversation and discussion	Methods of monitoring and evaluation Records related to active and independent participation in conversation s and discussions Records related to active and independent preparation of seminar paper with provision of	mi n 5	Grading Points max 10			

			Oral	Preparation for					
	1-5	0.25	exam	oral exam	Oral exam	15	25		
	Total	2				60	100		
	Final grade: 60-70 points: grade 2 (sufficient) 71-80 points: grade 3 (good) 81-90 points: grade 4 (very good) 91-100 points: grade 5 (excellent)								
Consultation hours	By appoint	ment							
Teaching	L	ectures		Seminars		Practic	es		
Hours - total		15		15		0			
Course content / teaching units	Or Or	verview of anageme auses of e onitoring anageme e world - ndangeree otanically evelopme	of botanicall ent of botan endangerme g and study ent and prot comparison d and ender important ent of the ar	mic plant species in bo areas and the local co ea	Croatia - habitats in Croatia ortant areas in Croa mportant areas otanically import mmunity - susta	roatia tia in Croati tant area inable	a a and in s		
Recommended reading	M., Pandža Vrbek M., V Anonymus	n M., Posa Vuković N (2001)	avec-Vukelio I. (2010) Bo European	S., Jasprica N., Katalir ć V., Randić M., Ruščić tanički važna područja Strategy for Plant C Islated and commente	ć M., Šegota V., a Hrvatske. Škols onservation ado	Šincek D ska knjiga opted at	., Topić J., a, Zagreb.		
Optional reading	Europi i os Nikolić T. (2 The Nature	snova za 2004) – si e Protecti	razvoj smje upported by	Important Plant Are ernica za ostala podr / the Regional Environ and Action Plan of th 2017)	ručja svijeta (or imental Center)	iginal tra	inslated by		
Conditions for obtaining teacher's signature				and actively participat	te in lectures and	d semina	rs.		
Exam passing procedure	awarding students t determine	points ac ake the d accordin	cording to written exangled	er monitors and evalued determined criteria. am, and proceed to mber of points achieved to clectures and seminar	After the lecture the oral exam. and written an	ures and The fin	l seminars, al grade is		
Main language of instruction; other languages	Croatian la	nguage							
Method of monitoring the quality and efficiency of teaching	achieveme students h lectures, st	nt, thus ave the o udents a	determinir pportunity re given an	continuously moniton og and adapting his/ to make oral or writte anonymous survey to ne success of students	her teaching. n remarks. Dur o evaluate the o	After ea ing the la	ch lecture, ast week of		

Course title	Animal Be	haviour									
Code	BM969										
Study											
programme	Graduate U	Iniversity	Study Program	nme in Biology and	Chem	istry Teache	r Educat	ion			
Semester	III semester	r									
Workload/ECTS											
credits	2	2									
Course status	Flective	Elective									
Course teacher		Assist. Prof. Dr. Mirta Sudarić Bogojević									
Associate	7.0010111101										
teachers											
Course entry											
requirements											
(Preceding											
courses)											
Course objective	To introduc	e studen	ts to the basic	principles of anima	l heha	viour and to	sunnor				
course objective			r natural scier				support	•			
Learning				in causes and motiv	es for	a certain for	m of ani	mal			
outcomes		haviour.	entity the ma		23 101			mai			
outcomes			edict interact	ions between anima	als and	lenvironme	nt throu	⊽h			
			l adaptation.	ions between annu				5''			
			•	haviour of animals	and hi	imans					
				science literacy by le			ically int	ernret			
		•		ehaviour, or those p		-	•	cipict			
			l literature.		JICSCH	ieu in scient	inc and				
Link between											
learning						Assess	ment				
-		Assessment Assessment									
outcomes.	Learning Form of Atathada of Crading										
outcomes, teaching and	-	of		Activities of learning and				-			
teaching and	Learning outcome		Form of teaching			onitoring		ding ints			
teaching and students'	-	of		learning and	m	onitoring and		-			
teaching and	-	of		learning and	ev	onitoring and aluation	Po	ints			
teaching and students'	-	of		learning and	ev F	and aluation Records	Po	ints			
teaching and students'	outcome	of ECTS	teaching	learning and teaching	ev F	and aluation Records elated to	Po min	ints max			
teaching and students'	-	of		learning and teaching Lecture	ev F	and aluation Records elated to student	Po	ints			
teaching and students'	outcome	of ECTS	teaching	Lecture attendance and active	ev ev F re acti	and aluation Records elated to itudent vity during	Po min	ints max			
teaching and students'	outcome	of ECTS	teaching	Lecture attendance and active participation	ev ev F re acti	and aluation Records elated to student	Po min	ints max			
teaching and students'	outcome	of ECTS	teaching	Lecture attendance and active participation Attendance of	ev F re s acti I	and aluation Records clated to ctudent vity during ectures	Po min	ints max			
teaching and students'	outcome 1-4	of ECTS 0.5	Lectures	Lecture attendance and active participation Attendance of lectures,	ev F re acti I	onitoring and aluation Records elated to student vity during ectures ecords,	<u>Po</u> min 10	ints max 20			
teaching and students'	outcome	of ECTS	teaching	Lecture attendance and active participation Attendance of lectures, Independent	ev F re actir I R eva	and aluation Records elated to tudent vity during ectures ecords, luation of	Po min	ints max			
teaching and students'	outcome 1-4	of ECTS 0.5	Lectures	Lecture attendance and active participation Attendance of lectures, Independent preparation of	me ev F acti I R eva pr	onitoring and aluation Records elated to itudent vity during ectures ecords, luation of esented	<u>Po</u> min 10	ints max 20			
teaching and students'	outcome 1-4	of ECTS 0.5	Lectures	Lecture attendance and active participation Attendance of lectures, Independent	me ev F acti I R eva pr	and aluation Records elated to tudent vity during ectures ecords, luation of	<u>Po</u> min 10	ints max 20			
teaching and students'	outcome 1-4 1-4	of ECTS 0.5	Lectures Seminars	Lecture attendance and active participation Attendance of lectures, Independent preparation of	ev F re acti I R eva pr sem	and aluation Records elated to tudent vity during ectures ecords, luation of resented inar paper	90 min 10 30	ints max 20 50			
teaching and students'	outcome 1-4	of ECTS 0.5	Lectures	Lecture attendance and active participation Attendance of lectures, Independent preparation of seminar paper	ev F re acti I R eva pr sem	onitoring and aluation Records elated to itudent vity during ectures ecords, luation of esented	<u>Po</u> min 10	ints max 20			
teaching and students'	outcome 1-4 1-4 1-4	of ECTS 0.5 1 0.5	Lectures Seminars	learning and teaching Lecture attendance and active participation Attendance of lectures, Independent preparation of seminar paper Preparation for	ev F re acti I R eva pr sem	and aluation Records elated to tudent vity during ectures ecords, luation of resented inar paper	90 min 10 30	ints max 20 50			
teaching and students'	outcome 1-4 1-4	of ECTS 0.5	Lectures Seminars	learning and teaching Lecture attendance and active participation Attendance of lectures, Independent preparation of seminar paper Preparation for	ev F re acti I R eva pr sem	and aluation Records elated to tudent vity during ectures ecords, luation of resented inar paper	Po min 10 30 20	ints max 20 50 30			
teaching and students'	outcome 1-4 1-4 1-4	of ECTS 0.5 1 0.5 2	Lectures Seminars	learning and teaching Lecture attendance and active participation Attendance of lectures, Independent preparation of seminar paper Preparation for	ev F re acti I R eva pr sem	and aluation Records elated to tudent vity during ectures ecords, luation of resented inar paper	Po min 10 30 20	ints max 20 50 30			
teaching and students'	outcome 1-4 1-4 1-4 Total Final grade	of ECTS 0.5 1 0.5 2	Lectures Seminars	learning and teaching Lecture attendance and active participation Attendance of lectures, Independent preparation of seminar paper Preparation for oral exam	ev F re acti I R eva pr sem	and aluation Records elated to tudent vity during ectures ecords, luation of resented inar paper	Po min 10 30 20	ints max 20 50 30			
teaching and students'	outcome 1-4 1-4 1-4 Total Final grade Od 60-70 p	of ECTS 0.5 1 0.5 2 : oints: gra	teaching Lectures Seminars Oral exam	learning and teaching Lecture attendance and active participation Attendance of lectures, Independent preparation of seminar paper Preparation for oral exam	ev F re acti I R eva pr sem	and aluation Records elated to tudent vity during ectures ecords, luation of resented inar paper	Po min 10 30 20	ints max 20 50 30			
teaching and students'	outcome 1-4 1-4 1-4 Total Final grade Od 60-70 p Od 71-80 p	of ECTS 0.5 1 0.5 2 : oints: gra oints: gra	teaching Lectures Seminars Oral exam	learning and teaching Lecture attendance and active participation Attendance of lectures, Independent preparation of seminar paper Preparation for oral exam	ev F re acti I R eva pr sem	and aluation Records elated to tudent vity during ectures ecords, luation of resented inar paper	Po min 10 30 20	ints max 20 50 30			
teaching and students'	outcome 1-4 1-4 1-4 Final grade Od 60-70 p Od 71-80 p 81-90 point	of ECTS 0.5 1 0.5 2 : oints: gra ts: grade	teaching Lectures Seminars Oral exam	learning and teaching Lecture attendance and active participation Attendance of lectures, Independent preparation of seminar paper Preparation for oral exam	ev F re acti I R eva pr sem	and aluation Records elated to tudent vity during ectures ecords, luation of resented inar paper	Po min 10 30 20	ints max 20 50 30			
teaching and students'	outcome 1-4 1-4 1-4 Final grade Od 60-70 p Od 71-80 p 81-90 point	of ECTS 0.5 1 0.5 2 : oints: gra oints: gra ts: grade points: gra	teaching Lectures Seminars Oral exam de 2 (sufficie ade 3 (good) 4 (very good)	learning and teaching Lecture attendance and active participation Attendance of lectures, Independent preparation of seminar paper Preparation for oral exam	ev F re acti I R eva pr sem	and aluation Records elated to tudent vity during ectures ecords, luation of resented inar paper	Po min 10 30 20	ints max 20 50 30			
teaching and students' activities	outcome 1-4 1-4 1-4 Total Final grade Od 60-70 p Od 71-80 p 81-90 point Od 91-100	of ECTS 0.5 1 0.5 2 : oints: gra oints: gra ts: grade points: gra	teaching Lectures Seminars Oral exam de 2 (sufficie ade 3 (good) 4 (very good)	learning and teaching Lecture attendance and active participation Attendance of lectures, Independent preparation of seminar paper Preparation for oral exam	ev F re acti I R eva pr sem	and aluation Records elated to tudent vity during ectures ecords, luation of resented inar paper	Po min 10 30 20	ints max 20 50 30			
teaching and students' activities	outcome 1-4 1-4 1-4 Final grade Od 60-70 p Od 71-80 p 81-90 point Od 91-100 By appoint	of ECTS 0.5 1 0.5 2 : oints: gra oints: gra ts: grade points: gra ment	teaching Lectures Seminars Oral exam de 2 (sufficie ade 3 (good) 4 (very good)	learning and teaching Lecture attendance and active participation Attendance of lectures, Independent preparation of seminar paper Preparation for oral exam	ev F re acti I R eva pr sem	and aluation Records elated to itudent vity during ectures ecords, luation of resented inar paper ral exam	Po min 10 30 20	ints max 20 50 30			
teaching and students' activities	outcome 1-4 1-4 1-4 Final grade Od 60-70 p Od 71-80 p 81-90 point Od 91-100 By appoint	of ECTS 0.5 1 0.5 2 : oints: gra oints: gra ts: grade points: gra ts: grade points: gra ts: grade	teaching Lectures Seminars Oral exam de 2 (sufficie ade 3 (good) 4 (very good)	learning and teaching Lecture attendance and active participation Attendance of lectures, Independent preparation of seminar paper Preparation for oral exam nt) ent) Seminars	ev F re acti I R eva pr sem	and aluation Records elated to itudent vity during ectures ecords, luation of resented inar paper ral exam	Po min 10 30 20 60 ractices	ints max 20 50 30			
teaching and students' activities	outcome 1-4 1-4 1-4 Final grade Od 60-70 p Od 71-80 p 81-90 point Od 91-100 By appoint	of ECTS 0.5 1 0.5 2 : oints: gra oints: gra ts: grade points: gra ment	teaching Lectures Seminars Oral exam de 2 (sufficie ade 3 (good) 4 (very good)	learning and teaching Lecture attendance and active participation Attendance of lectures, Independent preparation of seminar paper Preparation for oral exam	ev F re acti I R eva pr sem	and aluation Records elated to itudent vity during ectures ecords, luation of resented inar paper ral exam	Po min 10 30 20 60	ints max 20 50 30			

Course content /	Introduction to the animal behaviour
teaching units	Mechanisms of behaviour
teaching units	
	motivation and organisation of behaviour
	Development of behaviour
	Communication
	Foraging behaviour
	Avoiding of predators
	Reproductive behaviour
	 Analysis of video materials and papers related to course topics
	Presentation of one form of animal behaviour
Recommended	Alcock J. (2009) Animal Behavior: An Evolutionary Approach. 9th ed. Sinauer Associates,
reading	Sunderland.
	Goodenough J., McGuire B., Wallace R.A. (2001) Perspectives of Animal Behavior. John
	Wiley and sons, Inc. New York, Brisbane, Toronto.
	McFarland D. (1996) Animal behaviour. Addison Wesley Longman Limited, Edinbourgh.
Optional reading	Halliday T. (1994) Animal Behavior. A Blanford book, London.
	Miller S., Harley J.P. (1996) Zoology. WCB Mc. Graw – Hill Companiec Inc. Boston.
	Wilson E.O. (2000) Sociobiology, The new synthesis. 25th ed. The President and Fellows
	of Harvard College.
	Scientific journals, popular articles and videos
Conditions for	
obtaining	Attendance of lectures and seminars, and completion of all course assignments.
teacher's	
signature	
Exam passing	Performance of students is assessed during lectures, as well as within the written and oral
procedure	exam. Preparation and presentation of seminar paper is awarded by certain number of
	points according to determined criteria.
Main language	
of instruction;	Croatian language
other languages	
Method of	During the course, the teacher continuously monitors the learning process and student
monitoring the	achievements, thus determining and adapting his/her teaching. After the course, the
quality and	teacher conducts an anonymous survey among students to evaluate their subjective
efficiency of	impression about the teaching quality.
teaching	······································

Course title	History of	Plant Phy	siology Rese	arch					
Code	· · ·		07						
Study	Craduata		tu du Du o guo no s	no in Diele av and C					
programme	Graduate U	niversity S	tudy Programi	me in Biology and C	nemistry Teacher	Educatio	on		
Semester	III semester								
Workload/ECTS credits	2								
Course status	Elective								
Course teacher		Assist. Prof. Dr. Vesna Peršić Assist. Prof. Dr. Jasenka Antunović Dunić							
Associate teachers									
Course entry requirements (Preceding courses)									
Course	To teach st	udents al	out developr	nents of plant phy	siology science	from a H	nistorical		
objective			•	important achieve					
Learning				events related to th			vsiology		
outcomes		•		ists throughout his	•	1 P1	,		
				e of scientists/ever	•				
				achievements and	-	understa	inding of		
			processes.			underste			
		-		the literature on sc	ientific findings a	nd conce	ents that		
		-	o developmen						
				ory of research a	nd the precondit	tions for	correct		
				e development of n			contect		
Link between learning						sment			
outcomes,	Learning	Share	Form of	Activities of	Nathada af	Cre	din a		
teaching and	outcome	of	teaching	learning and	Methods of		ding		
students'	outcome	ECTS	teaching	teaching	monitoring	PO	ints		
activities					and	min	max		
utilities					evaluation				
					Records				
				Active learning;	related to	4.0			
	1-5	0.5	Lecture	critical	student	12	20		
				discussion	activity in				
					discussions				
	2, 4	0.75	Seminar	Supervised research into the development of scientific concepts within the history of scientific research; presentation of research and critical review of the relations between science and	Analysis of seminar paper presentation and provision of feedback	24	40		

	5 1-5 Total Final grade: 60-70 point: 71-80 point: 81-90 point: 91-100 poin	s: grade 2 s: grade 3 s: grade 4	(good) (very good)	Preparation for oral exam	rela stu activit practiv and p of fe	cords ited to ident ty during cal work irovision edback I exam	6 18 60	10 30 100
Consultation hours	By appointm	nent						
Teaching	Le	ctures		Seminars		P	ractices	
Hours - total		15		5			10	
Course content / teaching units	the var exp Car Ass Res Sch Wa Pho Boy Nit Tra Gro Jen Laboratory a Osr Iaw	torical dev ory of pla a Helmont beriments I Sprenge imilation – iwann, Bu ter and pl otosynthe ysen-Jense rogen assi nslocation sen, Paal, e last 60 ye and experi mometer a y of the mi	velopment c nt nutrition, 's willow tre with treatm I and J. von I of carbon di the researc chner) and t ants (Molisc sis (discover en, Robert H milation n of organic gation and p Went; resea ears of phot imental prac and the Pfef inimum, star	fer cell, Traube cell, v ch images, Hill reacti	ather of 17th cen med by mineral chs) 21 (de V 21 (Wark 10d, Wa d Kamer earch be ches und villow tr <u>on, plan</u>	botany ar itury, the f J. Woodwa nutrition o /ries, Pfeff burg, Black arburg, Eng n, Calvin) efore and a til 1927 by ee experin it moveme	nd systen irst hydr ard and S of plants er, Trauk (mann) gelmann, gelmann, after 189 Darwin, Darwin, nent, Lie	natics, oponic 5. Hales) be, 5 Boysen big's
Recommended reading	Antonkievica continuum f 21(1-2):29-4 Govindjee (2 personal per	z J., Łabet rom ancie 3. 2018) A six rspective.	owicz J. (20) ent Greece a kty-year trys Photosynth	iology. 5th ed. Sinaue 16) Chemical innovat nd Rome until mode with photosynthesis esis Research 139: 15 95) Practical Physiolo	ion in pl rn times and rela 5-43.	lant nutriti s. Chem di ated proce	ion in a ł dact eco esses: an	nistorical l metrol. informal
Optional reading	Kutschera U	J., Niklas	K.J. (2018)	an integrative plant p Julius Sachs (1868)): 1–11.				ysiology.
Conditions for obtaining	Attendance	of lecture	s is obligato	y, as defined by the R sity of Osijek. If a stu	-			

teacher's	teaching hours, he/she shall not be entitled to obtain the teacher's signature for the course
signature	attendance.
Exam passing procedure	During the course, the teacher monitors and evaluates the activities of students by awarding points according to determined criteria. After attending lectures, seminars and practices, students proceed with the oral exam. The final grade is determined according to the number of points collected during the lectures, seminars and practices and the points achieved at the oral exam.
Main language of instruction; other languages	Croatian language
Method of monitoring the quality and efficiency of teaching	During the course, the teacher continuously monitors the learning process and student achievement, thus determining and adapting his/her teaching. After each lecture, students have the opportunity to make oral or written remarks. During the last week of lectures, students are given an anonymous survey to evaluate the overall quality of the course. The teacher monitors the success of students at the exams.

Course title	Applicatior	n of Algae	and Cyanol	bacteria					
Code		0							
Study			_						
programme	Graduate Ur	niversity St	tudy Program	me in Biology ar	nd Chemistry Teache	r Educati	on		
Semester	III semester								
Workload/ECTS	in semester								
credits	2								
Course status	Elective								
Course teacher									
Associate		Assist. Prof. Dr. Filip Stević Assist. Prof. Dr. Dubravka Špoljarić Maronić							
		ssist. Prof. Dr. Dubravka Spoljaric Maronic ssoc. Prof. Dr. Tanja Žuna Pfeiffer							
teachers	ASSOC. Prot.	Dr. Tanja 2	zuna Preimer						
Course entry									
requirements									
(Preceding									
courses)									
Course					Itiple possibilities of	t using a	lgae and		
objective	<u> </u>			uman activities.					
Learning		-	•		f algae and cyanobac				
outcomes					algal and cyanobacte				
				tance of algae ar	nd cyanobacteria in t	he conte	ext of		
	-	oal climate	-						
				cess of algae and	l cyanobacteria appli	ication ir	i various		
	are	as of hum	an activities.						
Link between					Assess	mont			
learning	Leensine	Share	Form of	Activities of	ASSESS	ment			
outcomes,	Learning outcome	of	teaching	learning and	Methods of	Grading			
teaching and		ECTS	teaching	teaching	monitoring and		ints		
students'					•				
					evaluation	min	max		
activities					evaluation Records related	min	max		
activities				Critical		min	max		
activities				Critical conversation	Records related to active and				
activities	1-4	0.25	Lecture		Records related to active and independent	<u>min</u> 10	max 20		
activities	1-4	0.25	Lecture	conversation and	Records related to active and independent participation in				
activities	1-4	0.25	Lecture	conversation	Records related to active and independent participation in conversations				
activities	1-4	0.25	Lecture	conversation and	Records related to active and independent participation in conversations and discussions				
activities	1-4	0.25	Lecture	conversation and discussion	Records related to active and independent participation in conversations and discussions Records related				
activities	1-4	0.25	Lecture	conversation and discussion Independent	Records related to active and independent participation in conversations and discussions Records related to active and				
activities				conversation and discussion Independent preparation	Records related to active and independent participation in conversations and discussions Records related to active and independent	10	20		
activities	1-4	0.25	Lecture Seminar	conversation and discussion Independent preparation of seminar	Records related to active and independent participation in conversations and discussions Records related to active and independent preparation of				
activities				conversation and discussion Independent preparation	Records related to active and independent participation in conversations and discussions Records related to active and independent preparation of seminar paper	10	20		
activities				conversation and discussion Independent preparation of seminar	Records related to active and independent participation in conversations and discussions Records related to active and independent preparation of seminar paper with provision of	10	20		
activities			Seminar	conversation and discussion Independent preparation of seminar paper	Records related to active and independent participation in conversations and discussions Records related to active and independent preparation of seminar paper	10	20		
activities	3-4	0.5	Seminar Written	conversation and discussion Independent preparation of seminar paper Preparation	Records related to active and independent participation in conversations and discussions Records related to active and independent preparation of seminar paper with provision of feedback	10	20 25		
activities			Seminar	conversation and discussion Independent preparation of seminar paper	Records related to active and independent participation in conversations and discussions Records related to active and independent preparation of seminar paper with provision of	10	20		
activities	3-4	0.5	Seminar Written	conversation and discussion Independent preparation of seminar paper Preparation for written exam	Records related to active and independent participation in conversations and discussions Records related to active and independent preparation of seminar paper with provision of feedback	10	20 25		
activities	3-4	0.5	Seminar Written	conversation and discussion Independent preparation of seminar paper Preparation for written exam Preparation	Records related to active and independent participation in conversations and discussions Records related to active and independent preparation of seminar paper with provision of feedback	10	20 25		
activities	3-4	0.5	Seminar Written exam	conversation and discussion Independent preparation of seminar paper Preparation for written exam Preparation for oral	Records related to active and independent participation in conversations and discussions Records related to active and independent preparation of seminar paper with provision of feedback Written exam	10 15 15	20 25 25		
activities	3-4 1-4 1-4	0.5	Seminar Written exam	conversation and discussion Independent preparation of seminar paper Preparation for written exam Preparation	Records related to active and independent participation in conversations and discussions Records related to active and independent preparation of seminar paper with provision of feedback Written exam	10 15 15 20	20 25 25 30		
activities	3-4 1-4 1-4 Total	0.5	Seminar Written exam	conversation and discussion Independent preparation of seminar paper Preparation for written exam Preparation for oral	Records related to active and independent participation in conversations and discussions Records related to active and independent preparation of seminar paper with provision of feedback Written exam	10 15 15	20 25 25		
activities	3-4 1-4 1-4 Total Final grade:	0.5 0.5 0.75 2	Seminar Written exam Oral exam	conversation and discussion Independent preparation of seminar paper Preparation for written exam Preparation for oral	Records related to active and independent participation in conversations and discussions Records related to active and independent preparation of seminar paper with provision of feedback Written exam	10 15 15 20	20 25 25 30		
activities	3-4 1-4 1-4 Final grade: 60-70 points	0.5 0.5 0.75 2 :: grade 2	Seminar Written exam Oral exam (sufficient)	conversation and discussion Independent preparation of seminar paper Preparation for written exam Preparation for oral	Records related to active and independent participation in conversations and discussions Records related to active and independent preparation of seminar paper with provision of feedback Written exam	10 15 15 20	20 25 25 30		
activities	3-4 1-4 1-4 Final grade: 60-70 points 71-80 points	0.5 0.5 0.75 2 :: grade 2 :: grade 3	Seminar Written exam Oral exam (sufficient) (good)	conversation and discussion Independent preparation of seminar paper Preparation for written exam Preparation for oral	Records related to active and independent participation in conversations and discussions Records related to active and independent preparation of seminar paper with provision of feedback Written exam	10 15 15 20	20 25 25 30		
activities	3-4 1-4 1-4 Final grade: 60-70 points 71-80 points 81-90 points	0.5 0.5 0.75 2 :: grade 2 :: grade 3 :: grade 4	Seminar Written exam Oral exam (sufficient) (good) (very good)	conversation and discussion Independent preparation of seminar paper Preparation for written exam Preparation for oral	Records related to active and independent participation in conversations and discussions Records related to active and independent preparation of seminar paper with provision of feedback Written exam	10 15 15 20	20 25 25 30		
	3-4 1-4 1-4 Final grade: 60-70 points 81-90 points 91-100 point	0.5 0.5 0.75 2 :: grade 2 :: grade 3 :: grade 4 ts: grade 5	Seminar Written exam Oral exam (sufficient) (good) (very good)	conversation and discussion Independent preparation of seminar paper Preparation for written exam Preparation for oral	Records related to active and independent participation in conversations and discussions Records related to active and independent preparation of seminar paper with provision of feedback Written exam	10 15 15 20	20 25 25 30		
activities	3-4 1-4 1-4 Final grade: 60-70 points 71-80 points 81-90 points	0.5 0.5 0.75 2 :: grade 2 :: grade 3 :: grade 4 ts: grade 5	Seminar Written exam Oral exam (sufficient) (good) (very good)	conversation and discussion Independent preparation of seminar paper Preparation for written exam Preparation for oral	Records related to active and independent participation in conversations and discussions Records related to active and independent preparation of seminar paper with provision of feedback Written exam	10 15 15 20	20 25 25 30		

Teaching	Lectures	Seminars	Practices
Hours - total	15	15	0
Course content / teaching units	 Primary producers, h Bioactive substances Biotechnology Application of algae a medical and pharma (photobioreactors, b cosmeceutics), nutrit vitamins, proteins, m The most common ty UV protection Connection to global 	and cyanobacteria ent environmental conditions eterotrophs and mixotrophs and cyanobacteria: basic indica ceutical industry, water purifier iofuels), paleolimnology, cosmo cion - primitive food, macro and inerals and fatty acids ypes of algae and cyanobacteria climate change	rs, energy sources etic industry (cosmetics, d microelements, sources of a in wide application
Recommended reading		mbridge University Press, New Ecology of Phytoplankton. (erring to the subject area.	
Optional reading	Torres M.A., Souza A.O., Co economical impact. Comp Bio	Barros M.P., Falcão V.R., Tonor lepicolo P., Pinto E. (2007) M chem Physiol 146: 60-78. pllications of algae. Int J Adv	Metabolites from algae with
Conditions for obtaining teacher's signature		d and actively participate in lec	tures and practices.
Exam passing procedure	and oral exam. Each student	the course is evaluated during prepares and presents a semin rded according to determined	ar paper, for which there are
Main language of instruction; other languages	Croatian language		
Method of monitoring the quality and efficiency of teaching	An anonymous student surve course. Analysis of student su	ey will be carried out to evaluat ccess at the exams.	ate the overall quality of the

Code BBZ53 Study Graduate University Study Programme in Biology and Chemistry Teacher Education programme Graduate University Study Programme in Biology and Chemistry Teacher Education Semester III semester Workload/ECTS 3 Course status Elective Course teacher Prof. Dr. Enrih Merdić Associate Elective teachers The aim of the course is to provide an overview of sexuality of living creatures, to rai course objective The aim of the course is to provide an overview of sexuality of living creatures, to rai objective The aim of the course is to provide an overview of sexuality of living creatures, to rai objective The aim of the course is to provide an overview of sexuality of living creatures, to rai objective The aim of the course is to provide an overview of sexuality of living creatures, to rai objective The aim of the course is to provide an overview of sexuality of living creatures, to rai objective The aim of the course is to provide an overview of sexual if production. Course The aim of the course is to provide an overview of sexual reproduction. Course The aim of the course is to provide an overview of sexual reproduction. Course The aim of the c	Course title	Sexuality of	Living C	reature	s					
Study programme Graduate University Study Programme in Biology and Chemistry Teacher Education Semester III semester Workload/ECTS credits 3 Course status Elective Course status Elective Course teacher Prof. Dr. Enrih Merdić Associate teachers The aim of the course is to provide an overview of sexuality of living creatures, to rai awareness of the meaning of sexes, and to define similarities and differences of sexual in plants, animals and humans. Learning outcomes 1. Knowledge about the importance of bisexual reproduction. 2. Ability to compare the differences in sexuality between men and women. 4. Ability to critically estimate the quality of sexual life in humans. Link between learning outcomes, teaching and students' 15 1 15 1 15 1 25 1 01-5 1 01-5 1 01-5 1 01-5 1 01-5 1 01-5 1 01-5 1 01-5 1 01-5 1 01-5 1 01-5 1 01-5 1 01-5 1 01-5 1	Code		0 -		-					
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Semester III semester 3 3 Course status Elective Course teacher Prof. Dr. Enrih Merdić Associate Freeding teachers Course status Course status Elective Course teacher Prof. Dr. Enrih Merdić Course entry requirements (Preceding courses) The aim of the course is to provide an overview of sexuality of living creatures, to rai awareness of the meaning of sexes, and to define similarities and differences of sexual in plants, animals and humans. Learning outcomes 1. Knowledge about the importance of bisexual reproduction. 2. Ability to define the behavioural patterns of some animals during reproduction. 3. Ability to compare the differences in sexual behaviour of humans. Link between learning outcomes, teaching and students' activities of for teaching and students' activities Share of teaching and teaching and teaching and teaching and teaching and evaluation in conversations and discussions and conversations and discussions and discussio	-		, -					··· , ··· ·		
Workload/ECTS credits 3 Course status Elective Course status Elective Course cacher Prof. Dr. Enrih Merdić Associate teachers The aim of the course is to provide an overview of sexuality of living creatures, to rai awareness of the meaning of sexes, and to define similarities and differences of sexual in plants, animals and humans. Learning outcomes 1. Knowledge about the importance of bisexual reproduction. 2. Ability to define the behavioural patterns of some animals during reproduction. 3. Ability to compare the differences in sexuality between men and women. 4. Ability to critically estimate the quality of sexual behaviour of humans. 5. Knowledge about different forms of sexual behaviour of humans. Link between learning outcome Share of cutcome Form of of certs Activities of leaching 1-5 1 Lecture Attendance of lectures; discussions and conversations Records related to active participation in conversations 18 30 1-5 1 Seminar Independent research work on a seminar paper topic Assessment of seminar paper topic 24 40		III semester								
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1-5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						paper topic				
1-5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		-		Oral		Proparation for				
		1-5	1				0	ral exam	18	30
				Слан						
Total 3 60 100		Total	3						60	100
Final grade:		-								
60-70 points: grade 2 (sufficient)		•	-	•	nt)					
71-80 points: grade 3 (good)		-	-							
81-90 points: grade 4 (very good)		-	-		-					
91-100 points: grade 5 (excellent)		-	-	5 (excelle	ent)					
Consultation By appointment		By appointm	ent							
hours								Γ		
TeachingLecturesSeminarsPractices	Teaching	Leo	tures			Seminars		P	ractices	
Hours - total 30 15 0	Hours - total		30			15			0	
50 15 0			50			12			0	

Course content	Lectures:
/ teaching units	Two sexes vs. one sex
,	Patterns of sexual breeding in plants
	 Animals: copulation as a start of a new life and/or a great pleasure, searching for
	a partner, physiology of sexual receptors, fight for a female, courting, patterns
	of copulation, birth, care for the offspring
	Life in a partnership
	Homosexuality in animals
	Humans: love and sexuality, biology of sexuality, sexual selection, sociological
	moments (in the past and today).
	Infatuation, types of love, attractiveness, chemistry of attraction, pheromones
	• Man as a partner, woman as a partner, technics of sexual love
	Birth control
	Difficulties in sexual life
	Homosexuality
	Seminar:
	• Within the seminar, each student prepares and presents one topic related to the
	teaching units, while being supervised by the teacher
	Within the seminar, there will be course-related video materials shown
Recommended	Holroyd S., Holroyd S. (1989) The complete book of sexual love. Aldus Books Limited,
reading	London
	Klein M. (2009) Seks odgovori na sva pitanja. Mozaik knjiga, Zagreb.
Optional	http://www.intimatemedicine.com.hr/enciklopedija-seksualnosti
reading	https://www.animaledu.com/
Conditions for	
obtaining	Students are obliged to participate in lectures actively.
teacher's	
signature Exam passing	Students shall deliver an oral presentation about the topic of their choice. Presentations
procedure	are evaluated according to criteria valid for the assessment of seminar papers. Students
procedure	performance during the course contributes to the final grade with a share of 60%, while
	success at final exam contributes to the final grade with 40%.
Main language	
of instruction;	
other	Croatian language, English language
languages	
Method of	
monitoring the	
quality and	Evaluation form
efficiency of	
teaching	

Course title	Modern S	pectroso	copic Methods	in Chemistry					
Code	K056		•	•					
Study	Graduate	Graduate University Study Programme in Biology and Chemistry Teacher Education							
programme	Graduate O	liversity		The in Blology an			uon		
Semester	III semester	III semester							
Workload/ECTS credits	2								
Course status	Elective								
Course teacher	Assoc. Prof.	Dr. Beri	slav Marković						
Associate									
teachers									
Course entry									
requirements	Passed exa	ms withir	n the courses Fu	indamentals of P	hysical Chemistry	1 and 2			
(Preceding					, ,				
courses)	T	4				-41			
Course objective			•		tromagnetic radi instruments and				
objective			•		these methods.	some or ti	le mouern		
Learning	· · ·				ferent areas of t	he electr	omagnetic		
outcomes		diation sp	•				omagnetic		
				vavelength radia	tion to obtain d	ifferent ir	formation		
		out mate		0					
	3. Kn	owledge	about experime	ental techniques	that are the mos	t suitable	for testing		
	of	a particu	llar material.				_		
	4. Ab	ility to n	nake correlatior	n between surfac	ce chemistry and	its influe	nce on the		
	•	•	of nanomateria						
		-		ate methods f	or determinatio	n of cha	aracteristic		
		operties.							
	6. Sk	ills neces	sary for oral and	d written presen	tation of scientific	c work.			
Link between learning					Asse	essment			
outcomes,	Learning	Share	Form of	Activities of	Methods of	C	alia a		
teaching and	outcome	of	teaching	learning and	monitoring		ding		
students'	outcome	ECTS	teaching	teaching	and	μο	ints		
activities					evaluation	min	max		
				Critical	cruidation				
				conversation		_			
	1-6	0.5	Lecture	and	Records	7	10		
				discussion					
				Preparation					
				and	Oral				
	1-6	1	Practices	presentation	presentation,	10	20		
				of a seminar	evaluation				
				paper					
			Exam	Preparation					
	1-6	0.25	(preliminary	for written	Written exam	20	30		
			exam)	exam					
	1-6	0.25	Final exam	Preparation for oral exam	Oral exam	23	40		
	Total	2				60	100		
		_				_			
	71-80 point 81-90 point	ts: grade ts: grade ts: grade	2 (sufficient) 3 (good) 4 (very good) e 5 (excellent)						

		er of points refers to the lo efers to the highest grade (exce	
Consultation hours	One hour a week during a sen	nester according to schedule a	nnounced in advance.
Teaching	Lectures	Seminars	Practices
Hours - total	15	0	15
Course content / teaching units	 Absorption and emis Interaction of radiati Spectroscopic instrum Modern methods of NMR spectroscopy (r spin resonance) Raman spectroscopy 	ments: the main and auxiliary in data collection - FT instrument nuclear magnetic resonance); E ; Infrared spectroscopy (IR, FTI e spectroscopy (UV-VIS); Ultrav spectroscopy (XPS)	on nstrumental parts s SR spectroscopy (electron R)
Recommended reading	Learning, 6th ed. Andover. Skoog D.A., West D.M., Holler	 ch S.R. (2006) Principles of Ins F.J. (1999) Osnove analitičke k 7) Chemical Analysis: Modern I nichester. 	emije. Školska knjiga, Zagreb.
Optional reading	Harris D.C. (2010) Quantitativ	e Chemical Analysis. W.H. Free ation of new spectroscopic me	
Conditions for obtaining teacher's signature		ipate in lectures actively and t	
Exam passing procedure	Students' knowledge is evalu semester. Final exam is taken	lated within one preliminary e in form of oral exam.	exam taken in the middle of
Main language of instruction; other languages	Croatian language, English lan	guage	
Method of monitoring the quality and efficiency of teaching	Continuous communication survey.	between teacher and studer	nts and anonymous student

Course title	Introduct	ion to C	hemical Se	nsors and Biosenso	rs				
Code	K066								
Study	Graduate I	Iniversity	y Study Prog	ramme in Biology and	Chamistry Taacha	r Educati	on		
programme	Graduate University Study Programme in Biology and Chemistry Teacher Education								
Semester	III semeste	er							
Workload/ECTS credits	3								
Course status	Elective								
Course teacher	Assist. Pro	Assist. Prof. Dr. Marija Jozanović							
Associate									
teachers									
Course entry									
requirements (Preceding courses)	Attended o	Attended obligatory courses related to chemistry, basics of physics							
Course	To enable s	To enable students to acquire basic knowledge of chemical sensors and biosensors, and to							
objective	learn abo monitoring approach t	learn about theoretical principles, and their application in the process of quality monitoring and environmental protection. To explain to students the interdisciplinary approach to development and usage of chemical sensors and biosensors.							
Learning outcomes	2. Al 3. Al 4. Al 5. Kı 6. Al ar er	 Ability to determine the basic characteristics of the sensory element. Ability to critically evaluate the performance of chemical sensors and biosensors. Knowledge about the types of chemical sensors with respect to the transducer. Ability to assess the new technologies and approaches in the production and application of chemical sensors and biosensors in physiological processes and environmental protection. 							
Link between learning	Learning	Share	Form of	Activities of	Asses	sment			
outcomes, teaching and students'	outcome	of ECTS	teaching	learning and teaching	Methods of monitoring and evaluation	Ро	iding ints		
activities						min	max		
	1-3	1	Lecture	Critical conversation and discussion, collaborative learning	Records related to active participation in conversations and discussions	10	20		
	2-7	1	Seminar	Interpretation of scientific papers, case study analysis. Independent preparation of practice proposals	Monitoring of student performance at interpreting and solving of exercises. Analysis of created lesson plans	10	20		
	2-7 1-7	1 0.5	Seminar Written exam	scientific papers, case study analysis. Independent preparation of	student performance at interpreting and solving of exercises. Analysis of created lesson	10	20 30		
			Written	scientific papers, case study analysis. Independent preparation of practice proposals Preparation for	student performance at interpreting and solving of exercises. Analysis of created lesson plans				
	1-7	0.5	Written exam Oral	scientific papers, case study analysis. Independent preparation of practice proposals Preparation for written exam Preparation for	student performance at interpreting and solving of exercises. Analysis of created lesson plans Written exam	15	30		

	Final grade: 50.1-62.5 points: grade 2 (suf 62.6-75 points: grade 3 (good 75.1-87.5 points: grade 4 (ver 87.6-100 points: grade 5 (exc	l) ry good)				
Consultation hours	By appointment					
Teaching	Lectures	Seminars	Practices			
Hours - total	30	15	0			
Course content / teaching units	 Chemical sensors and biosensors - definitions, theoretical background, parts of the sensor system. Transducer elements: electrochemical, optical, thermal and mass converters Sensing elements: mechanisms of chemical and biological recognition, biomimetic systems, chemical and biological active ingredients in the sensory systems, methods of chemical and biological reagents immobilisation, the role of materials in the sensory systems - polymers Measuring of sensor performance: selectivity, sensitivity, precision, accuracy, repeatability, reversibility Electrochemical sensors and biosensors, optical sensors and biosensors, mass and thermal sensors Applications of chemical sensors: industrial processes, environmental protection, medicine Manufacturing and design of sensors, new materials and technologies: high-degree integration of sensors, microfluidics, micro-electromechanical systems (MEMS and BioMEMS, Micro-Total-Analytical-Systems (μTAS), Lab-on-a-chip systems, nanosensors, biochips 					
Recommended reading	Fraden J. (2010) Handbook of Springer. Karvinen T., Karvinen K., Valto	nsors and Biosensors: Fundame Modern Sensors: Physics, Desig okar V. (2014) Make: Sensors, 1 ensors: Reviews, Vol. 3, Ifsa Pu	gns, and Applications, 4th ed., st ed., Maker Media, Inc.			
Optional reading	Gruyter.	2019) Biosensors: Fundamenta hemical sensors, 2nd ed. Sprin				
Conditions for obtaining teacher's signature	Active participation in lecture number of teaching hours.	es and seminars, with an abser	nce of up to 30% of the total			
Exam passing procedure	During the course, the teacher monitors and evaluates the work of each student, which makes up to 20% of the final grade. During the course, students will be taking written preliminary exams, which can be considered as a substitute for the written final exam if they achieve at least 50% of total points. Preliminary exams or final written exam make up to 30% of the final grade, while oral exam makes up to 50% of the final grade.					
Main language of instruction; other languages	Croatian language, English lan	guage				
Method of monitoring the quality and efficiency of teaching	out after the course; during th	ression about the organisation ne course, students will be given er monitors students' success a	n an opportunity to make oral			

Course title	Introduct	ion to Sc	cientific Res	search Methodolog	ξV			
Code								
Study	Currelington							
programme	Graduate C	Iniversity	Study Progr	ramme in Biology and	a Chemistry Teache	r Educati	on	
Semester	III semeste	r						
Workload/ECTS credits	2							
Course status	Elective							
Course teacher	Assist. Prof	Assist. Prof. Dr. Lidija Begović						
Associate teachers	Assist. Prof	Assist. Prof. Dr. Selma Mlinarić						
Course entry requirements (Preceding courses)								
Course objective		To enable students to understand the basic concepts of scientific research work and to develop their skills required for independent preparation of a research paper.						
Learning outcomes	re 2. At 3. At 3. At 9r 4. At 5. Sk	 results. Ability to critically evaluate the importance of experimental design and application of statistical methods. Ability to select appropriate methods and techniques to research a selected problem and to test the hypotheses. Ability to assess and critically analyse scientific articles. 						
Link between learning		Share		Activities of	Assess	sment		
outcomes, teaching and	Learning outcome	of ECTS	Form of teaching	learning and teaching	Methods of monitoring and		ding ints	
students'				Ū	evaluation	min	max	
activities	1-5	0.5	Lecture	Critical conversation and discussion	Records related to active participation in conversations and discussions	15	20	
	2-5	0.5	Practices	Work on an experimental assignment	Monitoring of student performance within experimental assignment	20	30	
	1-5	0.5	Written exam	Preparation for written exam	Written exam	10	20	
	1-5	0.5	Oral exam	Preparation for oral exam	Oral exam	15	30	
	Total	2				60	100	
	71-80 poin 81-90 poin	ts: grade ts: grade ts: grade	2 (sufficient 3 (good) 4 (very good e 5 (exceller	d)				
Consultation	By appoint							

Teaching	Lectures	Seminars	Practices
Hours - total	15	0	15
Course content / teaching units	 How to design an experiment replication Experiments in contract Experiments in contract Ethics and codes of experiments of publications papers, WoS, SCImage Citation, reference methods Experiment design Rules for preparation Writing of scientific at Presentation of reseat Working with reference methods 	nanagement software	hnical, biological), ents, field research. nd animals ientific and professional ures dNote, Ref Manager, if databases
Recommended reading	Quinn G.P., Keough M.J. (20 Cambridge University Press, C	02) Experimental Design and	Data Analysis for Biologists.
Optional reading	Glass D.J. (2014) Experimenta Press, Cold Spring Harbor, NY	l Design for Biologists. 2 nd ed. C elected from the latest scientifi	
Conditions for obtaining teacher's signature		ipate in lectures actively and t	o fulfil all assignments within
Exam passing procedure	awarding points according to take a written exam and then	her monitors and evaluates to determined criteria. After lec an oral exam. Points achieved up to the final exam, thus ma	tures and practices, students at written and oral exam are
Main language of instruction; other languages	Croatian language, English lan	guage	
Method of monitoring the quality and efficiency of teaching	out after the course; during th	ression about the organisation the course, students will be given er monitors students' success a	n an opportunity to make oral

Code BM292 Study programme Graduate University Study Programme in Biology and Chemistry Teacher Education Semester III semester Workload/ECTS credits 2 Course status Elective Aleksandra Kočić, Ph.D. Aleksandra Kočić, Ph.D. Course entry requirements (Preceding courses) To enable students to apply methods for making flora inventory, to determine and identi habitat types and to create, use and interpret flora and vegetation maps. Students will it taught how to use vegetation-mapping techniques along different environment gradients within a research project. Learning outcomes 1. Skills in using methods for making flora inventory. 2. Ability to determine relations between inherent and differential species and plat community. 4. Skills in using vegetation-mapping techniques along different environment gradients. 5. Skills in using vegetation-mapping techniques along different environment gradients. 5. Skills in applying research into vegetation in future teaching activity. Link between learning outcomes, teaching and students' 1.5 0.5 Lectures Lecture attendance and active participation, work on a research project 1.2,3,4 0.5 Practices Practices attendance and active participation, work on a research project <t< th=""><th>Course title</th><th>Vegetatio</th><th>n Mapp</th><th>ing</th><th></th><th></th><th></th><th></th></t<>	Course title	Vegetatio	n Mapp	ing						
programme Graduate University Study Programme in Biology and Chemistry Teacher Education Semester III semester Workload/ECTS credits 2 Course status Elective Course status Elective Associate teachers Aleksandra Kočić, Ph.D. Course entry requirements (Preceding courses) To enable students to apply methods for making flora inventory, to determine and identi habitat types and to create, use and interpret flora and vegetation maps. Students will be taught how to use vegetation-mapping techniques along different environment gradients within a research project. Learning outcomes 1. Skills in using methods for making flora inventory. 3. Ability to compare different habitat types. 3. Ability to compare different habitat types. 4. Ability to compare different habitat types. 3. Ability to compare different habitat types. 5. Skills in using vegetation-mapping techniques along different environment gradients. 5. Skills in applying research into vegetation in future teaching activity. Link between learning outcomes, teaching and students' activities 15 0.5 Lecture attendance and active participation research project Records related to student performance 6 10 1.2,3,4 0.5 Practices Practicla classes attendance and active within a workshop	Code	-		•						
programme It is mester Workload/ECTS 2 Course status Elective Course tacher Prof. Dr. Janja Horvatić Associate Aleksandra Kočić, Ph.D. Course etachers Aleksandra Kočić, Ph.D. Course etachers To enable students to apply methods for making flora inventory, to determine and identi habitat types and to create, use and interpret flora and vegetation maps. Students will it taight how to use vegetation-mapping techniques along different environment gradients within a research project. Learning outcomes 1. Skills in using methods for making flora inventory. 0. Ability to compare different habitat types. 3. Ability to determine relations between inherent and differential species and plat community. 4. Skills in using wegetation-mapping techniques along different environment gradients. 5. Skills in applying research into vegetation in future teaching activity. Link between learning outcomes, teaching and students' activities of 1-5 0.5 Lectures Activities of learning and teaching 1-5 0.5 Lectures Activities of learning and active participation proformance Records related to student for builty or subustion of performance 1,2,3,4 0.5 Practices Practical classes attendance and active within a workshop Records and evaluation of performance 24 40	Study				: D : I					
Semester III semester Workload/ECTS credits 2 Course status Elective Course status Elective Associate teachers Prof. Dr. Janja Horvatić Associate courses Aleksandra Kočić, Ph.D. Course entry requirements (Preceding courses) To enable students to apply methods for making flora inventory, to determine and identi habitat types and to create, use and interpret flora and vegetation maps. Students will it taught how to use vegetation-mapping techniques along different environment gradients within a research project. Learning outcomes 1. Skills in using methods for making flora inventory. 2. Ability to compare different habitat types. 3. Ability to determine relations between inherent and differential species and plat community. 4. Skills in using vegetation-mapping techniques along different environment gradients. 5. Skills in applying research into vegetation in future teaching activity. Link between learning outcomes, teaching and students' activities Share of for for for for for for for for for	programme	Graduate C	Iniversity	Study Progra	imme in Biology and	Chemistry Teache	r Educati	on		
credits 2 Course status Elective Course status Elective Associate Aleksandra Kočić, Ph.D. Course entry Aleksandra Kočić, Ph.D. Course entry To enable students to apply methods for making flora inventory, to determine and identi habitat types and to create, use and interpret flora and vegetation maps. Students will be taught how to use vegetation-mapping techniques along different environment gradients within a research project. Learning 1. Skills in using methods for making flora inventory. Outcomes 2. Ability to compare different habitat types. 3. Ability to compare different nabitat types. 3. Ability to compare different nabitat types. 3. Ability to compare different nabitat types. 3. Ability to compare different nabitat types. 3. Ability to compare different nabitat types. 3. Ability to compare different nabitat types. 3. Ability to compare different napping techniques along different environment gradients. 5. Skills in applying research into vegetation in future teaching activity. Link between learning outcomes, teaching and teaching Lecture attendance and active participation Records related to student for making alternance for proformance for proformance active participation, work on a research project. 1.5 0.5 Lectures attendance and active participation, work on a research project winh a workshop		III semester								
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Link between learning outcomes, teaching and students' activities Share of for students' Form of of students' Activities of learning outcomes, teaching and students' Activities of learning outcomes, teaching and students' Records related to student of skills Grading points 1,2,3,4 0.5 Practices Practices Records and evaluation of performace Records and evaluation of performace	Associate		Aleksandra Kočić, Ph.D.							
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objective taught how to use vegetation-mapping techniques along different environment gradients within a research project. 1 Skills in using methods for making flora inventory. 2 Learning outcomes 1. Skills in using methods for making flora inventory. 3. Ability to compare different habitat types. 3. Ability to compare different habitat types. 3. Ability to determine relations between inherent and differential species and plat community. 4. Skills in using vegetation-mapping techniques along different environment gradients. 5. Skills in applying research into vegetation in future teaching activity. Link between learning outcomes, teaching and students' activities Share of eCTS Form of efform of ECTS Form of teaching Activities of learning and teaching Methods of monitoring and active participation, work on a research project Methods of nonitoring and active participation, work on a research project Records related to student performance 10	courses)									
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gradients within a research project. Learning outcomes 1. Skills in using methods for making flora inventory. 2. Ability to compare different habitat types. 3. Ability to determine relations between inherent and differential species and plan community. 4. Skills in using vegetation-mapping techniques along different environment gradients. 5. Skills in using vegetation-mapping techniques along different environment gradients. Link between learning outcomes, teaching and students' activities Share of ECTS Form of teaching Activities of learning and teaching Methods of monitoring and evaluation Grading points 1-5 0.5 Lectures Lecture attendance and active participation Records related to student performance 6 10 1,2,3,4 0.5 Practices Practices attendance and active participation, work on a research project within a workshop Records and evaluation of performed activities and skills 24 40	objective	habitat typ	es and to	o create, use a	and interpret flora a	nd vegetation maps	s. Studer	ts will be		
Learning outcomes 1. Skills in using methods for making flora inventory. 2. Ability to compare different habitat types. 3. Ability to determine relations between inherent and differential species and plat community. 4. Skills in using vegetation-mapping techniques along different environment gradients. 5. Skills in applying research into vegetation in future teaching activity. Link between learning outcomes, teaching and students' activities Share of ECTS Form of teaching Activities of learning and teaching Methods of monitoring and teaching Grading points 1-5 0.5 Lectures Lecture attendance and active participation Records related to student performance 6 10 1,2,3,4 0.5 Practices Practices attendance and active participation, work on a Records and evaluation of performed activities and skills 24 40		taught ho	w to us	e vegetation	n-mapping techniq	ues along differer	nt envir	onmental		
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within a workshop										
workshop						skills				
			L	Exam in	46					
form of a Preparation for Assessment of					Preparation for	Assessment of				
1,4,5 1 research designing a a research 30 50		1,4,5	1				30	50		
project research project project				project		project				
design										
Total 2 60 100		Total	2	-			60	100		
Final grade:		Final grade	:	•				•		
60-69.9 points: grade 2 (sufficient)		-		de 2 (sufficie	nt)					
70-79.9 points: grade 3 (good)		-	-							
80-89.9 points: grade 4 (very good)		00 00 0 mg	ints gra	de 4 (verv go	od)					
90-100 points: grade 5 (excellent)		on-oara ha			e a j					

Consultation hours	By appointment						
Teaching	Lectures	Seminars	Practices				
Hours - total	15	0	15				
Course content / teaching units	 Lecture: Overview of basic structure and dynamics of vegetation Phytocenological analysis and vegetation units Research methods and field work: site selection, geolocation, identification of habitat types Floristic lists, usage of the plant field survey forms, taxonomy and nomenclature standards Vegetation maps – inventory of the plant cover of specific area Maps of actual and potential vegetation and environment Vegetation sampling Monitoring methods Research planning Research planning Research into vegetation used in teaching biology Practices: Geolocation and identification of habitat types Completion of the plant field survey forms, identification, determination and records on plants Making of a floristic list Geocoding and mapping the species distribution; areal representation Identification of the plant communities, identification of inherent and differential species 						
Recommended reading	 The vegetation mapping techniques along different environmental gradients Nikolić T., Bukovec D., Šopf J., Jelaska S.D. (1998) Kartiranje flore Hrvatske - mogucnosti i standardi. Nat. Croat. 7, Suppl. 1: 1-62.Topić J., Vukelić J. (2009) Priručnik za određivanje kopnenih staništa u Hrvatskoj prema Direktivi o staništima EU. Državni zavod za zaštitu prirode, Zagreb. Topić J., Ilijanić LJ., Tvrtković N., Nikolić T. (2006) Staništa. Priručnik za inventarizaciju, kartiranje i praćenje stanja. Državni zavod za zaštitu prirode, Zagreb. 						
Optional reading	Domac R. (2002) Flora Hrvatske. Priručnik za određivanje bilja. 2. izd. Školska knjiga, Zagreb. Javorka S., Csapody V. (1991) Iconographia florae partis Austro-orientalis Europae centralis. Akademiai Kiado, Budapest. Nikolić T., Topić J. (2005) Crvena knjiga vaskularne flore Hrvatske. Minstarstvo kulture, Državni zavod za zaštitu prirode, Zagreb.Pedrotti F. (2013) Plant and Vegetation Mapping. Springer-Verlag, Berlin, Heidelberg. Vukelić J., Mikac S., Baričević D., Bakšić D., Rosavec R. (2008) Šumska staništa i šumske zajednice u Hrvatskoj. Nacionalna ekološka mreža. Državni zavod za zaštitu prirode, Zagreb.						
Conditions for obtaining teacher's signature	Students are obliged to attend and actively participate in lectures and to fulfil all assignments within the course.						
Exam passing procedure	During the course, the teacher monitors and evaluates the performance of each student at tasks and at collecting and determining of plant material, which makes up to 50% of the final grade. Preparation of a research project contributes with 50% to the final grade.						
Main language of instruction; other languages	Croatian language						

Course title	Protection and Revitalisation of Aquatic Ecosystems						
Code	BBZ55			• •			
Study	Craduata	Iniversity	Ctudy Drogs	commo in Diology on	l Chamistry Taashar F	ducatio	2
programme	Graduate C	miversity	Study Progr	amme in Biology and	d Chemistry Teacher E	uucatio	n
Semester	III semester	r					
Workload/ECTS credits	2						
Course status	Elective						
Course teacher	Assoc. Prof	. Dr. Mel	ita Mihaljevi	ć			
Associate							
teachers							
Course entry							
requirements	Torrostrial	Ecocysto	me or Aquati	ic Ecosystems			
(Preceding	Terrestriar	LCOSYSIE		ic Leosystems			
courses)							
Course	To teach st	udents h	ow to assess	and protect aquatic	ecosystems, and how	to appl	у
objective	revitalisatio	on metho	ods.				
Learning	1. Ab	oility to ci	ritically evalu	uate issues related to	aquatic ecosystems a	and find	an
outcomes	ар	propriate	e solution.				
	2. At	oility to re	eview measu	res for revitalisation	of endangered aquat	ic ecosy	stems.
	3. Ab	oility to a	ssess profess	sional projects relate	d to water revitalisati	on.	
	4. Sk	ills in sus	tainable wat	ter management.			
Link between							
learning		Share		Activities of	Assessm	ent	
outcomes,	Learning	of	Form of	learning and	Methods of	Gra	ding
teaching and	outcome	ECTS	teaching	teaching	monitoring and	Points	
students'					evaluation	min	max
activities				Lecture	Cranadion		шах
				attendance and	Records,		
	1-4	0.25	Lecture	active	evaluation	10	15
				participation	evaluation		
				Attendance at			
				the seminar,			
				prepared			
				seminar paper	Records,		
	1-4	0.25	Seminar	containing results	evaluation of	15	20
				and conclusions	seminar paper		
				of the performed			
				analyses			
				Preparation for	Written		
	1-4	0.5	Written	written	exam/preliminary	15	20
	1-4	0.5	exam	preliminary exam	exam	1.5	20
					CAGITI		
	1-4	1	Oral	Exam	Oral exam	20	45
			exam	preparation			
	Total	2				60	100
	Final grade: 60-70 points: grade 2 (sufficient) 71-80 points: grade 3 (good) 81-90 points: grade 4 (very good) 91-100 points: grade 5 (excellent)						

Consultation hours	By appointment					
Teaching	Lectures	Seminars	Practices			
Hours - total	15	15	0			
Course content / teaching units	 Lecture: Structure and function of aquatic ecosystems Water quality - indicators, classification Usage of waters and sources of water pollution Water monitoring Legal framework for water protection - national and international conventions (EU Water Directive) Aquatic ecosystem management Water revitalisation methods Trends in changes in aquatic ecosystems and climate change Seminars: Water protection in strategic documents for nature and environmental protection in the Republic of Croatia (National Environment Protection Strategy and National Environment Protection Action Plan, Water Management Strategy, Nature Protection Act, Laws and regulations on waters) Revitalisation of lakes - examples of implementation Revitalisation of wetland ecosystems - examples Current state of selected aquatic ecosystems in the Republic of Croatia (endangerment, protection and revitalisation projects) 					
Recommended reading Optional reading	 Ecological network NATURA 2000 - aquatic ecosystems Wetzel R.G. (2001) Limnology - Lake and River Ecosystems. 3rd ed. Academic Press, San Diego. Jørgensen S.E., Vollenweider R.A. (ed.) (1989) Guidelines of Lake Management: Vol. 1, 					
reading	Principles of Lake Management. International Lake Environment Committee Foundation. Shiga.					
Conditions for obtaining teacher's signature	Attendance at lectures and seminars by obtaining minimum 25 points and by achieving at least 40% of the total number of points at the preliminary exam.					
Exam passing procedure	During the course, the teacher monitors and evaluates the work of each student, which makes up to 25% of the final grade. Preliminary exam or final written exam contribute with 25% to the final grade, while oral exam makes up to 45% of the final grade.					
Main language of instruction; other languages	Croatian language					
Method of monitoring the quality and efficiency of teaching	Periodic evaluation of students and teachers is planned to be carried out in order to assure and continuously improve the quality of teaching and of the study programme. During the last week of lectures, an anonymous student survey will be carried out to evaluate the overall quality of the course. The analysis of students' success at exams will be carried out.					