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**

l semester		L	S	Р	ECTS	CODE
Pedagogy 1		15	15	15	3	BP9100
Psychology in Education 1		15	15	15	3	BP798
Animal Physiology 2		30		15	3	BP755
Plant Physiology 2		30		15	3	BP756
Biochemistry 3		30		15	3	BP754
Fundamentals of Physical Chemistry 1		45	15		5	K058
Practices in Physical Chemistry				60	5	K053
School Teaching Practice 1				30	2	BP7108
	375	165	45	165	27	
II semester		L	S	Р	ECTS	
Pedagogy 2		15	15	15	3	BP9101
Psychology in Education 2		15	15	15	3	BP798-2
Didactics 1		15	15	15	3	BP797
Biological Collections		15		30	2	BP899
Basics of Horticulture		30		15	3	BM861
Methodology of Teaching Biology		30	15	60	6	BP8102
Fundamentals of Physical Chemistry 2		30	15		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	DD7 07 0
Didactics 2		15	15	15	3	BP797-2
Ecosystems		45	15		5	BP9103
Conservation Biology		30			3	BP91006
Teaching Practice in Biology				30	3	BP9107
Teaching Practice in Chemistry				30	3	K072
School Teaching Practice 3				30	2	BP9110
Study Visit	30					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 Ecosystems	15	15		2	BBZ55

Course teachers and associates are assigned to courses as of the academic year 2020/2021.

Obligatory courses

Course title	Animal Ph	ysiology	/ 2				
Code	BP755						
Study programme	Graduate U	Jniversity	Study Programme i	n Biology and Ch	emistry Teacher I	Educatio	'n
Semester	I semester						
Workload/ECTS credits	3						
Course status	Obligatory						
Course teacher		. Dr. Sand	dra Ečimović				
Associate							
teachers							
Course entry							
requirements (Preceding courses)	Biochemist	ry 1, Bioc	hemistry 2, Animal	Physiology 1			
Course objective	mechanism homeostas system. To system ar environme	ns of ada is regula learn ab nd the ntal facto	to acquire knowledge ptation to changes tion and energy bal pout necessary conn integration of phy ors. To acquaint stuc nt and different envi	in the environm ance at lower an ection between ysiological proce lents with the pr	ent. To learn abo nd higher levels o different levels o esses under the inciples of adapta	out prind of the b of the b e influe	ciples of ological iological ence of
Learning outcomes Link between	er 2. Sk th 3. Sk co	ivironme ills in pre e enviror ills in pronditions	etermine the physio ntal conditions. esenting the adaptiv ment. resenting the princ in the terrestrial ntal conditions.	e mechanisms o iples of adapta	f animal organisn tion to different	ns to cha	anges in nmental
learning		Chave		A attivities of	Asses	sment	
outcomes, teaching and	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching	Methods of monitoring		ding ints
students' 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

	0				1			1
	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	-	-	ent)				
	71-80 poin	-		N				
	81-90 poin 91-100 poi	-		-				
Consultation	By appoint		e 5 (excei	ientj				
hours		ment						
Teaching	L	ectures			Seminars	Pra	actices	
Hours - total								
		30					15	
Course content	Lectures:							
/ teaching units	• In	troductio	n into and	d review o	f the basic physic	ological concepts		
		-	boundari					
				nsive adap				
		-			-	I the environmen	t	
					ion and evaporations	tion		
		-	re adapta		mal interactions			
					a Homeothermy	and endothermy	,	
					nvironment	and chaothering		
		-			transitional anim	nals		
			-	-	change in terrestr			
			ige adapta		0			
	• Er	nergetics	of locomo	tion				
	● Pł	nysiologic	al energy	balance				
					physiological cha	inges		
			of hibern					
		-	-	and nutri				
			-		phology and phys	siology of the dige	estive sy	stem
			tary regin		to herbivores			
				digestive t				
				-		the organism and	their in	fluence
			ogical prod					
					of extraterrestria	l biological system	ns	
	• Pł	nysiology	of high ar	nd low air a	and water pressu	re		
	• Pł	neromone	es as ecolo	ogical and	physiological fact	tors		
	Seminars:							
		•		-		emperatures. The	-	-
						s. Respiratory		
		aptation docrine s		uis. Horm	iones. Environm	ental stress. Ph	ysiology	of the
Recommended				iological I	Ecology of Verte	brates, Cornell L	Jniversit	v Press.
reading	London.	(====)						,,
		Burggre	n W., Fre	nch K. (20	02) Eckert Anima	al Physiology – N	/lechani	sms and
	Adaptation	i, W. H. Fi	reeman ai	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	Biochemi	stry 3					
Code	BP754						
Study	Graduate l	University	/ Study Prog	ramme in Biology an	d Chemistry Teacher	⁻ Educatio	on
programme							
Semester	I semester						
Workload/ECTS credits	3						
Course status	Obligatory						
Course teacher	Assist. Prof Assist. Prof		emary Vuko [,] ka Blažetić	vić			
Associate teachers	Ana Vukov	na Vuković, assistant					
Course entry requirements (Preceding courses)							
Course objective	organism a response o working or collect, and	and their of a living n experin alyse and	connection g organism t nents, to ap interpret re	with physiological to o environmental ch ply appropriate bioc sults by using releva	ples of biochemical functions, as well as anges. To develop s themical methods ar nt scientific referenc	the bio tudents' nd techn es.	chemical skills for iques, to
Learning outcomes	ar 2. Al th 3. Al tr. sių 4. Al ar te in 5. Al th 6. Al	nd quickly pility to p e membro pility to ansduction gnalling p pility to p nalysis, e chniques terpretat pility to n eir funct pility to	y to environr redict and co rane, and to make con on, and to re pathways. participate i experiment s for testing tion by using nake connec ion in the or	mental changes. ompare the mechanis review the importar nparison between view cell responses t n biochemistry rese design, selection ar g of hypotheses, da relevant scientific re tion between the im ganism.	a living organism to sm of ion and molecu ace of maintaining io different pathways hat result from activa varch work, which ir ad implementation ta collection and ar eferences. Imune system parts a enetic and external	ule transf nic balan s of ce ation of in ncludes I of meth nalysis, a and to de	er across ice. Il signal individual iterature iods and ind their etermine
Link between learning		Share		Activities of	Assess	ment	
outcomes, teaching and	Learning outcome	of ECTS	Form of teaching	learning and teaching	Methods of monitoring and		iding ints
students'					evaluation	min	max
activities	1-3, 4-6	1	Lecture	Critical conversation and discussion	Records related to student performance during lectures	5	10
	4	0.75	Practices	Independent performance of experimental tasks, data collection and analysis; presentation and interpretation of obtained results	Monitoring of experimental work progress; Work diary; Assessment of presentation and interpretation of obtained results with provision of feedback	25	40

		1					T	1
	1-6	1	Written exam	Preparation for written exam	Writ	ten exam	10	20
	1-6	0.25	Oral exam	Preparation for oral exam	Ora	al exam	20	30
	Total	3					60	100
Consultation	71-80 poin 81-90 poin	nts: grade nts: grade nts: grade ints: grade	e 2 (sufficien e 3 (good) e 4 (very goo le 5 (excelle	d)				
hours	by appoint							
Teaching	Lectures Seminars Pract							
Hours - total	30 0 15				15			
Course content / teaching units	tr cd Si tr pa In bi In bi In bi In bi In bi In bi In bi In bi In bi In bi In bi In bi In bi In bi In bi In bi In bi In In bi In In bi In In bi In In In bi In In In In In In In In In In In In In	ansport, nannels (ompound gnal trar iphospha pidermal athway p nmune sy asis of hi nmune sy asis of hi nmune sy ensory sy lolecular nd dyneir bacteria	P-type AT sodium, pot s, channels isduction pa te and diad growth fa articipants, vstem: speci gh antibody sponse, pro Ils and recep s, T-cell sele vstem in can stems: sens motors: mo n in interacti , chemotaxi	athways: heterotrim cyl glycerol as seco ctor (EGF) signallin diseases caused by d ficity and diversity of variability, synthesi oteins of the major h otors of immune syst ection in the thymus), cer prevention e of smell, taste, sigh tor proteins, myosin ion with microtubule s	n gradid oline cha eric G-p ndary m g, comm listurban f antibod s of anti istocomp em cells, autoimm and actin es, bacter	ents, lactos annel), actio proteins, cAl pessengers, non feature ces in signal dy molecule body classe patibility con . (T-cell rece mune diseas ag and touch n, muscle co rial moveme	se-perme n potent MP, Ca ²⁺ insulin s es and s pathway structure s as a pa mplex (M ptors, T-c ses, the ro pontraction ent, rotar	ase, ion ial, crack , inositol ignalling, signalling /s e, genetic rt of the IHC I and cell killers ole of the n, kinesin y motors
Recommended reading	Internation	nal Highe Berg J., Ty	r Education,	G.J., Stryer L. (2019) New York. 2013) Biokemija (6 th				
Optional reading	Neuroscien Harperova Alberts B., the Cell (5t Voet D., Vo Nelson D.I Freeman &	nce (5th e ilustrirar Johnson th editior Det J.G. (2 L., Cox M & Co, New	edition). Sina na biokemija A., Lewis J., I). Garland S 2011) Bioche I.M. (2013) I York.	zpatrick D., Hall W. auer Associates, INC, a (28th edition) (2011 Raff M., Roberts K., icience, New York. emistry (4th edition). Lehninger Principles	Sunderla J) Medici Walter F Wiley, N	and, Massad inska naklad 2. (2008) Mc New York.	chusetts, la. blecular B	USA.
Conditions for obtaining teacher's signature	Students a the course	-	d to particip	ate in lectures active	ely and to	o fulfil all as	signment	s within
Exam passing procedure	awardingp	points acc	ording to de	er monitors and eva etermined criteria. Af ng the semester, stu	ter the c	ourse, stude	ents take	a written

	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	Graduate	Iniversity		rammo in Dialogy and	Chamistry Taacha	r Educati	<u></u>							
programme	Graduate (Jinversity	/ Study Prog	ramme in Biology and	a chemistry reache	reducati	on							
Semester	II semester	-												
Workload/ECTS	2													
credits	3													
Course status	Obligatory													
Course teacher	Assist. Pro		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		o teach students about theory of didactics and its practical application in the educational process.												
Learning	· ·	nowledge	about theo	ries, directions and m	nodels of didactics.	as well a	s didactic							
outcomes		1. Knowledge about theories, directions and models of didactics, as well as didactic practical orientation in the educational process.												
				e autonomy of tead		ementatio	on of all							
				iring the planning of i										
				effectiveness of st										
		•		and teaching within	• •	•								
		ojectives.	-	, and teaching man										
		-		teaching methods b	w using approache	s to eval	uation in							
		-		_		5 10 2 44								
			-				order to improve learning and teaching.							
	5. Skills in valorisation of scientific and professional literature referring to education.													
Link between	5. 5	tills in val	orisation of s	scientific and professi	onal literature refei	rring to e	ducation.							
Link between learning	5. 5		orisation of s			rring to e sment	ducation.							
learning	Learning	Share	orisation of s	Activities of	Asses	sment								
learning outcomes,		Share of		Activities of learning and	Asses Methods of	sment Gra	Iding							
learning outcomes, teaching and	Learning	Share	Form of	Activities of	Asses Methods of monitoring and	sment Gra Po	iding ints							
learning outcomes, teaching and students'	Learning	Share of	Form of	Activities of learning and	Asses Methods of	sment Gra	Iding							
learning outcomes, teaching and	Learning	Share of	Form of	Activities of learning and teaching Critical conversation and	Asses Methods of monitoring and	sment Gra Po	iding ints							
learning outcomes, teaching and students'	Learning	Share of	Form of	Activities of learning and teaching Critical conversation and discussion;	Asses Methods of monitoring and	sment Gra Po	iding ints							
learning outcomes, teaching and students'	Learning	Share of	Form of	Activities of learning and teaching Critical conversation and discussion; collaborative	Asses Methods of monitoring and evaluation	sment Gra Po	iding ints							
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and discussion; collaborative learning and	Assess Methods of monitoring and evaluation Records related	sment Gra Po min	iding ints max							
learning outcomes, teaching and students'	Learning	Share of	Form of	Activities of learning and teaching Critical conversation and discussion; collaborative learning and reciprocal	Assess Methods of monitoring and evaluation Records related to active	sment Gra Po	iding ints							
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching within	Asses: Methods of monitoring and evaluation Records related to active participation in	sment Gra Po min	iding ints max							
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching within analysis of	Asses: Methods of monitoring and evaluation Records related to active participation in discussions and	sment Gra Po min	iding ints max							
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching within analysis of different types of	Assess Methods of monitoring and evaluation Records related to active participation in discussions and analysis;	sment Gra Po min	iding ints max							
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching within analysis of different types of information	Assess Methods of monitoring and evaluation Records related to active participation in discussions and analysis;	sment Gra Po min	iding ints max							
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching within analysis of different types of information sources	Assess Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio	sment Gra Po min	iding ints max							
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching within analysis of different types of information sources Flipped	Assess Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of	sment Gra Po min	iding ints max							
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching within analysis of different types of information sources Flipped classroom:	Assess Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of proposals of	sment Gra Po min	iding ints max							
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching within analysis of different types of information sources Flipped classroom: presentation and	Asses: Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of proposals of students' own	sment Gra Po min	iding ints max							
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching within analysis of different types of information sources Flipped classroom: presentation and analysis of real-	Assess Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of proposals of students' own teaching	sment Gra Po min	iding ints max							
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching within analysis of different types of information sources Flipped classroom: presentation and analysis of real- life situations;	Assess Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of proposals of students' own teaching practices with	sment Gra Po min	iding ints max							
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	Activities of learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching within analysis of different types of information sources Flipped classroom: presentation and analysis of real- life situations; independent	Assess Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of proposals of students' own teaching practices with provision of	sment Gra Po min	iding ints max							
learning outcomes, teaching and students'	Learning outcome	Share of ECTS 0.5	Form of teaching Lecture	Activities of learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching within analysis of different types of information sources Flipped classroom: presentation and analysis of real- life situations; independent development of	Assess Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of proposals of students' own teaching practices with provision of feedback;	sment Gra Po min	ding ints max 10							
learning outcomes, teaching and students'	Learning outcome	Share of ECTS 0.5	Form of teaching Lecture	Activities of learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching within analysis of different types of information sources Flipped classroom: presentation and analysis of real- life situations; independent development of proposals for	Assess Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of proposals of students' own teaching practices with provision of feedback; Records related	sment Gra Po min	ding ints max 10							
learning outcomes, teaching and students'	Learning outcome	Share of ECTS 0.5	Form of teaching Lecture	Activities of learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching within analysis of different types of information sources Flipped classroom: presentation and analysis of real- life situations; independent development of proposals for improvement of	Assess Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of proposals of students' own teaching practices with provision of feedback; Records related to student	sment Gra Po min	ding ints max 10							
learning outcomes, teaching and students'	Learning outcome	Share of ECTS 0.5	Form of teaching Lecture	Activities of learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching within analysis of different types of information sources Flipped classroom: presentation and analysis of real- life situations; independent development of proposals for improvement of analysed real-life	Assess Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of proposals of students' own teaching practices with provision of feedback; Records related to student activity in the	sment Gra Po min	ding ints max 10							
learning outcomes, teaching and students'	Learning outcome 1-5	Share of ECTS 0.5	Form of teaching Lecture	Activities of learning and teaching Critical conversation and discussion; collaborative learning and reciprocal teaching within analysis of different types of information sources Flipped classroom: presentation and analysis of real- life situations; independent development of proposals for improvement of	Assess Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of proposals of students' own teaching practices with provision of feedback; Records related to student	sment Gra Po min	ding ints max 10							

							r			
				teaching						
				practices;						
				Journal Club						
					A na	lucic of				
				Indonondont		lysis of				
				Independent		npleted				
	1-5	0.75	Practices	work on tasks for		ks with	10	20		
				learning process	•	ision of				
				improvement		dback,				
					ро	rtfolio				
	1-5	0.5	Written	Writing of an	-		20	30		
	1-3	0.5	exam	academic essay	L	ssay	20	50		
			Oral	Preparation for						
	1-5	0.25	exam	oral exam	Ora	l exam	5	10		
	Total	3	- Critarii				60	100		
	lotai	5						100		
	Final grade									
	-		2 (sufficien	+)						
	71-80 poin	-	-	c)						
			e 4 (very goo	d)						
		-	le 5 (excelle	•						
Consultation	By appoint	-	ie 5 (excelle							
hours	ву арропт	ment								
Teaching	I	ectures		Seminars			Practices			
		cetures		Schindis			ractices			
Hours - total		15		15 15						
Course content	• Di	dactics a	s an indeper	ndent pedagogical disc	cipline -	theory of e	ducation	: didactic		
/ teaching units			-	ther scientific disciplin		-				
				practice: concept and		-		piectives.		
			-	is on competencies a				-		
				teachers, levels and		-		-		
			-	reas, Cross-curricular						
		hool cur		,		, ,		,		
				ning (educational str	ategies	methods	nrocedi	ires and		
		chniques			ategies,	methods	, proceut			
				ation approaches						
				arning environment						
				-						
Recommended				outside of school Didaktika. Školska knjig	12 72 <i>a</i> r	oh				
reading		-	· ·	V. (2010) Didaktika i l			0			
reauling		-	-	čenje i poučavanje: ps				arah		
	Vizok Video	/IC V., KI[(evacivi., viai	nović-Štetić V., Miljkov	MC D. (2	014) 251101	iogija obra	azovalijd.		
								× .		
Ontional	IEP, Zagreb		nor_nactava	Jensen E. (2003) Super-nastava: nastavne strategije za kvalitetnu školu i uspješno učenje.						
Optional	IEP, Zagreb Jensen E. (2	2003) Su	per-nastava:	: nastavne strategije z	a kvalit	etnu školu	i uspješn	o učenje.		
Optional reading	IEP, Zagreb Jensen E. (2 Educa, d.o.	2003) Su o.				etnu školu	i uspješno	o učenje.		
•	IEP, Zagreb Jensen E. (2 Educa, d.o. Klippert H.	n. 2003) Su o. (2001) K	ako uspješno	o učiti u timu. Educa, z	Zagreb.	etnu školu	i uspješno	o učenje.		
-	IEP, Zagreb Jensen E. (2 Educa, d.o. Klippert H. Meyer H. (2	2003) Su o. (2001) K 2002) Dic	ako uspješno daktika razre	o učiti u timu. Educa, z dne kvake. Educa, Zag	Zagreb. greb.		i uspješno	o učenje.		
reading	IEP, Zagreb Jensen E. (2 Educa, d.o. Klippert H. Meyer H. (2	2003) Su o. (2001) K 2002) Dic	ako uspješno daktika razre	o učiti u timu. Educa, z	Zagreb. greb.		i uspješno	o učenje.		
reading Conditions for	IEP, Zagreb Jensen E. (Educa, d.o. Klippert H. Meyer H. (Terhart E. (). 2003) Su o. (2001) K 2002) Dio (2001) M	ako uspješno daktika razre etode učenj	o učiti u timu. Educa, z dne kvake. Educa, Zag a i poučavanja. Educa	Zagreb. greb. , Zagreb).				
reading Conditions for obtaining	IEP, Zagreb Jensen E. (2 Educa, d.o. Klippert H. Meyer H. (2 Terhart E. (Students a	n. 2003) Su o. (2001) K 2002) Dia (2001) M re oblige	ako uspješno daktika razre etode učenj	o učiti u timu. Educa, ž dne kvake. Educa, Zag	Zagreb. greb. , Zagreb).				
reading Conditions for obtaining teacher's	IEP, Zagreb Jensen E. (Educa, d.o. Klippert H. Meyer H. (Terhart E. (n. 2003) Su o. (2001) K 2002) Dia (2001) M re oblige	ako uspješno daktika razre etode učenj	o učiti u timu. Educa, z dne kvake. Educa, Zag a i poučavanja. Educa	Zagreb. greb. , Zagreb).				
reading Conditions for obtaining teacher's signature	IEP, Zagreb Jensen E. (2 Educa, d.o. Klippert H. Meyer H. (2 Terhart E. (Students a the course.	n. 2003) Su o. (2001) K 2002) Dio (2001) M re oblige	ako uspješno daktika razre etode učenj d to particip	o učiti u timu. Educa, z dne kvake. Educa, Zag a i poučavanja. Educa ate in lectures activel	Zagreb. greb. , Zagreb y and to	o. o fulfil all a	issignmen	ts within		
reading Conditions for obtaining teacher's signature Exam passing	IEP, Zagreb Jensen E. (2 Educa, d.o. Klippert H. Meyer H. (2 Terhart E. (Students a the course During the	n. 2003) Su o. (2001) K 2002) Dio 2001) M re oblige e course,	ako uspješno daktika razre etode učenj d to particip the teache	o učiti u timu. Educa, z dne kvake. Educa, Zag a i poučavanja. Educa ate in lectures activel er monitors and eval	Zagreb. greb. , Zagreb y and to uates t	o. o fulfil all a he activitio	issignmen	ts within dents by		
reading Conditions for obtaining teacher's signature	IEP, Zagreb Jensen E. (2 Educa, d.o. Klippert H. Meyer H. (2 Terhart E. (Students at the course. During the awarding p	n. 2003) Su o. (2001) K 2002) Dia (2001) M re oblige e course, points acc	ako uspješno daktika razre etode učenj d to particip the teache cording to d	o učiti u timu. Educa, z dne kvake. Educa, Zag a i poučavanja. Educa ate in lectures activel	Zagreb. greb. , Zagreb y and to uates t ne teach). o fulfil all a he activitio her thus pr	es of stur ovides co	ts within dents by ntinuous		

	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					
Code	BP797-2						
Study	Craduata						
programme	Graduate C	Graduate University Study Programme in Biology and Chemistry Teacher Education					
Semester	III semeste	r					
Workload/ECTS credits	3						
Course status	Obligatory						
Course teacher	Assist. Prof	Dr Iren	a Labak				
Associate	7.00.000.000	<u>. Brinen</u>	u Lubuk				
teachers							
Course entry							
requirements							
(Preceding							
courses)							
Course	T			- f . II			
objective				ssfully and responsibl learning and develop	-	nal proce	ess within
Learning outcomes	er m 2. Sk w 3. Sk of st 4. Al w 5. Se	nvironme otivation (ills to pro- ith the ai (ills requi thinking rategies a polity to s ith specia elf-assess	nt in which edict the nee m of achievi red to suppo , as well as v and approac support indiv al needs. ment of ow	ation of a stimula each students can n eds of each student i ng knowledge at high ort the development various types of litera hes to evaluation. vidualisation and diff n needs and aspects d responsibly manage	nanage their learni n planning cognitive er cognitive levels. of creative thinking acy by selecting app ferentiation of teac for professional de	ng, emote ely active g and othe propriate ching for evelopme	tions and learning ner forms teaching students
Link between learning		Share	_	Activities of	Asses	sment	
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				Critical			
	1-5	0.5	Lecture	conversation and discussion; collaborative learning and reciprocal teaching within analysis of different types of information sources	Records related to active participation in discussions and analysis; portfolio	5	10
	1-5	1	Seminar	Flipped classroom: presentation and analysis of real- life situations; independent development of proposals for improvement of	Analysis of proposals of students' own teaching practices with provision of feedback; portfolio	20	30

		1	1						
				analysed real-life situations and for students' own teaching practices					
	1-5 0.75 Practices Independent work on tage learning primerover				cor tas prov fee	alysis of npleted ks with vision of edback, ortfolio	10	20	
	1-5	0.5	Written exam	Es Es		ssay	20	30	
	1-5	0.25	Oral exam	Preparation for oral exam	Ora	al exam	5	10	
	Total	3					60	100	
Consultation hours	71-80 poin 81-90 poin 91-100 poi	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.							
Teaching	L	ectures.		Seminars			Practices		
Hours - total		15		15			15		
Course content / teaching units	 As Ac Ec ps in Cr ar Sc lit In Le de 	 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 							
Recommended				long learning. Didaktika. Školska knjiį	ga, Zagr	eb.			
reading	Cindrić M., Desforges Vizek Vidov IEP, Zagreb	Miljkovi C. (2001) vić V., Rijo	ć D., Struga Uspješno evac M., VI	ar V. (2010) Didaktika i učenje i poučavanje: ps ahović-Štetić V., Miljko	kurikulu ihologij vić D. (2	ım. IEP d.o ski pristup 014) Psiho	i. Educa, Z logija obra	agreb.	
Optional reading	Shunk D. H and Applic Miller M. (2	l., Meece ation, 4th 2020) Te	e J. R., Pintr n ed. Pears ch Like a Pl	na psihologija. Naklada ich P. R. (2020) Motiva on. RATE: Using Classroom e. Dave Burges Consulti	tion in Techno	Education plogy to Cre	- Theory, eate an Ex		

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. 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 Phys	iology 2							
Code	BP756								
Study	Graduate U	Graduate University Study Programme in Biology and Chemistry Teacher Education							
programme									
Semester	I semester	l semester							
Workload/ECTS credits	3								
Course status	Obligatory								
Course teacher	Prof. Dr. Jar	nja Horva	tić						
Associate	Assist. Prof. Dr. Vesna Peršić								
teachers	Martina Var	•							
	Vera Tikas,	expert ac	lvisor						
Course entry									
requirements	Cell Biology	. Biochen	nistrv 1. Plar	nt Physiology 1					
(Preceding		,		/***0/					
courses)		<u> </u>	<u> </u>						
Course objective	physiologica	To enable students to understand a cause-effect relationship of chemical and physiological changes in the plant organism. To enable students to interpret physiological changes by linking theoretical knowledge and the results of experimental research.							
Learning				tabolic processes in					
outcomes		•	•	ribution of metaboli	•	Photos	ynnic313,		
outcomes		•		mechanisms of plan		s and to	compare		
		-		ation in plants.	8.0.000		een par e		
		-	-	s and levels of plant	tissue differentiati	on and t	he aging		
		ocess of p	-				00		
	4. Ab	ility to ex	amine the p	hysiological process	es of plant movem	ents.			
	5. De	velopme	nt of natura	I science literacy by	selecting research	ı tasks re	elated to		
	int	erpretati	on of physio	logical changes in pl	ants.				
Link between learning	Loorning	Share	Form of	Activities of	Asses	essment			
outcomes,	Learning outcome	of	teaching	learning and	Methods of	Gra	ding		
teaching and	outcome	ECTS	teaching	teaching	monitoring	Ро	oints		
students'					and evaluation	min	max		
activities	1-4	1.0	Lecture	Lecture attendance and active participation	Records related to student performance with provision of feedback	6	10		
	1,2,5	0.5	Practices	Practical classes attendance and active participation	Records related to student activity at practices with provision of feedback	12	20		
	1-5	1.0	Written exam	Preparation for written exam	Written exam	24	40		
	1-5	0.5	Oral exam	Preparation for oral exam	Oral exam	18	30		
	Total	3				60	100		
	Final grade: 60-69.9 po 70-79.9 po 80-89.9 po 90-100 poir	ints: grac ints: grac ints: grac	le 3 (good) le 4 (very go	od)					

Consultation	By appointment		
hours Teaching	Locturos	Seminars	Practices
	Lectures	Seminars	Practices
Hours - total	30	0	15
Course content /	Lectures:		
teaching units	 Photosynthesis (C3, 		
	Photosynthesis and	-	/ I
	 Cell exchange regulations) 	lation: inner cell regulation	(gene and enzyme activity
		itions: plant growth regulat	tors – auxins, gibberellins,
		e and abscisic acid (chemica	
	transport, physiolog	ical effects and their mechanis	sm)
		ion and development: levels o	f differentiation, cause of cell
	differentiation, plan		
	 Regulations by ecol growth and plant de 	ogical factors: effects of temp	berature and daylight on the
		ant organelles and/or organ m	ovements
	Practices:		
	 Starch phosphorylas 	se	
	 Amylase 		
		starch hydrolysis during barley	y seed germination
	Influence of kinetinInfluence of auxin o		
Recommended	Pevalek-Kozlina B. (2003) Fizi		
reading		, Murphy A. (2015) Plant Phys	iology and Development, 6th
	ed. Sinauer Associates, Inc.		
Optional reading	Berg J.M., Tymoczko J.L., Stry	ver L. (2013) Biokemija. Školska	i knjiga, Zagreb.
Conditions for			
obtaining	Regular attendance and activ	e participation in lectures.	
teacher's signature			
Exam passing	Before taking oral exam, stu	dents are obliged to pass wri	tten exam. The final grade is
procedure	determined according to the	number of points for student's	s performance and the points
	achieved in written and oral	exams.	
Main language of instruction;			
other languages	Croatian language		
e inci iunguages			
Method of			
monitoring the	Student survey after the cou	rse; reviews during the course	and possibility to give oral or
quality and	-	es; monitoring of student succe	
efficiency of teaching			
teaching	1		

Course title	Biological	Collectio	ons						
Code	BP899								
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education								
programme									
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 annli	cation of methods	for preparation of	various	hiological		
objective				teaching process.		various	Siciogical		
Learning	-			ogical samples by u	sing appropriate to	ols.			
outcomes				of biological mater			taxidermv		
		thods.	U	U	, , ,		,		
				skills in assessme			ethods of		
				of living organisms		s.			
		-		iological collection.					
	5. Ma	iking a pr	oposal for a liv	ing corner in the cla	assroom.				
Link between					Asses	sment			
learning	Learning	Share	Form of	Activities of					
outcomes, teaching and	outcome	of	teaching	learning and	Methods of		ding		
students'		ECTS	5	teaching	monitoring and		ints		
activities					evaluation	min	max		
				Critical					
				conversation					
				and discussion.	Records related				
				and discussion;	Records related to active				
	1-5	0.25	Lecture	collaborative		5	10		
	1-5	0.25	Lecture	collaborative learning within	to active participation in discussions and	5	10		
	1-5	0.25	Lecture	collaborative learning within analysis of	to active participation in	5	10		
	1-5	0.25	Lecture	collaborative learning within analysis of different	to active participation in discussions and	5	10		
	1-5	0.25	Lecture	collaborative learning within analysis of	to active participation in discussions and	5	10		
	1-5	0.25	Lecture	collaborative learning within analysis of different taxidermy	to active participation in discussions and	5	10		
	1-5	0.25	Lecture	collaborative learning within analysis of different taxidermy methods	to active participation in discussions and	5	10		
	1-5	0.25	Lecture	collaborative learning within analysis of different taxidermy methods Practical application of methods in	to active participation in discussions and	5	10		
	1-5	0.25	Lecture	collaborative learning within analysis of different taxidermy methods Practical application of methods in sampling of	to active participation in discussions and analysis Records related	5	10		
				collaborative learning within analysis of different taxidermy methods Practical application of methods in sampling of biological	to active participation in discussions and analysis Records related to active				
	1-5	0.25	Field-based	collaborative learning within analysis of different taxidermy methods Practical application of methods in sampling of biological material,	to active participation in discussions and analysis Records related to active engagement in	5	10		
				collaborative learning within analysis of different taxidermy methods Practical application of methods in sampling of biological material, selection of	to active participation in discussions and analysis Records related to active engagement in the field-based				
			Field-based	collaborative learning within analysis of different taxidermy methods Practical application of methods in sampling of biological material, selection of suitable	to active participation in discussions and analysis Records related to active engagement in				
			Field-based	collaborative learning within analysis of different taxidermy methods Practical application of methods in sampling of biological material, selection of suitable biological	to active participation in discussions and analysis Records related to active engagement in the field-based				
			Field-based	collaborative learning within analysis of different taxidermy methods Practical application of methods in sampling of biological material, selection of suitable biological material within	to active participation in discussions and analysis Records related to active engagement in the field-based				
			Field-based	collaborative learning within analysis of different taxidermy methods Practical application of methods in sampling of biological material, selection of suitable biological material within field classes	to active participation in discussions and analysis Records related to active engagement in the field-based learning				
			Field-based	collaborative learning within analysis of different taxidermy methods Practical application of methods in sampling of biological material, selection of suitable biological material within field classes	to active participation in discussions and analysis Records related to active engagement in the field-based learning Analysis of				
			Field-based	collaborative learning within analysis of different taxidermy methods Practical application of methods in sampling of biological material, selection of suitable biological material within field classes Independent preparation of	to active participation in discussions and analysis Records related to active engagement in the field-based learning				
	1-5	0.25	Field-based teaching	collaborative learning within analysis of different taxidermy methods Practical application of methods in sampling of biological material, selection of suitable biological material within field classes	to active participation in discussions and analysis Records related to active engagement in the field-based learning Analysis of stuffed	5	10		

	1-5 Total Final grade: 60-70 point		Oral practic based ex 2 (sufficier	am	Prepared student's own biological collection	a col Cor app taxi deter and s	aration of small lection htrol of ethods lied for dermy, mination torage of lection	40 60	60 100
Consultation	71-80 point 81-90 point 91-100 point By appointn	s: grade ts: grade	4 (very go						
hours	ву арропти	ient.							
Teaching	L	ectures	ures		Seminars			Practices	
Hours - total		15			0			30	
Course content / teaching units	Overvie Taxider vertebr Product Making	What is a biological collection and how it looks like? Overview of taxidermy methods - possibilities of creating a biological collection Taxidermy methods of living organisms: protozoa, plants, fungi and lichens, arthropods, vertebrates Production of permanent and semi-permanent microscopic preparations Making of aquariums, terrariums, and living corners Selection of suitable biological material for field teaching							
Recommended reading	Durrell G. (1	.990) Svij hors (201	et prirode. L5) Taxider	. GZ⊦ my \	/ol. 9 Bones and Sk			ection, Pr	eparation
Optional		0							
reading Conditions for obtaining teacher's signature	course.				n lectures actively a				
Exam passing procedure	points acco feedback, w biological co exam. Durir learning out	rding to /hich stu ollection. ng the or ccomes. 7	determin Idents use After havi ral exam, t The final gr	ed c to a ng pr he to rade	itors and evaluates criteria. In this wa assess their learnin repared their biolog eacher checks the is determined acco cam, as well as for p	y, the the trig progrigical coll applied rding to the trigger the	teacher protection, student methods to the number	ovides co create t dents tak hat are r er of poin	ontinuous their own e the oral related to nts gained
Main language of instruction; other languages	Croatian lan	guage							
Method of monitoring the quality and efficiency of teaching	the learning teaching. Af	g proces ter the c	s and stue ourse, the	dent teac	orms evaluation for achievement, thu her conducts a sur- ching quality, all wit	s deteri vey amo	mining and ong student	l adaptin s to eval	g his/her uate their

Course title	Conservati	on Biolo	ogy					
Code	BP91006		•					
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education							
programme								
Semester	III semester							
Workload/ECTS	3							
credits	5							
Course status	Obligatory							
Course teacher	Assist. Prof.	Dr. Nata	ša Turić					
Associate								
teachers								
Course entry								
requirements								
(Preceding								
courses)		<u> </u>						
Course objective			•	ts of conservation bi	•.	•	•	
		•	•	biology and other soc		science	s, and to	
	•			ing for referential sc		-6		
Learning			intically eva	aluate the basic pri	ncipies and goals	or cons	servation	
outcomes		logy.	ssass nagat	ive human influence	on the hindiver	sity of e		
		tems.	ssess negat		e on the bloarvers	Sity Of C	cological	
			assess the	role of key specie	s and their impo	ortance	in living	
		nmunitie		Tote of key specie	s and then impe	reariee		
			-	bout natural, socio-	economic and cu	ltural as	spects of	
		otected a	-	,				
				mportance of biolog	ical diversity, its o	conserva	tion and	
				nt of natural resource				
Link between								
learning	Learning	Share	Form of	Activities of	Assess	sment		
outcomes,	outcome	of	teaching	learning and	Methods of	Gra	nding	
teaching and	outcome	ECTS	teating	teaching	monitoring	Ро	oints	
students'					and evaluation	min	max	
activities					Records			
				Critical	related to			
	1-5	1	Lecture	conversation and	active	15	20	
	10	-	Leotare	discussion	participation in	10	20	
					conversations			
					and discussions			
	1-5	1.5	Written	Preparation for	Seminar paper	25	50	
	1-5	1.5	exam	seminar	Seminar paper	25	50	
	4.5	0.5	Oral	Preparation for		20	20	
	1-5	0.5	exam	oral exam	Oral exam	20	30	
	Total	3				60	100	

Consultation hours	Wednesdays, from 10.00 - 1	2.00 a.m.	
Teaching	Lectures	Seminars	Practices
Hours - total	30	0	0
Course content / teaching units	 Human influence: h influence on species Habitat disorders: c diseases, genetically Unsustainable mana populations, overex Scientific developm Selection of protect value of an area. De semi-natural comm In situ conservation categorisation, sma populations, sustair Ex situ conservatior in captivity, reintroot Landscape conservat species movement ecosystem managed 	s extinction, habitat fragmen hemical pollution, introducti y modified organisms, disturl agement: what is sustainable ploitation of resources ent of conservation biology ed areas - historical overview esign and management of pro- unities, monitoring of change : rarity among species, threa Il population management, g hability of small populations at ex situ conservation of plan duction of species ation: landscape, preservatio	rrent human influence, human tation on of exotic species and bances in ecosystem dynamics e management, hunting of wild w, criteria for measuring the otected areas: management of es in protected areas t assessment and genetic management of small hts and animals, reproduction conservation, improvement of
Recommended reading	Groom J.M., Meffe K.G., Car Associates, Massachusetts. Pullin S.A. (2007) Conservatio		Conservation Biology. Sinnauer
Optional reading	DZZP (2008) Izvješće o stanju	u prirode i zaštite prirode u R D7) Fundamentals of Conserv sity. Conserving Endangered	epublici Hrvatskoj. Zagreb. ration Biology. 3rd ed. Blackwell Species. Facts On File, USA.
Conditions for obtaining teacher's signature		er evaluates the activities of	students. By regular attendance
Exam passing procedure	preparing and presenting the	eir seminar paper. Points ach ained up to the final exam,	lete the written assignment by nieved at written and oral exam thus making a total number of
Main language of instruction; other languages	Croatian language		
Method of monitoring the quality and efficiency of teaching		the course, students will be	ion of the course will be carried given an opportunity to make success at exams.

Course title	Teaching	Practice	in Biology						
Code	BP9107								
Study	Graduate I	Graduate University Study Programme in Biology and Chemistry Teacher Education							
programme	Ulauuale C								
Semester	III semeste	III semester							
Workload/ECTS credits	3								
Course status	Obligatory								
Course teacher	Assist. Prof	. Dr. Iren	a Labak						
Associate									
teachers Course entry									
requirements (Preceding courses)				gogy 1, Pedagogy 2 llogy of Teaching Bi		ducation	1,		
Course objective		o enable students to develop knowledge and cognitive skills for independent teaching of piology and for self-assessment of their own professional development aspects.							
Learning outcomes	2. At 3. At lea pr pc	2. Ability to deliver teaching independently.							
Link between									
learning		Chang			Asse	ssment			
outcomes,	Learning	Share of	Form of	Activities of learning and	Methods of	Gra	ding		
teaching and	outcome	ECTS	teaching	teaching	monitoring		ints		
students' activities					and	min	max		
activities					evaluation				
	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	Written lesson plan, Form for assessment of delivered lecture, teaching portfolio	25	40		

					of a realised teaching hour,			
					creation of a			
					teaching			
					portfolio			
					Writing of			
					lesson plans			
					and			
					consultations			
					with	Written		
					a mentor	lesson plan,		
					Independent	Form for		
					realization of	assessment		
	1-3	1	Public le	cture	one teaching	of delivered	25	40
					hour for public.	lecture,		
					(Self)evaluation	teaching		
					of a realised	portfolio.		
					teaching hour,			
					creation of a			
					teaching			
					portfolio			
	Total	3					60	100
	Final grade	:						
	60-70 poin	-	-	ent)				
	71-80 poin	-						
	81-90 poin	-		-				
	91-100 poi	-	e 5 (excell	lent)				
Consultation	By appoint	ment						
hours Teaching		ectures			Seminars		Practices	
Hours - total								
fiours total		0			0		30	
Course content	Within this	course,	students a	re obli	ged to participation	n in direct educa	ational wo	ork under
/ teaching units	supervisior				- · ·			
	• ok	oservatio	n of mento	or's tea	aching and analysis	of lessons with a	a mentor	and
	cc	lleagues						
	• pr	eparatio	n of lessor	n plans	and delivery of ind	ividual and publ	ic lecture	S
	• ar	 analysis of delivered lectures with a mentor, colleagues and a course teacher 					acher	
			a portfoli	o - refl	ection forms and p	rofessional deve	lopment	plan (3rd
		utcome)						
Recommended	Reading lists as defined within all obligatory courses.							
reading	Curriculum documents and textbooks.							
Optional	Selected scientific and professional papers dealing with Biology.							
reading	Reading lis	ts as defi	ned withir	n all ob	ligatory courses, sc	ientific and pop	ular journ	als.
Conditions for								
obtaining	Students a	re oblige	d to partic	ipate i	n lectures actively a	and to fulfil all a	Issignmer	ts within
teacher's	the course	-						
signature				1	onitors and avalua	tos the activiti	ac of ctu	1
signature Exam passing	During the	course,	the teac	her me	onitors and evalua	les the activition	es or stu	dents by
	-				ermined criteria. Ir			-
Exam passing	awarding	points ac	cording t	o dete		this way, the	teacher	provides
Exam passing	awarding continuous	points ac feedbac	ccording t k and sup	o dete ports	ermined criteria. Ir	this way, the of students that	teacher at are req	provides uired for
Exam passing	awarding continuous creation of hour (lectu	points ac feedbac a teachi ure), the	ccording t k and sup ng portfoli success o	o dete ports io. Stud of whi	ermined criteria. Ir the self-reflections dents pass the exan ch is evaluated by	this way, the of students tha upon realisation a mentor acc	teacher at are req on of one ording to	provides uired for teaching defined
Exam passing	awarding continuous creation of hour (lectu assessmen	points ac feedbac a teachi ure), the t criteria	ccording t ck and sup ng portfoli success o . The fina	o dete ports io. Stud of whi I grade	ermined criteria. Ir the self-reflections dents pass the exan	this way, the of students than upon realisation a mentor acc cording to the	teacher at are req on of one ording to number	provides uired for teaching defined of points

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 their
efficiency of	subjective impression about the teaching quality, all with the aim to improve future
teaching	teaching.

Course title	Teaching Practice in Chemistry									
Code	K072									
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education									
programme										
Semester	III semeste	III semester								
Workload/ECTS										
credits	3									
Course status	Obligatory									
Course teacher	Assoc. Prof		ntina Daviá							
	ASSOC. Prof	. Dr. vale	ntina Pavic							
Associate										
teachers										
Course entry	Attended (ourses.	Didactics 1 Ped	lagogy 1, Pedagogy	2 Psychology i	n Educa	ation 1			
requirements				logy of Teaching Chen						
(Preceding	of Teaching			logy of reaching chem	instry, Fractices i	minietine	Judiogy			
courses)	Orreaching	s chemis	.гу							
Course	Application	of knov	vledge and cogn	itive skills in indeper	dent realisation	of teac	hing in			
objective				e own professional de			-			
Learning			•	material for classes.						
outcomes			eliver teaching in							
		-	-	the success of their p	practice classes f	rom the	aspect			
		-		anagement, evaluation			-			
		-	-	-		-				
				ach student in their		n iun p	ersonal			
Link haturaan	pc	lential a	nu în achievemer	nt of inclusive school	culture.					
Link between					Assess	ment				
learning		Share		Activities of	A3303.	mene				
outcomes,	Learning		Form of		Methods of	Gra	ding			
teaching and	outcome of teaching learning and mentious of									
-	outcome	ГСТС	teaching	teeshing	monitoring	Poi	ints			
students'	outcome	ECTS	teaching	teaching	monitoring and	Poi	ints			
-	outcome	ECTS	teaching	teaching	and	Poi min	max			
students'		ECTS	teaching		_					
students'		ECTS	teaching	Observations of	and					
students'		ECTS	teaching	Observations of mentor's lessons	and					
students'		ECTS	teaching	Observations of mentor's lessons and analysis of	and evaluation Work diary,					
students'		ECTS		Observations of mentor's lessons and analysis of observed lessons,	and evaluation Work diary, Completed					
students'			Observations	Observations of mentor's lessons and analysis of observed lessons, preparation of a	and evaluation Work diary, Completed lesson	min	max			
students'	1-3	ECTS		Observations of mentor's lessons and analysis of observed lessons,	and evaluation Work diary, Completed lesson observation					
students'			Observations	Observations of mentor's lessons and analysis of observed lessons, preparation of a	and evaluation Work diary, Completed lesson observation forms,	min	max			
students'			Observations	Observations of mentor's lessons and analysis of observed lessons, preparation of a teaching portfolio (reflection forms	and evaluation Work diary, Completed lesson observation forms, teaching	min	max			
students'			Observations	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	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	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	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	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	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	and evaluation Work diary, Completed lesson observation forms, teaching	min	max			
students'			Observations	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	and evaluation Work diary, Completed lesson observation forms, teaching portfolio Written	min	max			
students'			Observations	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'			Observations in schools	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	and evaluation Work diary, Completed lesson observation forms, teaching portfolio Written lesson plan, Form for	min	max			
students'			Observations in schools	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, Form for assessment	min	max			
students'	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) Writing of lesson plans and consultations with a mentor. Independent	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	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 lecture,	min 18	max 30			
students'	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) 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, teaching	min 18	max 30			
students'	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) 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,	min 18	max 30			
students'	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) 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	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	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 teaching portfolio	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	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 21	max 30 35			
students'	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) 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 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 wi Students are obliged to pa the course.						
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 and 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										
Study	Graduate l	Graduate University Study Programme in Biology and Chemistry Teacher Education									
programme		, , , , , , , , , , , , , , , , , , , ,									
Semester	II semester	-									
Workload/ECTS	6										
credits	-										
Course status	Obligatory Assist. Prof	Dr. Iron	a Labak								
Course teacher Associate	ASSIST. PLOI	. Dr. Iren	d LdDdK								
teachers	Nataša Buš	šić, assista	ant								
Course entry											
requirements											
(Preceding											
courses)											
Course	To teach a	nd guide	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									
		-		view of teaching and	evaluation in order	r to boos	t student				
Link between				onal regulation.							
learning		Share		Activities of	Asses	sment					
outcomes,	Learning		Form of		Methods of	Gra	ding				
teaching and	outcome	ECTS	teaching	teaching		outcome of teaching learning and Methods of Grading					
students'				-	monitoring and	Ро	-				
activities					monitoring and evaluation	1	ints				
					evaluation	Po min	-				
					evaluation Records related	1	ints				
				Critical	evaluation Records related to active and	1	ints				
				conversation and	evaluation Records related to active and independent	1	ints				
					evaluation Records related to active and independent participation in	1	ints				
				conversation and	evaluation Records related to active and independent participation in lecture	1	ints				
	1-6	1	Lecture	conversation and discussion;	evaluation Records related to active and independent participation in lecture activities;	1	ints				
	1-6	1	Lecture	conversation and discussion; collaborative	evaluation Records related to active and independent participation in lecture activities; analysis of	min	ints max				
	1-6	1	Lecture	conversation and discussion; collaborative learning and	evaluation Records related to active and independent participation in lecture activities; analysis of performed	min	ints max				
	1-6	1	Lecture	conversation and discussion; collaborative learning and reciprocal	evaluation Records related to active and independent participation in lecture activities; analysis of performed tasks with	min	ints max				
	1-6	1	Lecture	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	min	ints max				
	1-6	1	Lecture	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;	min	ints max				
	1-6	1	Lecture	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	min	ints max				
	1-6	1	Lecture	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;	min	ints max				
	1-6	1	Lecture	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	min	ints max				
	1-6	1	Lecture	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	min	ints max				
	1-6	1	Lecture	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	min	ints max				
				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	min 5	ints max 10				
				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	min 5	ints max 10				
				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	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				Consistent		Ducations		
Teaching	L	ectures		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 	 Implementation of defined curricula in realisation of teaching Direct planning (curricular alignment in creation of lesson plans based on outcomes: planning of what is to be learned (content) and how it is taught and evaluated with the aim to develop knowledge at higher cognitive levels in factual, conceptual, procedural, epistemological and metacognitive contexts; implementation of defined curriculum of cross-curricular topics in teaching and direct planning Assessment in direct planning, issues related to higher cognitive levels, Crooks taxonomy, self-evaluation, creation of concepts – correlation between evaluation and teaching/learning Motivation and emotional regulation through teaching and evaluation Construction of exams and assessment of written knowledge tests Application of learning strategies, methods, procedures and techniques for development of natural science literacy of students and development of their creative- and critical-thinking skills Inquiry-based learning, the 5E learning model and out-of-classroom teaching in the development of natural science literacy and other types of literacy Forms of teaching, types of lessons and phases of a teaching hour Visualization of knowledge and understanding 						
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	Methodology of Teaching Chemistry									
Code	K071									
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education									
programme	Stadate onversity stady riogramme in bloogy and chemistry reacher Education									
Semester	II semester	U comester								
	II semester									
Workload/ECTS	3									
credits										
Course status	Obligatory									
Course teacher	Assist. Pro	t. Dr. Elvi	ra Kovač-Ar	idrić						
Associate										
teachers										
Course entry										
requirements			-	duate study courses ar		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	quiry-based learni	ng in wh	nich 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				ching strategies, meth			ng			
	te	chniques	s required fo	or achievement of che	mistry teaching obj	jectives.				
	3. Al	bility to s	elect chemi	cal experiments withi	n which students ca	an develo	p their			
		-		y in classroom conditi						
				, when working with ch						
				wn teaching and to re		aching ac	tivities			
		•		-		•				
	Developed communication and cooperation skills for working with people outside the school by exchanging experiences and finding optimal solutions for									
		-			-					
		utside the	e school by	exchanging experienc	-					
	te	utside the aching a	e school by dvancemen	exchanging experienc t.	es and finding optir	nal soluti	ons for			
	te 6. Al	utside the aching a bility to a	e school by dvancemen issess the ne	exchanging experienc 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	utside the aching a bility to a	e school by dvancemen issess the ne	exchanging experienc t.	es and finding optir lents during their co	mal soluti ognitive le	ons for earning			
Link between	te 6. Al	utside the aching a bility to a order to	e school by dvancemen issess the ne	exchanging experienc t. eeds of individual stuc m to acquire knowled	es and finding optir lents during their co	nal soluti ognitive levels.	ons for earning			
learning	te 6. Al in	aching a bility to a order to Share	e school by dvancemen issess the no enable the	exchanging experienc 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 levels.	ons for earning			
learning outcomes,	te 6. Al in Learning	utside the aching a bility to a order to Share of	e school by dvancemen issess the no enable the Form of	exchanging experienc 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 lo 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 issess the no enable the	exchanging experienc 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	utside the aching a bility to a order to Share of	e school by dvancemen issess the no enable the Form of	exchanging experienc 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	utside the aching a bility to a order to Share of	e school by dvancemen issess the no enable the Form of	exchanging experienc t. eeds of individual stuc m to acquire knowled Activities of learning and teaching	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	utside the aching a bility to a order to Share of	e school by dvancemen issess the no enable the Form of	exchanging experienc 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	utside the aching a bility to a order to Share of	e school by dvancemen issess 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	utside the aching a bility to a order to Share of	e school by dvancemen issess the no enable the Form of	exchanging experience t. eeds of individual stuce m to acquire knowled Activities of learning and teaching Critical conversation and discussion,	es and finding optin 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 in Learning	utside the aching a bility to a order to Share of	e school by dvancemen issess the no enable the Form of	exchanging experienc t. eeds of individual stud 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 Assess Methods of monitoring and evaluation Records related to student	nal soluti ognitive levels. sment Gra Po	ons for earning ding ints			
learning outcomes, teaching and students'	te 6. Al in Learning	utside the aching a bility to a order to Share of	e school by dvancemen issess the no enable the Form of	exchanging experienc t. eeds of individual stud 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	utside the aching a bility to a order to Share of ECTS	e school by dvancemen issess the no enable the Form of teaching	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	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	utside the aching a bility to a order to Share of ECTS	e school by dvancemen issess the no enable the Form of teaching	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	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	utside the aching a bility to a order to Share of ECTS	e school by dvancemen issess the no enable the Form of teaching	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	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	utside the aching a bility to a order to Share of ECTS	e school by dvancemen issess the no enable the Form of teaching	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	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	utside the aching a bility to a order to Share of ECTS	e school by dvancemen issess the no enable the Form of teaching	exchanging experience t. eeds of individual stud 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	utside the aching a bility to a order to Share of ECTS	e school by dvancemen issess the no enable the Form of teaching	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:	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	nal soluti ognitive le ve levels. sment Gra Po min	ints			
learning outcomes, teaching and students'	te 6. Al Learning outcome	utside the aching a bility to a order to Share of ECTS	e school by dvancemen issess the no enable the Form of teaching	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	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	nal soluti ognitive le ve levels. sment Gra Po min	ints			
learning outcomes, teaching and students'	te 6. Al Learning outcome	utside the aching a bility to a order to Share of ECTS	e school by dvancemen issess the no enable the Form of teaching	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;	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	utside the aching a bility to a order to Share of ECTS	e school by dvancemen issess the no enable the Form of teaching	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	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	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	e school by dvancemen issess the no 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;	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	utside the aching a bility to a order to Share of ECTS	e school by dvancemen issess the no enable the Form of teaching	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	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	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	e school by dvancemen issess the no 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	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	e school by dvancemen issess the no 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	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	e school by dvancemen issess the no 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	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	e school by dvancemen issess the no 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			

		1						1
				direct educational	feedba			
				process	portfo	lio		
	1-6	0.5	Written exam	Preparation for written exam	Written e	exam	10	20
		0.5	Oral exam	Preparation for oral exam	Oral ex	am	5	10
	Tatal	2	слатт				50	100
	Total	3					50	100
	Final grade) (aufficia					
	71-80 poin	-	e 2 (sufficie	nu)				
	-	-	e 4 (very go	od)				
	-	-	de 5 (excelle	-				
Consultation hours	By appoint	-						
Teaching		ectures		Seminars		F	Practices	
Hours - total		30		15			0	
Course content	Lectures							
/ teaching units	• Cl	hemistry	as a school	subject (goals and tas	ks of teachi	ng chen	histry, ch	emistry
	as	s a scienc	e and as a s	school subject)				
	 St 	rategies	of teaching	(applying experiments	s in chemist	ry teacł	ning, lear	ning by
	di	iscovery,	group worl	<, pair work, individual	work, front	al work	:)	
	• Ci	urriculun	n (specific ta	asks of chemistry teach	ning and the	age of	students	,
	р рі	rinciples	of curriculu	m development, princ	iples of tead	hing un	nits select	tion,
	de	efining le	arning outo	comes for students, qu	alitative and	d quanti	itative an	alysis of
	cł	nemistry	curricula fo	r primary and seconda	ry school, e	valuatio	on of tead	ching
	с с	ontent, n	nethods, for	ms and results educat	ional work,	textboo	oks and o	ther
			naterials)					
		-	linary teach	ning				
		-	-	om (chemistry classroo	m. laborato	rv equir	oment an	d
				ent and use of teaching				
			-	ucting experiments in t	-			
				quence of the teaching		,		
				rs for teaching (langua		ech. psv	chologic	al.
				I preparations for: nev	• •		-	-
				aching hour, writing of	•			-
				achievements)	· · · · ·	,		
				edge, abilities and skills	s (evaluatio	n during	g the tead	ching
				ance of assessment as				
			-	ational exams, state g				
				ions, students' cognitiv				
			ents, self-as					
				vironment of chemistr	v teachers (teache	rs' rights	and
			-	xams, school supervisi	-		-	
		-		onal development and		-		-
		-	-	s on assessment, appro	-			
				, work with students w				
		ctivities)	•		•	, -		
		-	objectives	related to various te	rms (subst	ance, a	ggregatio	on state.
		-	-	chemical reaction equ	-			
				f atoms, chemical bon				
				pasic chemical laws, cl	-			-
				illibrium, reduction p				
			-	characteristics of r				
			st. acturul					

	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	
Exam passing procedure	Written and oral exams are taken after attended lectures.
-	
Main language	
of instruction;	Croatian language
other	
languages	
Method of	
monitoring the	Continuous monitoring of the learning process and of students' achievement, for the
quality and	purpose of guiding and adjusting teaching process. Students provide feedback about the
efficiency of	quality of teaching, which is used in improvements of future teaching.
teaching	

	Basics of Horticulture							
Code	BM861							
Study	Carduste University Study Decements in Dislams and Charrister Teacher Education							
programme	Graduate University Study Programme in Biology and Chemistry Teacher Education							
Semester	II semester	r						
Workload/ECTS	2							
credits	3							
Course status	Obligatory							
Course teacher	Assoc. Pro	f. Dr. Ivna	a Štolfa Čam	agajevac				
Associate	Keenija De	hoč loho	ratory tachr	leion				
teachers	Ksenija Do	DOS, IADO	ratory techr					
Course entry								
requirements	Cormophy	to (nasso	d avam)					
(Preceding	Connopiny	te (passe	u examj					
courses)								
Course objective	To teach s	tudents a	about princi	ples, theories and co	ncepts in horticult	ure and t	o enable	
				integrate those conc	•			
Learning		•		basic concepts of hor	•			
outcomes	-		-	oing, dendrology) into			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	
	pi	ant spec	les by respec	ting soil characterist	ics and climatic cor	iditions.		
Link between					Asses	sment		
learning outcomes,	Learning	Share	Form of	Activities of				
teaching and	outcome	of	teaching	learning and	Methods of		-	
students'		ECIS	outcome teaching teaching					
Students					monitoring and		ints	
activities					evaluation	min	max	
activities	-			Critical	-			
activities				Critical conversation and	-			
activities				Critical conversation and discussion;	evaluation Records related			
activities				Critical conversation and discussion; collaborative	evaluation Records related to active and	min	max	
activities	1-3	1	Lecture	Critical conversation and discussion; collaborative learning and	evaluation Records related to active and independent			
activities	1-3	1	Lecture	Critical conversation and discussion; collaborative learning and reciprocal	evaluation Records related to active and	min	max	
activities	1-3	1	Lecture	Critical conversation and discussion; collaborative learning and reciprocal teaching;	evaluation Records related to active and independent participation in	min	max	
activities	1-3	1	Lecture	Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based	evaluation Records related to active and independent participation in lecture	min	max	
activities	1-3	1	Lecture	Critical conversation and discussion; collaborative learning and reciprocal teaching;	evaluation Records related to active and independent participation in lecture activities	min	max	
activities	1-3	1	Lecture	Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks	evaluation Records related to active and independent participation in lecture activities Records related	min	max	
activities	1-3	1	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 Records related to active and	min	max	
activities	1-3	0.5	Lecture	Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of	evaluation Records related to active and independent participation in lecture activities Records related to active and independent	min	max	
activities				Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory	evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in	min 10	20	
activities				Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of	evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in practical	min 10	20	
activities			Practices	Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory exercises	evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in	min 10	20	
activities			Practices Written	Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory exercises Exam	evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in practical	min 10	20	
activities	3,4	0.5	Practices	Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory exercises	evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in practical activities	min 10 20	20 20	
activities	3,4	0.5	Practices Written	Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory exercises Exam	evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in practical activities Exam	min 10 20 20	20 20 35	
activities	3,4	0.5 1 0.5	Practices Written exam	Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory exercises Exam preparation	evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in practical activities	min 10 20	20 20	
activities	3,4	0.5	Practices Written exam Oral	Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory exercises Exam preparation	evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in practical activities Exam	min 10 20 20	20 20 35	
activities	3,4 1-4 1-4 Final grade	0.5 1 0.5 3	Practices Written exam Oral exam	Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory exercises Exam preparation Preparation for oral exam	evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in practical activities Exam	min 10 20 20 10	max 20 20 35 25	
activities	3,4 1-4 1-4 Final grade	0.5 1 0.5 3 e: ts: grade	Practices Written exam Oral exam	Critical conversation and discussion; collaborative learning and reciprocal teaching; knowledge-based tasks Independent performance of laboratory exercises Exam preparation Preparation for oral exam	evaluation Records related to active and independent participation in lecture activities Records related to active and independent participation in practical activities Exam	min 10 20 20 10	max 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 ables and flowers and park landscaping den: spices and aromatic herb	(annuals, biennials, aquatic nt representatives of os, vegetable, ornamental			
Recommended reading	fakultet, Zagreb. Idžojtić M. (2009) Dendrologi	a-cvijet, češer, plod, sjeme. Sv ja-list. Sveučilište u Zagrebu, Š	umarski fakultet, Zagreb.			
Optional reading	Poljoprivredni fakultet, Osijek Parađiković N. (2002) Opće i s Parađiković N. (1994) Plasten	jković S., Kraljičak J., Vinković ⁻ pecijalno povrćarstvo. Poljopr ici i staklenici. Nova zemlja, Os Davies Jr. F.T., Geneve R.L. (2	ivredni fakultet, Osijek. ijek.			
	plant propagation : principles Pittenger D.R. (2002) Californ	and practice. 8th ed. Prentice a Master Gardener Handbook. i bez kemikalija (2010). Mozai	Hall, USA. University of California, USA.			
Conditions for obtaining teacher's signature	Students are obliged to partic the course.	ipate in lectures actively and t	o fulfil all assignments 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. During the course, students take a written exam, and proceed to 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 written 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	of the learning process and st teaching. After the course, the	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	Jniversity	y Study Prog	ramme in Biology and	d Chemistry Teache	r Educatio	on		
programme									
Semester	I semester								
Workload/ECTS									
credits	3								
	Obligatory								
Course status	Obligatory								
Course teacher	Assist. Pro	ssist. Prof. Dr. Irena Labak							
Associate	Nataša Buš	śić assist	ant						
teachers									
Course entry									
requirements									
(Preceding									
courses)									
Course	To develop	student	s' knowledge	e about pedagogical s	cience and its role i	n the edu	ucation		
objective	system.								
Learning		hility to c	ritically aval	uate pedagogical scie	nce its foundation	and term	inology		
outcomes		•	•	ogical concepts.	nce, its iounuation	and term	mology		
outcomes					includes of solute 11				
				ement of goals and p					
		-	eview conte	mporary pedagogical	theory and its relat	ion to scl	hool		
	pi	ractice.							
	• A	bility to a	issess the eff	fectiveness of educat	onal strategies in the	ne overal	l		
	de	evelopme	ent of childre	en, in the identificatio	on of problems and	needs of			
		-		self-reflection, and in	-				
				tific and professional					
						with the			
	educational topics.								
Link botwoon	e	ducationa	al topics.						
Link between			al topics.		Assess	sment			
learning		Share		Activities of	Asses	sment			
learning outcomes,	Learning		Form of	Activities of learning and	Assess Methods of		ding		
learning outcomes, teaching and		Share				Gra	ding ints		
learning outcomes, teaching and students'	Learning	Share of	Form of	learning and	Methods of	Gra Po	-		
learning outcomes, teaching and	Learning	Share of	Form of	learning and teaching	Methods of monitoring and	Gra	ints		
learning outcomes, teaching and students'	Learning	Share of	Form of	learning and teaching Critical	Methods of monitoring and	Gra Po	ints		
learning outcomes, teaching and students'	Learning	Share of	Form of	learning and teaching Critical conversation and	Methods of monitoring and	Gra Po	ints		
learning outcomes, teaching and students'	Learning	Share of	Form of	learning and teaching Critical conversation and discussion;	Methods of monitoring and evaluation	Gra Po	ints		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	learning and teaching Critical conversation and discussion; collaborative	Methods of monitoring and evaluation Records related to active	Gra Po min	ints max		
learning outcomes, teaching and students'	Learning	Share of	Form of	learning and teaching Critical conversation and discussion; collaborative learning within	Methods of monitoring and evaluation Records related to active participation in	Gra Po	ints		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	learning and teaching Critical conversation and discussion; collaborative	Methods of monitoring and evaluation Records related to active participation in discussions and	Gra Po min	ints max		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	learning and teaching Critical conversation and discussion; collaborative learning within	Methods of monitoring and evaluation Records related to active participation in discussions and analysis;	Gra Po min	ints max		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	learning and teaching Critical conversation and discussion; collaborative learning within analysis of	Methods of monitoring and evaluation Records related to active participation in discussions and	Gra Po min	ints max		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	learning and teaching Critical conversation and discussion; collaborative learning within analysis of different types of	Methods of monitoring and evaluation Records related to active participation in discussions and analysis;	Gra Po min	ints max		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	learning and teaching Critical conversation and discussion; collaborative learning within analysis of different types of information	Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio	Gra Po min	ints max		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	learning and teaching Critical conversation and discussion; collaborative learning within analysis of different types of information	Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of	Gra Po min	ints max		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	learning and teaching Critical conversation and discussion; collaborative learning within analysis of different types of information	Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of completed	Gra Po min	ints max		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	learning and teaching Critical conversation and discussion; collaborative learning within analysis of different types of information sources	Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of completed tasks with	Gra Po min	ints max		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	learning and teaching Critical conversation and discussion; collaborative learning within analysis of different types of information sources Tasks related to professional	Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of completed tasks with provision of	Gra Po min	ints max		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching Lecture	learning and teaching Critical conversation and discussion; collaborative learning within analysis of different types of information sources Tasks related to professional development	Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of completed tasks with provision of feedback;	Gra Po min	ints max 10		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching	learning and teaching Critical conversation and discussion; collaborative learning within analysis of different types of information sources Tasks related to professional development planning by active	Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of completed tasks with provision of	Gra Po min	ints max		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching Lecture	learning and teaching Critical conversation and discussion; collaborative learning within analysis of different types of information sources Tasks related to professional development planning by active research and peer	Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of completed tasks with provision of feedback;	Gra Po min	ints max 10		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching Lecture	learning and teaching Critical 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	Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of completed tasks with provision of feedback; Records related to student	Gra Po min	ints max 10		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching Lecture	learning and teaching Critical conversation and discussion; collaborative learning within analysis of different types of information sources Tasks related to professional development planning by active research and peer	Methods of monitoring and evaluation Records related to active participation in discussions and analysis; portfolio Analysis of completed tasks with provision of feedback; Records related to student activity in the	Gra Po min	ints max 10		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching Lecture	learning and teaching Critical 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	Methods of monitoring and evaluation Records related 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;	Gra Po min	ints max 10		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching Lecture	learning and teaching Critical 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	Methods of monitoring and evaluation Records related 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	Gra Po min	ints max 10		
learning outcomes, teaching and students'	Learning outcome	Share of ECTS	Form of teaching Lecture	learning and teaching Critical 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	Methods of monitoring and evaluation Records related 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;	Gra Po min	ints max 10		

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							
	 Upbringing and education Educational system 								
			-	ronological starting n	oints of educ	ation theorie	nrocess		
	 Philosophical and anthropological starting points of education, theories, proces and factors of education Student - an active participant in education Teacher personality and teacher vocation Educational strategies Educational strategies in the education system Assessment in the education system Theory of school. Learning and teaching Family upbringing Home education Education during free time Education and modern information and communication technology Educational and social work Preventive work in education Methodology of pedagogy Types of pedagogical research 								
	 Types of pedagogical research Quantitative and qualitative paradigm of pedagogical research 								
Recommended	Quantitative and qualitative paradigm of pedagogical research Gudjons H. (1994) Pedagogija. Temeljna znanja. Educa, Zagreb.								
reading	Mijatović A. (ed.) (1998) Osnove suvremene pedagogije. HKZ "MI" HPKZ, Zagreb.								
	-	Vukasović A. (2001) Pedagogija. 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	Cue durate l				Chamister Taasha			
programme	Graduate C	Iniversity	Study Progr	amme in Biology and	Chemistry Teache	r Educat	ion	
Semester	II semester							
Workload/ECTS								
credits	3							
Course status	Obligatory							
Course teacher	Assist. Prof	Dr Iron	alabak					
Associate	ASSIST. FIO	. Dr. iren						
teachers	Nataša Buš	ić, assista	ant					
Course entry								
requirements								
(Preceding								
courses)								
Course objective				n teaching philosophy				
				n which each studer			-	
				arning. To teach stud		-		
	stimulating	comm	unication w	ith students, pare	nts, professional	associa	tes and	
	community							
Learning	1. At	oility to c	reate a schoo	ol environment in wh	ich all students res	pect the	emselves	
outcomes	ar	d others	and fulfil the	eir personal potential				
	2. At	oility to e	stablish com	munication with stuc	lents within which	all ethic	al	
	pr	inciples a	re respected	d and which is stimula	ating for building o	f positiv	e	
	re	lationshi	os towards o	neself, others, and le	arning.	-		
				luation in a way to su	-	a positive	e image	
		-	and of others	-			0 -	
				ples of practical pro	blem solving relate	d to issu	les of	
		-		behavioural disorde	-			
		-		lisabilities and of enc		-		
		udents.			ouruging developi		,iiicea	
			stablish coor	peration and commu	nication with nare	hts and		
		-			•		onment	
Link between	professional associates in school who can contribute to students' developm						opinent.	
					Assessment			
learning	Learning	Share	Form of	Activities of				
outcomes,	outcome	of	teaching	learning and	Methods of	Gra	Grading	
teaching and	outcome	ECTS	ceaening	teaching	monitoring	Ро	ints	
students'					and evaluation	min	max	
activities				Critical				
				conversation and				
				discussion;	Records			
				collaborative	related to			
				learning and	active			
	1-5	05	Lecture	reciprocal	participation in	5	10	
	1-5	0.5	Lecture					
	1-5	0.5	Lecture	-		-		
	1-5	0.5	Lecture	teaching within	discussions and	-	10	
	1-5	0.5		teaching within analysis of	discussions and analysis;	-	10	
	1.2	0.5		teaching within analysis of different types of	discussions and		10	
		0.5	Lecture	teaching within analysis of different types of information	discussions and analysis;		10	
		0.5		teaching within analysis of different types of information sources	discussions and analysis;		10	
		0.5		teaching within analysis of different types of information sources Flipped	discussions and analysis; portfolio			
		0.5		teaching within analysis of different types of information sources Flipped classroom:	discussions and analysis; portfolio Analysis of a			
				teaching within analysis of different types of information sources Flipped classroom: presentation and	discussions and analysis; portfolio Analysis of a lesson plan and			
	1-5	0.75	Seminar	teaching within analysis of different types of information sources Flipped classroom: presentation and analysis of a	discussions and analysis; portfolio Analysis of a lesson plan and related	10	20	
				teaching within analysis of different types of information sources Flipped classroom: presentation and	discussions and analysis; portfolio Analysis of a lesson plan and			

	1-5	1	Practice Written exam	outcomes preparatio proposals improveme analysed pr	n of for by the g and n of for ent of actice f an	create plans impro with p of fee por	lysis of ed lesson and their vements provision edback; rtfolio ssay	20	30
	1-5	0.25	Oral exam	Preparatio oral exa	n for	Ora	l exam	5	10
	Total	3						60	100
	Final grade			1				1	
	60-70 poin		2 (sufficie	ent)					
	71-80 poin	ts: grade	3 (good)						
	81-90 poin	-							
	91-100 poi		e 5 (excell	ent)					
Consultation hours	By appoint								
Teaching	Le	ectures		Semina	ars		Р	ractices	
Hours - total		15		15				15	
Course content / teaching units	 General characteristics, pedagogical requirements and problems of children with special needs Definitions and terminology of special needs Classification and etiology of special needs Historical position and attitudes towards people with special needs Legal provisions and importance of early detection and early professional treatment of children with developmental difficulties Teamwork in the process of diagnosis, upbringing, education and rehabilitation Education and rehabilitation system Stereotypical attitudes Philosophy of inclusion Integrated upbringing and education of children and youth with disabilities Marginalized groups, contemporary tendencies and civic educational program Giftedness, personality, creativity Gifted child in family and in school Enriched programs for monitoring and guiding of gifted children and youth Elements of a comprehensive support system for gifted children The concept of marginal groups, processes and dimensions of marginality Competences of the modern teacher Communication with students, parents, professional associates, community and other members involved in education 								

	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 fun BudBe
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.

teaching and students' activitiesoutcomeof ECTSteachingmonitoring and evaluationmonitoring and evaluation1-32Laboratory practicesAttendance of classes; Participation in classes by asking questions or giving suggestions; Experimental workRecords related to attendance, control of twokbooks, commenting the obtained results1-33Periodical exams (preliminary oral exams)Preparation for laboratory practices, participation in classes by asking questions or giving suggestions; Experimental workRecords attendance, control of workbooks, commenting the obtained results1-33Periodical exams (preliminary oral exams)Preparation for participation in oral exams prior to or during practical classesPreliminary oral exams performanceTotal560								
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Workload/ECTS credits S Course status Obligatory Course teacher Assist. Prof. Dr. Martina Medvidović-Kosanović Associate teachers Matej Šag, professional associate Course entry requirements (Preceding courses) Practices in General Chemistry, Analytical Chemistry Laboratory Practice Course objective To develop students' knowledge about some concepts and laws of physical cher to train students for independent practical work related to designing and perfore experiment by reviewing scientific literature. Learning outcomes 1. Ability to assess the design and realisation of experiments perform the course 2. Ability to critically evaluate the obtained and processed experime and to compare the obtained values with the published referentia 3. Ability to oral exaning outcomes, teaching and students' activities Share of ECTS Form of teaching Activities of learning and teaching and sugestions; Experimental work Methods of monitoring and evaluation G monitoring and evaluation 1-3 2 Laboratory practices Preparation for giving suggestions; Experimental work Records related to control of vortboods, related to related to								
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and to compare the obtained values with the published referentia 3. Ability to make conclusions about the examined physical proce- present the report about the analysed topic. Link between learning outcomes, teaching and activities 1-3 2 1-3 2 1-3 3 2 1-3 3 2 1-3 3 2 1-3 3 2 1-3 3 1-3 3 1-3 3 1-5	ntal data							
3. Ability to make conclusions about the examined physical proce- present the report about the analysed topic. Assessment Link between learning outcomes, teaching and students' activities Learning outcome Share of ECTS Form of teaching Activities of learning and teaching Methods of monitoring and evaluation 1-3 2 Laboratory practices Attendance of classes by asking questions or giving suggestions; Experimental work Records related to attendance, control of workbooks, commenting the obtained results Form of classes by asking questions or giving suggestions; Experimental work Preliminary oral exams, Records 5 1-3 3 Periodical exams (preliminary oral exams) Preparation for laboratory practical classes Preliminary oral exams, Records 55 1-3 5 Imagrade 55 Imagrade 55								
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Final grade:								
	100							
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) Final exam: achieved minimum number of points refers to the lowest grade (s and maximum number of points refers to the highest grade (excellent).	ufficient),							

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. (2012) Praktikum fizikalne kemije / Maja Dutour Sikirić (ed.). Osijek: Sveučilište J.J. Strossmayera u Osijeku, Odjel za biologiju.					
Optional reading	Atkins P.W., Atkins J.de P. (2002) Physical Chemistry. Oxford University Press, Oxford. Atkins P.W., Clugston M.J. (1989) Načela fizikalne kemije. Školska knjiga, Zagreb. Cvitaš T., Kallay N. (1980) Fizičke veličine i jedinice Međunarodnog sustava. Školska knjiga, Zagreb. Sikirica M. (1985) Stehiometrija. Školska knjiga, Zagreb.					
Conditions for obtaining teacher's signature	Students are obliged to participate in lectures actively and to fulfil all assignments within the course (practices, keeping notes by using forms for practices).					
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	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								
Study	Graduate	Graduate University Study Programme in Biology and Chemistry Teacher Education							
programme	ll comosta								
Semester Workload/ECTS	II semeste	er							
credits	3								
Course status	Obligator	v							
Course teacher			ira Kovač-And	lrić					
Associate teachers		Assist. Prof. Dr. Elvira Kovač-Andrić Nataša Bušić, assistant							
Course entry requirements (Preceding courses)	courses:	Passed exams within undergraduate study courses and attended winter semester courses: Psychology in Education 1, Pedagogy 1, School Teaching Practice 1							
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	 Knowledge about basic rules of laboratory work, safety and protection 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. Skills in integration of professional, methodological and pedagogical knowledge in the planning of direct teaching process. 								
Link between learning	Learning	Share	Form of	Activities of	Asses	sment			
outcomes, teaching and students'	hing and outcome ECTS teaching 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 good) 91-100 points: grade 5 (excellent)								
Consultation hours	By appointment	By appointment							
Teaching	Lectures	Seminars	Practices						
Hours - total	0	0	60						
Course content / teaching units	 Introduction to laboratory work in school: Basic rules of laboratory work; safety and protection measures in chemical laboratory; Basic rules for handling chemicals and reagents; First aid in chemical laboratory; Use of household chemicals in chemistry teaching; Preparation of solutions and reagents in classes Experiments related to teaching units; Introduction to school experiment; Types of substances; Separation of mixtures; Metals and their compounds; Salts; Non-metals and their compounds; Water and hydrogen; Oxygen and air; Chemical kinetics; Carbon and organic compounds; Hydrocarbons; Organic compounds with oxygen; Biologically important compounds; Synthetically important compounds Creation and usage of models in teaching chemistry 								
Recommended	Sikirica M. (2011) Zbirka kem	Sikirica M. (2011) Zbirka kemijskih pokusa za osnovnu i srednju školu. Školska knjiga,							
reading Optional reading	Zagreb.	and the Francisco of Article							
	 Farley R.F. (2001) School Chemistry Experiments. Association for Science Education. Journal of Chemical Education, Division of Chemical Education of the American Chemical Society, New York. Kostović-Vranješ V. (2015) Metodika nastave predmeta prirodoslovnog područja. Školska knjiga, Zagreb. Marin G., Ruić R., Cindrić M. (2009) Projektna nastava prirode, biologije, fizike i kemije. Školska knjiga, Zagreb. Sikirica M. (2004) Metodika nastave kemije. Školska knjiga, Zagreb. 								
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.
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 individual. Ability to analyse the relations among teaching process, memory process and learning outcomes. Ability to explain relations among the cognitive development, personality traits and the educational process. 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. Ability to predict possible difficulties in working with students with disabilities and skills in finding possible solutions.
 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. Link between learning outcomes, teaching and teaching and teaching and teaching and teaching and teaching and teaching
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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
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Link between learning outcomes, Learning outcome Control of ECTS Share of teaching and teaching Control of ECTS Control of teaching Control of tea
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										
	1-8	0.75	exam	for written exam	Written exam	36	55					
	1-8	0.5	Oral exam	Preparation for oral exam	12	20						
	Total	3				60	100					
	Final grade:											
		All above-mentioned elements of monitoring of students' performance are evaluated and graded according to the publicly available evaluation criteria that students are										
	and graded a familiar with.	-	o the publicly	available evaluatio	on criteria that stu	dents ar	e					
	The final grad	de refers	to continuous	monitoring and t	esting of knowled	ge (prel	iminary					
		xams 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 st	Records on student activity are taken during each lecture.										
	Final grade:	nointe a	rada 2 (aufficia	- m#1								
			rade 2 (sufficie rade 3 (good)									
			rade 4 (very go	bod)								
			ade 5 (excelle	•								
Consultation	According to	defined so	chedule and by	individual appoin	itment; written an	d oral						
hours	consultations		I		I							
Teaching	Lec	tures		Seminars	Pr	actices						
Hours - total	-	15		15		15						
Course content	Intro	duction t	o scientific psy	chology	·							
/ teaching units	Defi	nition of e	ducational psy	chology fields								
		-	s of behaviour									
	Development of an individual											
	Cognitive abilities and creativity											
	 Personality and individual differences Memory 											
	Memory Learning											
		0	learning disab	ilities and special	educational needs							
Recommended	Students with learning disabilities and special educational needs. Vizek-Vidović V., Vlahović-Štetić V., Rijavec M., Miljković, D. (2003) Psihologija											
reading	obrazovanja. IEP- VERN, Zagreb.											
	Zarevski P. (2007) Psihologija učenja i pamćenja (5th edition). Naklada Slap, Jastrebarsko.											
Optional	Atkinson R.L., Hilgard E. (2007) Uvod u psihologiju. Naklada Slap, Jastrebarsko.											
reading				ap, Jastrebarsko.	· · ·							
		ki D. (200	9) Primijenjena	a psihologija: pitar	ija i odgovori. Škol	ska knjig	ga,					
	Zagreb. Čudina-Obradović M. (1991) Nadarenost: razumijevanje, prepoznavanje, razvijanje. Školska knjiga, Zagreb. Gardner H., Kornhaber M.L., Wake W.K. (1999) Inteligencija. Naklada Slap, Jastrebarsko. Grgin T. (2004) Edukacijska psihologija (2nd edition). Naklada Slap, Jastrebarsko.											
). Naklada Slap, Jas							
			eset znanstven	ih studija koje su	promijenile psihol	ogiju. Na	ıklada					
	Slap, Jastreba		olii ncihologiio	Naklada Slan Ja	strobarska							
				 Naklada Slap, Jas oteškoće. ITP Foru 								
		-			practice (10th ed.).	Pearson	n. New					
	York.					2 201 301	.,					
		h M.M., N	/iller S.A. (2004	4) Dječja psihologi	ija (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 Biology and Chemistry Teacher Education							
programme								
Semester	II semester							
Workload/ECTS credits	3							
Course status	Obligatory							
Course teacher	Assoc. Prof.	. Dr. Dan	iela Šincek					
Associate teachers	Ivana Duvn	jak, assis	tant					
Course entry								
requirements (Preceding courses)	Completed equivalent)	-	raduate stu	dy; attended cour	se Psychology in	Educatio	on 1 (or	
Course	To introduc	e studer	its to the pra	ictical aspects of psy	chology of education	on.		
objective	1. Ab	vility to d	otormino the	e correlation betwee	a different theories	ofmotiv	ation and	
Learning outcomes	en an 2. Sk 3. Ab 4. Ab 5. Kn for 6. Sk ac 7. Ab cre	notions a id teachin ills requi otivation bility to co bility to co anageme owledge r success ills in pl ademic co bility to p eating pc	Ind theories org. red in analy: ritically analy oritically analy oritically are ritically are oritically are ful classroon anning diffe lomains. redict possib ossible solution	of learning and their sis of teaching proce yse various factors of nalyse processes re ortance of different g n and discipline man erent methods of k le difficulties in achie	application in the pedures that are dir success and failure elated to classroo group processes an agement. nowledge assessn eving classroom dis cernative approach Asses Methods of	process o ected to e. m and nd group nent in i cipline ar es to edu sment Gra	f learning students' discipline dynamics individual nd skills in ication.	
students'		ECTS		teaching	monitoring and		oints	
activities					evaluation	min	max	
	1-8	0.5	Lecture	Critical conversation and discussion	Records	-	-	
	1-8 0.75 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		
	1-8	0.5	Practices	Work on practical assignment	Monitoring of student performance	0	5	
	1-8	0.75	Written exam	Preparation for written exam	Written exam	36	55	
	1-8	0.5	Oral exam	Preparation for oral exam	Oral exam	12	20	
	Total	3				60	100	

	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.						
	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 emot Teaching Planning of lessons Assessment and evaluation 	ions - the role of emotions in th	ne learning process				
	 Evaluation of teacher's Group processes and gr Classroom managemen Inappropriate behaviou Alternative approaches 	performance oup dynamics t and discipline r					
Recommended reading	Vizek-Vidović V., Vlahović-Šte IEP- VERN, Zagreb.	tić V., Rijavec M., Miljković D. (2	003) Psihologija obrazovanja.				
Optional reading	 Vizek-Vidović V., Vlahović-Štetić V., Rijavec M., Miljković D. (2003) Psihologija obrazovanja. IEP- VERN, Zagreb. Barth B.M. (2004) Razumjeti što djeca razumiju. Profil International, Zagreb. Beck M. (2000) Motivacija. Naklada Slap, Jastrebarsko. Čudina-Obradović M. (1991) Nadarenost: razumijevanje, prepoznavanje, razvijanje. Školska knjiga, Zagreb. Gossen D.C. (2011) Restitucija - preobrazba školske discipline (2nd edition). Alineja, Zagreb. Grgin T. (2004) Edukacijska psihologija (2nd edition). Naklada Slap, Jastrebarsko. Grgin T. (2001) Školsko ocjenjivanje znanja (4th edition). Naklada Slap, Jastrebarsko. Matijević M. (2004) Grading u osnovnoj školi. Tipex, Zagreb. Woolfolk A. (2012) Educational psychology (12th ed.). Allyn and Bacon (poglavlje 10, 11, 12), New York. Vlahović-Štetić V. (ed.), Vizek Vidović V., Arambašić L., Vojnović N. (2005) Daroviti učenici: Teorijski pristup i primjena u školi. Institut za društvena istraživanja, Zagreb. 						
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	, , , , , , , , , , , , , , , , , , , ,								
Semester	III semester								
Workload/ECTS									
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		Chana		A attivition of		Asses	sment		
	Learning Share Form of Activities of								
outcomes,	Learning	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 (sufficien 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 (sufficien 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 (sufficien 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 (sufficien 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 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-class 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-clas 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 distre 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 e: tts: grade tts: grade tts: grade ints: grad	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		Tactice 1	•					
Study		Iniversity	Study Pro	ogramn	ne in Biology and Che	mistry Teache	er Educati	on	
programme		Jinversity	Study III	ogrann	ne in biology and ene	initiating redene		011	
Semester	l semester								
Workload/ECTS	i semester								
credits	2								
Course status	Obligatory								
	Obligatory Assist. Prof	Dr. Iron	a Labali						
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						A33	essment		
outcomes,	Learning	Share	Form	of	Activities of	es of Methods (Grading	
teaching and	outcome	of	teach		learning and	of	Points		
students'	outcome	ECTS	teach	ing	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 Te	aching P	ractice 2				
Code	BP8109						
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education						
programme							
Semester	Il semester						
Workload/ECTS							
credits	2						
Course status	Obligatory						
Course teacher	Assist. Prof	. Dr. Iren	a Labak				
Associate							
teachers							
Course entry							
requirements							
(Preceding							
courses)							
Course objective	To teach s	students	about the impo	ortance of communio	cation and co	oneratio	n to he
course objective			•	ts and other people of		-	
			· •	e to the overall de			
				ng learning of studen		Papilo	
Learning				e and responsibilities		her in tl	he direct
outcomes		-		ecome familiar with			
outcomes		acher's w			i uuties ansing	, 110111 (
			-	tasks related to schoo	hoard teache	ars' cour	ncil class
	2. Knowledge about roles and tasks related to school board, teachers' council, class						
		uncil na	rents' council and	d nunils' council			
			rents' council and		ossional traini		way of
	3. Ra	aised aw	areness on the	importance of profe	essional trainir	ng as a	way of
Link between	3. Ra	aised aw		importance of profe	essional trainir	ng as a	way of
Link between	3. Ra	aised aw	areness on the	importance of profe		ng as a ssment	
learning	3. Ra	ofession	areness on the	importance of profestion of the profestion of th	Asse	ssment	
learning outcomes,	3. Ra	ofession ofession	areness on the	importance of profession of teachers.	Asse Methods	ssment Gra	ading
learning outcomes, teaching and	3. Ra	ofession ofession Share of	areness on the al development c	importance of profest of teachers. Activities of learning and	Asse Methods of	ssment Gra	
learning outcomes, teaching and students'	3. Ra pr	ofession ofession	areness on the al development c Form of	importance of profession of teachers.	Asse Methods of monitoring	ssment Gra Po	ading pints
learning outcomes, teaching and	3. Ra pr	ofession ofession Share of	areness on the al development c Form of	importance of profest of teachers. Activities of learning and	Asse Methods of monitoring and	ssment Gra	ading
learning outcomes, teaching and students'	3. Ra pr	ofession ofession Share of	areness on the al development c Form of	Activities of learning and teaching	Asse Methods of monitoring	ssment Gra Po	ading pints
learning outcomes, teaching and students'	3. Ra pr	ofession ofession Share of	areness on the al development c Form of	Activities of learning and teaching Work with a	Asse Methods of monitoring and	ssment Gra Po	ading pints
learning outcomes, teaching and students'	3. Ra pr	ofession ofession Share of	areness on the al development c Form of	Activities of learning and teaching Work with a mentor in school,	Asse Methods of monitoring and	ssment Gra Po	ading pints
learning outcomes, teaching and students'	3. Ra pr	ofession ofession Share of	areness on the al development c Form of	Activities of learning and teaching Work with a mentor in school, analysis of duties	Asse Methods of monitoring and	ssment Gra Po	ading pints
learning outcomes, teaching and students'	3. Ra pr	ofession ofession Share of	areness on the al development c Form of	Activities of learning and teaching Work with a mentor in school, analysis of duties and	Asse Methods of monitoring and	ssment Gra Po	ading pints
learning outcomes, teaching and students'	3. Ra pr	ofession ofession Share of	areness on the al development c Form of	Activities of learning and teaching Work with a mentor in school, analysis of duties and responsibilities of	Asse Methods of monitoring and	ssment Gra Po	ading pints
learning outcomes, teaching and students'	3. Ra pr	ofession ofession Share of	areness on the al development of Form of teaching	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 pints
learning outcomes, teaching and students'	3. Ra pr	ofession ofession 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	Asse Methods of monitoring and evaluation Work diary,	ssment Gra Po	ading pints
learning outcomes, teaching and students'	3. Ra pr	Share of ECTS	areness on the al development 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	ssment Gra Po	ading pints
learning outcomes, teaching and students'	3. Ra pr	Share of ECTS	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. Creation of a	Asse Methods of monitoring and evaluation Work diary, teaching	ssment Gra Po	ading pints
learning outcomes, teaching and students'	3. Ra pr	Share of ECTS	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. Creation of a teaching portfolio	Asse Methods of monitoring and evaluation Work diary, teaching	ssment Gra Po	ading pints
learning outcomes, teaching and students'	3. Ra pr	Share of ECTS	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. Creation of a teaching portfolio (reflection forms	Asse Methods of monitoring and evaluation Work diary, teaching	ssment Gra Po	ading pints
learning outcomes, teaching and students'	3. Ra pr	Share of ECTS	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. Creation of a teaching portfolio (reflection forms and professional	Asse Methods of monitoring and evaluation Work diary, teaching	ssment Gra Po	ading pints
learning outcomes, teaching and students'	3. Ra pr	Share of ECTS	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. Creation of a teaching portfolio (reflection forms and professional development	Asse Methods of monitoring and evaluation Work diary, teaching	ssment Gra Po	ading pints
learning outcomes, teaching and students'	3. Ra pr	Share of ECTS	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. Creation of a teaching portfolio (reflection forms and professional	Asse Methods of monitoring and evaluation Work diary, teaching	ssment Gra Po	ading pints
learning outcomes, teaching and students'	3. Ra pr	Share of ECTS	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. Creation of a teaching portfolio (reflection forms and professional development	Asse Methods of monitoring and evaluation Work diary, teaching	ssment Gra Po	ading pints

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		ssional papers dealing with Bio	iogy.			
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		s students and school mentors and guality, in order to improve	-			

Code					School Teaching Practice 3						
	BP9110										
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education										
programme	Graduate oniversity study mogramme in blology and chemistry reacher Education										
	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	: I:+ + - ·	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				
		-		he professional school							
		•		sment of students' ov	• •		d areas				
	for	improve	ement of their wo	ork in direct educationa	l environment.						
Link between					Asses	sment					
learning					7.0500						
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	-

Course title	Fundame	ntals of	Physical Ch	emistry 1							
Code	K058										
Study	Graduate l	Graduate University Study Programme in Biology and Chemistry Teacher Education									
programme											
Semester	l semester										
Workload/ECTS											
credits	5										
Course status	Obligatory	hligatory									
Course teacher		E Dr. Mai	a Dutour Sik	irić							
Associate	ASSUC. FIU	. DI . Iviaj									
teachers	General Ch	emistry									
Course entry											
requirements											
(Preceding											
courses)											
Course objective			-	rinciples of thermody	-		-				
				plex problems by li							
	· ·		•	ng scientific literature	; to train students t	to apply (concepts				
	of thermoo										
Learning	1. Al	oility to c	ritically evalu	uate the applicability	of state equations	of real a	and ideal				
outcomes	ga	ises in in	dustrial cond	itions and in the envi	ronment.						
	2. Al	oility to	determine tl	he relations betweer	n basic thermodyr	namic qu	antities:				
	he	eat, oper	ation, heat	capacity, internal en	ergy, enthalpy, er	tropy ar	nd Gibbs				
		nergy.	-		••••						
			nalyse physic	cal and chemical react	tions by using ther	nochemi	ical laws.				
		-		e diagrams of pure su							
		-		icability of chemical		-					
		-	nmental pro		equilibrium conce		noiogicai				
			•		rachamical proces	scoc in h	iological				
		-		arison between elect			lological				
			d chemical p								
			etermine the	e connection betweer	n quantum theory	and the s	structure				
	01	atoms.									
Link between											
learning	Learning	Share	Share Activities of Assessment								
outcomes,		Learning Form of Form									
teaching and		of		Activities of learning and	Asses: Methods of		ding				
a hundra i a ta l	outcome	of ECTS	Form of teaching			Gra	ding ints				
students'	outcome			learning and	Methods of monitoring	Gra Po	-				
students' activities	outcome			learning and	Methods of monitoring and evaluation	Gra	ints				
	outcome			learning and	Methods of monitoring and evaluation Records	Gra Po	ints				
		ECTS	teaching	learning and teaching	Methods of monitoring and evaluation Records related to	Gra Po min	ints max				
	1-7			learning and	Methods of monitoring and evaluation Records related to active	Gra Po	ints				
		ECTS	teaching	learning and teaching	Methods of monitoring and evaluation Records related to active participation in	Gra Po min	ints max				
		ECTS	teaching	learning and teaching Critical discussion	Methods of monitoring and evaluation Records related to active participation in lectures	Gra Po min	ints max				
		ECTS	teaching	learning and teaching Critical discussion Usage of	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of	Gra Po min	ints max				
		ECTS	Lecture	learning and teaching Critical discussion Usage of theoretical	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students'	Gra Po min	ints max 10				
		ECTS	teaching	learning and teaching Critical discussion Usage of theoretical knowledge in	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of	Gra Po min	ints max				
	1-7	ECTS 1.5	Lecture	learning and teaching Critical discussion Usage of theoretical	Methods of monitoring and evaluation Records related to active participation in lectures Monitoring of students'	Gra Po min	ints max 10				
	1-7	ECTS 1.5	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' performance	Gra Po min	ints max 10				
	1-7	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 solving of tasks	Gra Po min	ints max 10				
	1-7	ECTS 1.5 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 solving of tasks Results of	Gra Po min 5	ints max 10 10				
	1-7	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 solving of tasks	Gra Po min	ints max 10				
	1-7 1-7 1-7	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 solving of tasks Results of written exam	Gra Po min 5 5 20	ints max 10 10				
	1-7	ECTS 1.5 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 solving of tasks Results of written exam Results of oral	Gra Po min 5	ints max 10 10				
	1-7 1-7 1-7 1-7	ECTS 1.5 1.5 1	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 solving of tasks Results of written exam	Gra Po min 5 5 20 20	ints max 10 10 40 40				
	1-7 1-7 1-7	ECTS 1.5 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 solving of tasks Results of written exam Results of oral	Gra Po min 5 5 20	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	Lectures Seminars Practices						
Hours - total	45	15	0					
Course content / teaching units	 Properties of gases, changes of pure su mixtures, mixing th electrochemistry, el Quantum theory, So Each teaching unit is accomp to apply basic concepts of the environmental protection. 	ermodynamics and quantum cl the first and the second law ibstances, phase diagrams, pr hermodynamics, activity, chem lectrochemical cells, standard p chrödinger equation, atomic str hanied by seminar assignments, ermodynamics to solving proble	of thermodynamics, physical operties of solutions, simple nical equilibrium, equilibrium potentials ructure and atomic spectrum which are requiring students ems in chemistry, biology and					
Recommended reading	Press.	Elements of Physical Chemistry J. (2018) Atkins' Physical Chem						
Optional reading	Simeon V. (1980) Termodina	mika. Školska knjiga, Zagreb.						
Conditions for obtaining teacher's signature	Obligatory active participation	on in lectures and performance	of all assignments.					
Exam passing procedure		5 the written exam in order to d according to the number of p tained during the course.	-					
Main language of instruction; other languages	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	tals of F	Physical Che	emistry 2						
Code	K059	K059								
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education									
programme										
Semester	Il semester									
Workload/ECTS credits	5									
Course status	Obligatory									
Course teacher		Dr Maia	Dutour Siki	rić						
Associate	A330C. F101.	DI. Maja								
teachers	Fundament	als of Phy	sical Chemis	stry 1 (attended)						
Course entry										
requirements (Preceding courses)										
Course	To teach stu	udents ab	out the basi	cs of quantum theor	y and to develop th	eir skills	required			
objective	for applicat	ion of th	e quantum	theory to molecular	spectroscopy. To c	levelop s	students'			
	knowledge	about th	e basics of	chemical kinetics an	d its application ir	n biologio	cally and			
		, ,	ortant proce							
Learning	1. Ab	ility to de	etermine the	connection betwee	n quantum theory	and the s	structure			
outcomes		molecule								
		-		eoretical basis of mo						
		-	review phys	ical quantities that	describe the kine	etics of	chemical			
		actions.								
			redict the in	fluence of experimer	ntal conditions on o	chemical	reaction			
	rat									
		-		edge about simple o	chemical reaction	rate on	complex			
		action rat		ahavaataviatioo of a	description that a		tant far			
		-	ous catalysis	characteristics of a	adsorption that ar	e impor	tant for			
Link between		leiogene	ous catalysis).						
learning		Share		Activities of	Asses	sment				
outcomes,	Learning	of	Form of	learning and		Cur	aller a			
teaching and	outcome	ECTS	teaching	teaching	Methods of		ding			
students'		ECIS		teaching	monitoring and		ints			
activities					evaluation	min	max			
	1-6	1.5	Lecture	Critical discussion	Records related to active participation in	5	10			
					lectures					
	1-6	5	10							
	1-6	1	Written exam	Preparation for written exam	Results of written exam	20	40			
	1-6	1	Oral exam	Preparation for oral exam	Results of oral exam	20	40			
	Total	5				50	100			
	Final grade:	:								
	62.6-75 poi 75.1-87.5 p	nts: grad oints: gra	ade 2 (suffici e 3 (good) ade 4 (very g de 5 (excelle	ood)						

Consultation			
hours Teaching	Lectures	Seminars	Practices
Hours - total	Lettures	Jenninars	ractices
Hours - total	30	15	0
Course content / teaching units	 Molecular structures, B Spectroscopy: rotational magnetic resonance Substance changes: kin chemical reactions, k autocatalysis and he interactions, surface re Each teaching unit is accomp the basic concepts of quantur chemistry, biology and environ 	anied by seminar assignments n chemistry and chemical kinet nmental protection.	ion, molecular symmetry ron transitions, lasers, nuclear electrolyte solutions, order of , catalysis - homogeneous, y, dynamics of molecular s within which students apply ics into solving of problems in
Recommended reading	Press.	lements of Physical Chemistry. . (2018) Atkins' Physical Chemis	
Optional reading			
Conditions for obtaining teacher's signature	Obligatory active participatio	n in lectures and performance of	of all assignments.
Exam passing procedure		he written exam in order to pro ording to the number of points d during the course.	
Main language of instruction; other languages	Croatian language, English lar	nguage	
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	Ecosysten	าร								
Code	BP9103									
Study	Graduate L	Jniversity	/ Study Progr	amme in Biology and	Chemistry Teache	er Educat	ion			
programme										
Semester	III semester									
Workload/ECTS	5									
credits	5									
Course status	Obligatory	Deligatory								
Course teacher			ita Mihaljevi	ć						
	Prof. Dr. St	jepan Krà	ćmar							
Associate	Assist. Prof	ssist. Prof. Dr. Anita Galir Balkić								
teachers										
Course entry										
requirements										
(Preceding										
courses)	To suchly					L C				
Course objective				p an argument-bas	•		-			
				al biomes, freshwater ynthesized approach	-					
				nt information about	-					
Learning				concepts of ecologica			tribution			
outcomes	on Ear		Sut the busic			then uis	libution			
outcomes		•••••	w the role an	d importance of vario	ous ecological ecos	vstems.				
				es and differences of	-	-				
		-		paper, which is w	•		scientific			
	literati			p-p-,						
Link between										
learning		Share		Activities of	Asses	sment				
outcomes,	Learning	of	Form of	learning and	Methods of	Gra	ding			
teaching and	outcome	ECTS	teaching	teaching	monitoring		ints			
students'					and evaluation	min	max			
activities				Lecture			тал			
				attendance and	Records,					
	1-3	1.5	Lecture	active	evaluation	10	20			
				participation						
				Independent						
				search for and						
				critical revision of						
				scientific	Records and					
	1-4	1.5	Seminar	references used	assessment of	20	го			
	1-4	1.5	Seminar	in preparation of	presented	30	50			
				a seminar paper,	seminar paper					
				and presentation						
				of a seminar						
				paper						
	1.4	1	Written	Preparation for		10	15			
	1-4	1	exam	written exam	Written exam	10	15			
				Duran ii f						
	1-4	1	Oral	Preparation for	Oral exam	10	15			
			exam	oral exam						
	Total	5				60	100			
	Final grade									
	60-70 poin	ts: grade	2 (sufficient)						
	-	-	-	,						
	71-80 poin	ts: grade	-	-						

	91-100 points: grade 5 (exce	ellent)	
Consultation hours	By appointment		
Teaching	Lectures	Seminars	Practices
Hours - total	45	15	0
Course content / teaching units	on Earth; Compari biomes on Earth; Co of terrestrial biome deserts, tropical rai Freshwater ecosyst classification of f characteristics of le zone; Sediment; Eur Abiotic and biotic communities; Bent Ecology of the inter Seminars: Presentation relate Eutrophication and Human influence or	s of an ecosystem; Spatial dist son of climatic and edaphic omparison of faunal and florist (tundra, coniferous woods, of nforests and Mediterranean bio rems – classification, water as freshwater organisms; Basic entic systems; Lotic systems - I trophication; Water pollution a factors of marine ecosystem hic population of phytal syst tidal zone; Coasts; Estuaries; Tu d to biological diversity of select protection of freshwater ecosy marine ecosystems.	characteristics of terrestrial cic similarities and differences deciduous woods, grasslands, ome) is a living medium, ecological biological and ecological ongitudinal zonation; Littoral and water protection. hs; Plankton and planktonic tem; Seaweed communities; ropical communities.
Recommended reading	Diego. Chapin S.F.III., Matson P.A. ecology. Springer, New York. Nybakken J.W. (2001) Marin Cummings.	D1) Terrestrial ecosystems. Ha , Mooney H.A. (2002) Princip , e biology: An ecological appro gy - Lake and River Ecosystems	oles of terrestrial ecosystem ach. San Francisco: Benjamin
Optional reading	Levinton J.S. (2017) Marine Press.	bt in Tümpel, Bach und Weiher Biology: Function, Biodiversit dia of biomes. Gale, Cengage Le	y, Ecology. Oxford University
Conditions for obtaining teacher's signature		es, preparation and presentation	
Exam passing procedure	student, which refers to 609	rs, the teachers monitor and e % of the final grade. Achieved e with 20%, while the remaining xam.	success at the written exam
Main language of instruction; other languages	Croatian language		
Method of monitoring the quality and efficiency of teaching	Evaluation form		

Elective Courses

Course title	Atmosph	ere and	Environme	nt						
Code	K082									
Study	Graduate l	Graduate University Study Programme in Biology and Chemistry Teacher Education								
programme										
Semester	III semeste	III semester								
Workload/ECTS										
credits	2									
Course status	Elective									
Course teacher	Assist. Pro	f. Dr. Elvi	ra Kovač-An	drić						
Associate										
teachers										
Course entry										
requirements										
(Preceding										
courses)										
Course	T · · · ·			1 1.1						
objective				mosphere and the en		irroundir	igs and			
-	to teach th	iem abou	t possible p	ollution and its conse	quences.					
Learning	1. In	tegrated	knowledge	about concepts of	development and	propertie	es of the			
outcomes		mospher	-	·	·					
	2. Al	bility to a	ssess the im	portance of micro-co	nstituents present i	n the air	and their			
	in	terdeper	idence.							
	3. Al	bility to	predict the	mechanisms that af	fect the level of n	nicro-cor	stituents			
	pr	esent in	the atmospl	nere.						
	4. A	bility to a	ssess the ca	uses of atmospheric	pollution and their	consequ	ences for			
	th	e enviro	nment.							
	5. Al	bility to	critically as	sess the human infl	uence on the atm	osphere	and the			
	er	nvironme	nt.							
Link between										
learning		Share		Activities of	Assess	sment				
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		шал			
				Critical	to student					
	1-5	0.5	Locturo	conversation and		15	20			
	1-5	0.5	Lecture	discussion	performance at discussions and	15	30			
					analyses					
					Monitoring of					
				Interpretation of	students'		10			
	1-5	0.5	Seminar	scientific papers	performance at	20	40			
					interpretations					
					and tasks					
	1-5	0.5	Written	Preparation for	Written exam	10	20			
	1-5	0.5	exam	written exam	WITTLEITEXam	10	20			
			Oral	Droporation for						
	1-5	0.5	Oral	Preparation for	Oral exam	5	10			
			exam	oral exam						
	Total	2				50	100			
	Final grade 60-70 poin 71-80 poin	ts: grade	2 (sufficien 3 (good)	t)						

	91-100 points: grade 5 (excel Final exam: minimum number	81-90 points: grade 4 (very good) 91-100 points: grade 5 (excellent) 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	By appointment							
Teaching	Lectures Seminars Practices								
Hours - total	15	15	0						
Course content / teaching units	 compounds; atmosp Photochemical react Air pollution; pollutio environment, health Influence of meteoro 	here onstituents, cycles: sulphur, nit heric ozone; particulate matter ions; chemistry of the stratosp on sources, types of pollutants) ological parameters on atmospl warming; acid rain; human influ	r; aerosols here and troposphere and their influence (climate, heric micro-constituents						
Recommended reading	Blackwel. Jacob D.J. (1999) Intoductti Prenston, New Jersey. Seinfeld J.H., Pandis S.N. (200 Inc., New Jersey.	 Atmospheric Science for Envi on of Atmospheric Chemisty 6) Atmospheric Chemistry and 	Prenston University Press, Phisics. John Wiley and Sons,						
Optional reading	-	r. (1986) Atmospheric Chemistr eric Chemistry and Physics of .							
Conditions for obtaining teacher's signature		inimum 5 points obtained, oral ned; minimum 10 points requir							
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	Croatian language								
Method of monitoring the quality and efficiency of teaching		se; 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	rotechn	ique and M	icroscopy								
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programme III semester Workload/ECTS 2 Course status Elective Course tacker Prof. Dr. Vera Cesar Associate Assist. Prof. Dr. J. Senka Antunović Dunić Assist. Prof. Dr. J. Jogna Milinarić Course entry requirements (Perceding) Physical Foundations of Instrumental Methods in Biology, Cell Biology, Plant Anatomy 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 valuate the quality of prepared material. 4. Ability to interpret tissues structure of available preparations by applying previously acquired knowledge about the structure of evailable methods of monitoring and evaluation interpretation of scientific research results. Link between learning outcomes, activities of outcomes of the eaching Critical conversations and discussion and discussion and discussion and discussion and microscopic examination in conversations and discussions and discussion and microscopic examination material and students'	Study	Graduate University Study Programme in Biology and Chemistry Teacher Education											
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learning outcomes, teaching and students' activities Learning outcome Share of ECTS Form of teaching Activities of learning and teaching Methods of monitoring and evaluation Grading Points 1, 3, 4, 5 1 Lecture Critical conversation and discussion Records related to active participation in conversations and discussions 12 20 2, 3 0.5 Practices Independent preparation of materials Records related to active participation in conversations and discussion 12 20 1, 1, 3, 4, 5 1 Lecture Practices Records related to students' preparation and microscopic examination of materials 12 20 1, 1, 5 0.25 Written exam Preparation for written exam Records related to students' performance at preparing and examining of materials 18 30 1, - 5 0.25 Oral exam Preparation for oral exam Oral exam 9 15		interpretation of scientific research results.											
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activitiesImage: section of the section o	learning outcomes,	Learning	Share of	Form of	Activities of learning and	Methods of	Gra	-					
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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					
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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	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					

	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							
Consultation hours	By appointment							
Teaching	Lectures Seminars		Practices					
Hours - total	30	0	15					
Course content / teaching units	methacrylate and e Usage of rotating m Immunolocalisation In situ hybridisation Light microscopy: m contrast, fluorescen Electron microscopy Practices: Preparation of cytol	ng cytochemical reactions: fresh se poxy resins icrotome and cryostat of nucleic acids icroscope with phase and differ ice microscope, confocal micros y: TEM and SEM (ESEM)	rential-interference scope , staining and microscopy					
Recommended reading	Ambriović Ristov A. (2007) Zagreb.	microscopy methods to analys Metode u molekularnoj biolog otechnique and Microscopy. O	giji. Institut Ruđer Bošković,					
Optional reading	Bowes B.G. (1996) A Colour / Maliga P., Klessig D.F., Cashn 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	awarding points according to	cher monitors and evaluates t determined criteria. The final g ected during the lectures and th	rade is determined according					
Main language of instruction; other languages	Croatian language, English la	nguage						
Method of monitoring the quality and efficiency of teaching	Survey carried out during the remarks and/or suggestions Monitoring of students' succe Carrying out a uniform University out a substantial contents of the second statement of	ess at exams.	o students to make written					

Course title	Plant Path	noanato	my						
Code	BMZ80		-						
Study	Graduate University Study Programme in Biology and Chemistry Teacher Education								
programme									
Semester	III semester								
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.		_			
		-		ant defence mechan	isms against pat	thogen at	tack and		
			velopment.						
		-		ence literacy of stud			research		
	ta	sks relate	ed to monito	ring of pathological c	hanges in plant t	issues.			
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		

	4.5	0.5	Oral	Preparation for		45	25
	1-5	0.5	exam	oral exam	Oral exam	15	25
	Total	2				60	100
	Final grade 60-70 poin 71-80 poin 81-90 poin 91-100 poi	ts: grade ts: grade ts: grade	3 (good) 4 (very go	od)			
Consultation hours	By appoint	ment					
Teaching	Le	ectures		Seminars		Practices	
Hours - total		15		0		15	
Course content / teaching units	 At an Pa Pa Practices: Pr Ar 	piotic and ad plant t athologica athologica eparation nalysis an	issues al changes o al changes o n of fresh m nd comparis	ors as causes of patho of cellular structures a of plant tissues nicroscopic samples of on of healthy and dise	nd organelles healthy and dise ased plant tissue	ased plan	
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	akultet, Os /. (2010) O rja 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	je 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		re oblige		pate in lectures actively		assignmen	its within
Exam passing procedure	which refe	rs to 40%	of the fina	r monitors and evalu l grade. Passing of wri n 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 he overa	ously impro ek of lectur	s and teachers is plan ve the quality of teacl es, an anonymous stu of the course. Studer	ning and of the s dent survey will	tudy prog be carried	ramme. I out to

Course title	Biomolec	ules in F	ood				
Code	BMZ77						
Study	Graduate L	University	/ 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	SSAS	
	•			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 ECTS	Form of teaching	learning and teaching	Methods of Grading		ading
teaching and	outcome				monitoring and	Points	
students'		Lens		teating	evaluation	min	1
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		
				Interpretation of	and discussions		
				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 81-90 poin	ts: grade ts: grade ts: grade	2 (sufficien 3 (good) 4 (very goo e 5 (exceller	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 	ies 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	-	dents are obliged to prepare an ints achieved at oral exam and	
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	Ecology in	Educatio	on					
Code	BBZ50							
Study	Craduatal	Iniversity		mma in Dialogy and C	homistry Tooohs		ion	
programme	Graduate C	Inversity	Study Progra	mme in Biology and C	nemistry reache	er Educat	lon	
Semester	III semeste	r						
Workload/ECTS credits	2							
Course status	Elective							
Course teacher	Assist. Prof	. Dr. Irena	Labak					
Associate								
teachers								
Course entry requirements (Preceding courses)								
Course objective	To enable	students	to independ	ently and effectively	manage the edu	ucational	process	
				ment issues.				
Learning			-	erish the natural and c	-			
outcomes		-		inctioning of eco-scho	ois for the purp	ose of n	nanaging	
		ich a schoo nility to re	-	ays of integrating env	ironmental edu	ration in	to direct	
		lucational		iys of integrating env				
				ects and opportunitie	s to improve th	e knowle	edge and	
		•	•	mental education.	o top. o to ti			
Link between								
learning					Asse	ssment		
outcomes,	Learning	Share	Form of	Activities of	Methods of	Gra	ding	
teaching and	outcome	of	teaching	learning and teaching			oints	
students'		ECTS		teaching	and			
activities					evaluation	min	max	
activities	1-4	0.5	Lecture	Critical conversation and discussion Flipped classroom: analysis of relevant curricula; collaborative learning and a debate within analysis of different types of information sources	Records related to active participation in discussions, analysis and in collaborative learning; portfolio	10	20	
						1		
	1-5	1	Practices	Visit to an eco- school, workshop	Analysis of a proposal referring to active engagement in a workshop; portfolio	25	40	
	1-5	1 0.5	Practices Written exam		proposal referring to active engagement in a workshop;	25 25	40	
			Written	school, workshop Preparation of a	proposal referring to active engagement in a workshop; portfolio Simulation of a			

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	15015• 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 curriculu• 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						
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. <i>,</i> 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 schop 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.

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 indication of the i	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	g Life: The Nature of Host-Paras	site 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	_	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 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	Genome I	Evolutio	n							
Code	BMZ79									
Study	Craduata	Iniversity	Ctudy Drogs	amma in Dialagu ana	Chamistry Taasha	r Educat	ion			
programme	Graduate C	Jiiversity	7 Study Progr	amme in Biology and	i chemistry reache					
Semester	III semeste	III semester								
Workload/ECTS	2	2								
credits										
Course status	Elective	Elective								
Course teacher	Assist. Pro	Assist. Prof. Dr. Zorana Katanić								
Associate										
teachers										
Course entry										
requirements	Genetics, N	Aoleculai	r Biology, Evo	olution						
(Preceding										
courses)	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				pasics of genome or		-	different			
outcomes		ganisms.	-	basics of genome of	samsation and run		unterent			
		-		tion and significance	of different mecha	nisms of	genome			
		olution.		0			0			
	3. Sk	ills in ap	plying resea	rch methods related	to the size, organ	isation, f	unction,			
		-	ion of the ge							
	4. Al	oility 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			
teaching and	outcome	ECTS	teating	teaching	monitoring	Po	ints			
		LCIO		teaching .	monitoring	10				
students'		2015			and evaluation	min	max			
students' activities					and evaluation Records related					
				Critical	and evaluation Records related to active	min	max			
	1-4	0.5	Lecture	Critical conversation and	and evaluation Records related to active participation in					
	1-4		Lecture	Critical	and evaluation Records related to active participation in conversations	min	max			
	1-4		Lecture	Critical conversation and discussion	and evaluation Records related to active participation in conversations and discussions	min	max			
	1-4		Lecture	Critical conversation and discussion Critical	and evaluation Records related to active participation in conversations and discussions Monitoring of	min	max			
	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			
	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			
	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			
		0.5	Lecture Seminar	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			
		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			
		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			
		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			
	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			
		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			
	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			
	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			
	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			
	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			
	1-4 1-4 Total Final grade	0.5 1 0.5 2 :: 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			
	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			
	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	By appointment							
hours Teaching	Lectures	Seminars	Practices					
Hours - total								
Hours - total	15	15	0					
Course content /	Lectures:							
teaching units	 Size and organisatio 	n of genomes in different orga	nisms					
	Genetic control of control o	ell size						
	 Mechanisms of gene 	ome evolution						
	 Evolution of gene st 	ructure and gene expression						
	Basic differences of							
	Evolution of plastid	DNA						
	 B-chromosomes 							
	Sex chromosomes							
		nificance of chromatin reductio	n and chromosome					
	elimination							
		gating the size, structure, funct	ion and evolution of the					
	genome							
	Seminars:							
	 Working on assignments: review of literature and selection of a seminar paper topic; presentation of a seminar paper 							
Decementaria			anistura Madisinalia nablada					
Recommended		(2010) Stanica: Molekularni	pristup. Medicinska naklada,					
reading	Zagreb Scientific papers referring to	the subject area						
		ution of the Genome. Elsevier /	Academic Press					
Optional reading		Raff M., Roberts K., Watson J.D						
	· · ·	lishing, Inc., New York – Londo						
		07) Metode u molekularnoj bio						
	-	the Human Genome I. Springe						
Conditions for								
obtaining	Students are obliged to partie	cipate in lectures actively and t	o fulfil all assignments within					
teacher's	the course.							
signature								
Exam passing	-	ther monitors and evaluates	-					
procedure		o determined criteria. After th	-					
		I grade consists of points achie	eved at the oral exam and of					
	points obtained during the co	ourse.						
Main language								
of instruction;	Croatian language							
other languages								
Method of								
monitoring the		nous survey will be carried out						
quality and		about the organisation and qu						
efficiency of	students' success at exams.	opportunity to make written o	r oral remarks; monitoring of					
teaching	students success at exams.							

Course title	Fauna Div	ersity o	f Croatia				
Code	BBZ52						
Study	Craduata	lucius anaitu					
programme	Graduate C	university	Study Progr	amme in Biology and	a chemistry reache	r Educati	on
Semester	III semeste	r					
Workload/ECTS credits	3						
Course status	Elective						
Course teacher	Assist. Prof	. Dr. Alm	a Mikuška				
Associate	Accist Prof	Dr Mir	ta Sudarić Bo	najović			
teachers	A33131. FT01	. DI. IVIII		gojevic			
Course entry							
requirements							
(Preceding							
courses)							
Course			-	ible members of the		-	-
objective				ir knowledge and ski			
	· ·	-	batia and by	raising their aware	eness of Croatian fa	auna valu	ue at the
	internation						
Learning	1.			knowledge and skills	s needed for respor	isible ber	naviour in
outcomes		•		diversity in Croatia.			
	2.			e the relation betwe		Influence	e and the
		•		e fauna diversity of C		cortain /	round of
	3.	-	ls living in Cr	protocol for indepe	endent research of	certain §	groups of
	4.		•	cientific and profess	ional research of Cr	oatian fa	
	5.			calculations of biodiv			
			ls and areas			interene	5,0005.01
Link between							
learning		Share		Activities of	Asses	sment	
outcomes,	Learning	of	Form of	learning and	Mathadaaf	Gra	ding
teaching and	outcome	ECTS	teaching	teaching	Methods of		iding ints
students'		2015		teating	monitoring and evaluation	min	
activities				Critical	evaluation	min	max
				conversation and	Monitoring of		
	1-4	0.5	Locturo	discussion,	students'	15	20
	1-4	0.5	Lecture	Flipped	activity during	12	20
				classroom	lectures		
				Classicolli	Analysis of the		
					essay by		
					provision of		
				Independent	feedback on		
	1-4	0.5	Seminars	writing of an	student's	10	20
				essay	progress in the		
					learning		
					process		
					Analysis of		
					completed		
		•	1	1	tasks by		
					cusiks by		
				Calculation of	provision of		
	1-5	1	Practices	biodiversity	provision of feedback on	10	20
	1-5	1	Practices		provision of feedback on student's	10	20
	1-5	1	Practices	biodiversity	provision of feedback on student's progress in the	10	20
	1-5	1	Practices	biodiversity	provision of feedback on student's	10	20

		T					n			
	1-5	0.5	Written	Preparation for	Seminar	15	20			
			exam	written exam	Oralai	10				
	1-5 0.5 Oral			Preparation for	Oral exam	10	20			
	Total	3	exam	oral exam		60	100			
		5				00	100			
	Final grade	<u>.</u>								
	60-70 poin		2 (sufficie	nt)						
	71-80 poin									
	81-90 poin	ts: grade	4 (very go	(bc						
	91-100 poi	nts: grad	e 5 (excelle	ent)						
Consultation	By appoint	By appointment								
hours										
Teaching	Le	ctures		Seminars		Practices	5			
Hours - total		15		15		15				
		-								
Course content	Lectures									
/ teaching units			-	 course content, read 	ding list and stude	nt obligat	ions			
			iodiversity							
			•	d to explore fauna? e the composition of f	auna tha ratio of	ovaluator	and			
				imals in the world, Eu		evaluated	anu			
				ropean fauna						
				e the great diversity o	f Mediterranean f	auna				
				Croatian fauna						
		-		roatia and the nationa	al classification of	Croatian ł	nabitats			
			, 000 species							
	• •	Research	into Croati	an fauna						
	• 6	Endanger	ment and p	protection of Croatian	fauna					
	• (Overview	of individu	al groups of vertebrat	es and invertebra	tes in Croa	itia			
	Seminar:									
				y and monitoring of fa						
				iture and databases or	n fauna					
			ity indexes f fauna sim	ilority						
				oftware to calculate th	ha indaxas of diva	rcity and c	imilarity			
		-	n various h			i sity and s	iiiiiaiity			
Recommended				Primer 7. User Manua	l/ Tutoral. Primer	-E Ltd. Plvi	nouth.			
reading		-		Fauna, Priručnik za		-				
			• •	avod za zaštitu prirode	•	. ,	-			
			učnik za ist	raživanje biološke raz	nolikosti duž rijek	e Drave. S	veučilište			
	u Pečuhu,									
				a razdoblje 2013-2016						
				ault/files/uploads/dok	umenti/06_integr	irane/dok	umenti/			
Optional	niso/IZVJ_(_		oar ešić M., Holcer D., Vi	uković M Elaiča	an E Gra				
reading				ović N. (2006) Crvena k	-					
. cuung				u prirode, Zagreb.						
				nković M., Ljuština M.,	Mihoković N., Vit	as B. (200	8) Crvena			
				istarstvo kulture, Drža						
				Jukić-Peladić S., Dadić		-	-			
				Državni zavod za zašt						
		-		Treer D., Šalamon D.,						
				kinić S., Jelić K. (2013)						
	Hrvatska. N	viinistars	tvo zaštite j	prirode i okoliša i Drža	vni zavod za zaštit	u prirode,	Zagreb.			

	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	Immunoco	mpeten	ce and Trans	plantation				
Code	BMZ84	•		•				
Study	Craduata	nivorcity	Study Drogram	ma in Dialogy and Cha	mistry Topobor Educ	ation		
programme	Graduate O	niversity	Study Program	nme in Biology and Che	mistry reacher Educ	ation		
Semester	III semester							
Workload/ECTS	2							
credits								
Course status	Elective							
Course teacher	Assist. Prof.	Dr. Lidija	i Begović					
Associate								
teachers								
Course entry								
requirements	Biochemistr	Biochemistry 3, Immunology						
(Preceding courses)								
Course	To enable s	tudonts t	o understand	the concepts and impo	rtance of transplant	ation and	limmune	
objective				ation, the role and in	-			
objective				h transplantation of tis	-	tolerand	e, and to	
Learning				wledge and insights int	-	echnique	es for	
outcomes		-		petence during organ t		cennqu		
		-		ods of isolation of indiv		ns from p	eripheral	
		-		nodes, and methods of		-	-	
		bilical bl		,	0 1	•		
	3. Ab	ility to de	termine the cl	ass I HLA antigen, the j	panel of reactive ant	ibodies ii	n serum,	
	the	e cross-m	atch test, the l	HLA class II gene and H	LA phenotype and g	enotype,	and to	
	сог	nduct ger	nealogical rese	arch.				
	4. Ab	ility to an	alyse and eval	uate problems related	to tissue and organ	transplar	ntation.	
Link between					A			
learning	Loarning	Share	Form of	Activities of	Assess	ment		
outcomes,	learning	of teaching		learning and	Methods of Grading		ding	
teaching and students'	outcome		teaching	monitoring and	Points			
activities					evaluation	min	max	
activities					Records related			
				Critical	to active			
	1-4	0.5	Lecture	conversation and	to active participation in	5	10	
	1-4	0.5	Lecture		participation in conversations	5	10	
	1-4	0.5	Lecture	conversation and	participation in conversations and discussions	5	10	
	1-4	0.5	Lecture	conversation and	participation in conversations and discussions Monitoring of	5	10	
	1-4	0.5	Lecture	conversation and discussion	participation in conversations and discussions Monitoring of student	5	10	
	2-3			conversation and discussion Work on	participation in conversations and discussions Monitoring of student performance		30	
		0.5	Lecture Practices	conversation and discussion Work on experimental	participation in conversations and discussions Monitoring of student performance within	5 25		
				conversation and discussion Work on	participation in conversations and discussions Monitoring of student performance within experimental			
			Practices	conversation and discussion Work on experimental assignment	participation in conversations and discussions Monitoring of student performance within experimental assignment			
	2-3	0.5		conversation and discussion Work on experimental assignment Preparation for	participation in conversations and discussions Monitoring of student performance within experimental assignment Written	25	30	
			Practices	conversation and discussion Work on experimental assignment	participation in conversations and discussions Monitoring of student performance within experimental assignment			
	2-3	0.5	Practices Written exam	conversation and discussion Work on experimental assignment Preparation for	participation in conversations and discussions Monitoring of student performance within experimental assignment Written exam	25	30	
	2-3	0.5	Practices Written	conversation and discussion Work on experimental assignment Preparation for written exam	participation in conversations and discussions Monitoring of student performance within experimental assignment Written	25	30	
	2-3	0.5	Practices Written exam	conversation and discussion Work on experimental assignment Preparation for written exam Preparation for	participation in conversations and discussions Monitoring of student performance within experimental assignment Written exam	25	30	
	2-3 1-4 1-4	0.5 0.5 0.5 2	Practices Written exam	conversation and discussion Work on experimental assignment Preparation for written exam Preparation for	participation in conversations and discussions Monitoring of student performance within experimental assignment Written exam	25 15 15	30 30 30 30	
	2-3 1-4 1-4 Final grade: 60-70 point	0.5 0.5 0.5 2 s: grade 1	Practices Written exam Oral exam 2 (sufficient)	conversation and discussion Work on experimental assignment Preparation for written exam Preparation for	participation in conversations and discussions Monitoring of student performance within experimental assignment Written exam	25 15 15	30 30 30 30	
	2-3 1-4 1-4 Final grade: 60-70 point 71-80 point	0.5 0.5 0.5 2 s: grade	Practices Written exam Oral exam 2 (sufficient) 3 (good)	conversation and discussion Work on experimental assignment Preparation for written exam Preparation for	participation in conversations and discussions Monitoring of student performance within experimental assignment Written exam	25 15 15	30 30 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 s s: grade s	Practices Written exam Oral exam 2 (sufficient) 3 (good) 4 (very good)	conversation and discussion Work on experimental assignment Preparation for written exam Preparation for	participation in conversations and discussions Monitoring of student performance within experimental assignment Written exam	25 15 15	30 30 30 30	
	2-3 1-4 1-4 Final grade: 60-70 point 71-80 point 81-90 point 91-100 poir	0.5 0.5 0.5 2 s: grade s: grade	Practices Written exam Oral exam 2 (sufficient) 3 (good)	conversation and discussion Work on experimental assignment Preparation for written exam Preparation for	participation in conversations and discussions Monitoring of student performance within experimental assignment Written exam	25 15 15	30 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 s: grade	Practices Written exam Oral exam 2 (sufficient) 3 (good) 4 (very good)	conversation and discussion Work on experimental assignment Preparation for written exam Preparation for	participation in conversations and discussions Monitoring of student performance within experimental assignment Written exam	25 15 15	30 30 30 30	

Teaching	Lectures	Seminars	Practices					
Hours - total	15	0	15					
Course content / teaching units	Lectures: Transplantation of cell 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 tissu Transplant reaction, re- recipient, criteria of re- liver, heart, pancreas), Chimerism: application Practices: Isolation of individual Methods of storing ce Determination of a pa Cross-match test (CM)	 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 vractices: 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 f r L.D. (2000) The HLA facts book	M., Višnjić D. (2004) Imunologija. K. Academic Press, London.					
reading	35, 107-119. Janeway C.A., Travers P., Wal system in health and disease. G	Janeway C.A., Travers P., Walport M., Shlomchik M.J. (2001) Immunobiology 5, The Immune system in health and disease. Garland Publishing, New York. Starzl T.E. (2004) Chimerism and tolerance in transplantation. 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	ed criteria. After lectures and p Points achieved at written and o	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-ba	sed Tea	ching of Biolo	gy			
Code	BBZ49						
Study	Graduate U	niversity	Study Program	me in Biology and Che	mistry Teacher Edu	cation	
programme							
Semester	III semester						
Workload/ECTS credits	2						
Course status	Elective						
Course teacher	Assist. Prof.	Dr. Irena	ı 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	g in their
objective			-	se scientific methodol			-
Learning outcomes	me 2. Abi 3. De ach 4. Ski me 5. Abi	thod. ility to ad veloped s nievemen Ils to man thodolog	ljust the inquiry skills for assess its by applying nage self-regula sy. view scientific	tural science concepts y-based learning meth ment of the inquiry-ba evaluation approaches ated professional deve and professional liter	od to pupils' age. ased learning proces s. lopment by applying	s and g scientifi	с
Link between learning	Learning	Share	Form of	Activities of learning and teaching	Assessment		
outcomes, teaching and students'	outcome	of ECTS	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

				Planning of	Professional					
	1-5	0.25	Written	professional	development	10	20			
		0.25	exam	development	plan	10	20			
	Total	2		uevelopment	plan	60	100			
	Final grade					00	100			
			2 (sufficient)							
	71-80 point									
			(very good)							
Consultation			5 (excellent)							
Consultation	By appointr	nent								
hours		ectures		Seminars		Practices				
Teaching		ectures		Seminars		Practices				
Hours - total		15		0		15				
Course content	• Na	tural scie	nce literacy, sc	ientific approach and	biological literacy - o	changing	the			
/ teaching units			-	eaching of the science		00				
		-	-	periential learning, in	-	of biolog	pical			
			-	evelopment of natura		,	5			
				ce (analysis, interpreta		vnlanatio	n			
			•	drawing based on ob		•	-			
	-	-		istemological knowle		urementy	, causai			
				_	-	oc and ctr	tictical			
	 Research questions - characteristics, conditions, variables, hypotheses and statistical mothods 									
	methods									
	 5E learning model for the development of natural science literacy Degrees of students' independence in learning by using the method of scientific 									
	 Degrees of students' independence in learning by using the method of scientific research 									
				way ting basad laagusta	_					
				nquiry-based learning			•.			
				hary topics for the dev		science	iteracy			
			-	arning of a scientific l			·· ··· ·			
			-	, technology and soci	al progress, one's ov	/n respon	sibility for			
			s of society							
			ethods in educ							
				netacognitive skills ar	nd self-regulated lea	rning				
		•		g and teaching						
	-		nce of lifelong	-						
Recommended				2007) Metode istraživ	anja u obrazovanju.	Naklada	Slap.			
reading		-		DUCA, Zagreb.		×				
		-		goškog istraživanja. Za	-		-			
				(2012) Orchestrating	· · · · · · · · · · · · · · · · · · ·	-	_			
Optional				es N.J., Notari M.,			tury Skills			
reading		-		d Learning From Theo		-	vi v .			
				vremenom odgojno-c			-			
				venog obrazovanja:		bektiva.	Akademija			
0 1111	oagojno-ob	razovnih	znanosti Hrvat	ske, Zagreb, 258-275	pp.					
Conditions for	Chu L			the large state of the						
obtaining		e obliged	to participate	in lectures actively	and to fulfil all assig	gnments	within the			
teacher's	course.									
signature						<u> </u>				
Exam passing	-			nitors and evaluates		-	-			
procedure				teria. The teacher thu						
				g progress and to cre						
				development. At the						
		-		ment plan. The final	-	d accord	ing to the			
	number of	points gai	ned during the	course and at the wr	itten exam.					

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 V	Vork in T	eaching Ch	emistry			
Code	K075			,			
Study	Cura dura tra 1 la		tu du Dua avan	n n in Diala an a	a d. Chanaistan . Ta a sha a	E du and	
programme	Graduate Or	liversity S	tudy Prograf	nme in Biology a	nd Chemistry Teacher	Educati	on
Semester	III semester						
Workload/ECTS	2						
credits	2						
Course status	Elective						
Course teacher	Assoc. Prof.	Dr. Valent	tina Pavić				
Associate							
teachers							
Course entry							
requirements							
(Preceding							
courses)							
Course objective	To develop s	students' s	kills require	d to apply the me	thod of inquiry-based	learning	g in their
-	-				ic methodology into i	_	-
	-			-	and teamwork skills.	-	
Learning					ncepts by using scient	ific	
outcomes		thodology	-		. , .		
	2. Abi	lity to adj	ust the inqui	ry-based learning	g method to pupils' ag	e.	
	3. Abi	lity to sea	rch for infor	mation about Eu	opean projects and in	iternatio	onal
	coc	peration	opportunitie	s.			
	4. Skil	ls in mana	aging team g	roups for the pur	pose of project realisation	ation.	
Link between							
learning		Share		Activities of	Assessm	ent	
outcomes,	Learning		Form of		Mothods of	Gra	ding
outcomes, teaching and	outcome	of	Form of teaching	learning and	Methods of		ding
	-				monitoring and	Po	ints
teaching and	-	of		learning and			
teaching and students'	-	of		learning and	monitoring and evaluation	Po	ints
teaching and students'	-	of		learning and	monitoring and evaluation Records related to	Po	ints
teaching and students'	-	of		learning and	monitoring and evaluation Records related to active and	Po	ints
teaching and students'	-	of		learning and	monitoring and evaluation Records related to active and independent	Po	ints
teaching and students'	-	of		learning and	monitoring and evaluation Records related to active and independent participation in	Po	ints
teaching and students'	-	of		learning and teaching Critical conversation	monitoring and evaluation Records related to active and independent participation in conversations and	Po	ints
teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical	monitoring and evaluation Records related to active and independent participation in conversations and discussions;	Po min	ints max
teaching and students'	-	of		learning and teaching Critical conversation	monitoring and evaluation Records related to active and independent participation in conversations and discussions; monitoring of	Po	ints
teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and	monitoring and evaluation Records related to active and independent participation in conversations and discussions; monitoring of student	Po min	ints max
teaching and students'	outcome	of ECTS	teaching	Critical conversation and discussion;	monitoring and evaluation Records related to active and independent participation in conversations and discussions; monitoring of student performance at	Po min	ints max
teaching and students'	outcome	of ECTS	teaching	Critical conversation and discussion; inquiry-based	monitoring and evaluation Records related to active and independent participation in conversations and discussions; monitoring of student performance at inquiry-based	Po min	ints max
teaching and students'	outcome	of ECTS	teaching	Critical conversation and discussion; inquiry-based	monitoring and evaluation Records related to active and independent participation in conversations and discussions; monitoring of student performance at inquiry-based learning with	Po min	ints max
teaching and students'	outcome	of ECTS	teaching	Critical conversation and discussion; inquiry-based	monitoring and evaluation Records related to active and independent participation in conversations and discussions; monitoring of student performance at inquiry-based learning with provision of	Po min	ints max
teaching and students'	outcome	of ECTS	teaching	Critical conversation and discussion; inquiry-based	monitoring and evaluation Records related to active and independent participation in conversations and discussions; monitoring of student performance at inquiry-based learning with	Po min	ints max
teaching and students'	outcome	of ECTS	teaching	Critical conversation and discussion; inquiry-based	monitoring and evaluation Records related to active and independent participation in conversations and discussions; monitoring of student performance at inquiry-based learning with provision of	Po min	ints max
teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion; inquiry-based learning	monitoring and evaluation Records related to active and independent participation in conversations and discussions; monitoring of student performance at inquiry-based learning with provision of feedback	Po min	ints max
teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion; inquiry-based learning	monitoring and evaluation Records related to active and independent participation in conversations and discussions; monitoring of student performance at inquiry-based learning with provision of feedback	Po min	ints max
teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion; inquiry-based learning	monitoring and evaluation Records related to active and independent participation in conversations and discussions; monitoring of student performance at inquiry-based learning with provision of feedback Analysis of simulation with	Po min	ints max
teaching and students'	outcome	of ECTS 0.25	Lecture	learning and teaching Critical conversation and discussion; inquiry-based learning Independent simulation of inquiry-based	monitoring and evaluation Records related to active and independent participation in conversations and discussions; monitoring of student performance at inquiry-based learning with provision of feedback Analysis of simulation with provision of	20	ints max 30
teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion; inquiry-based learning	monitoring and evaluationRecords related to active and independent participation in conversations and discussions; monitoring of student performance at inquiry-based learning with provision of feedbackAnalysis of simulation with provision of feedback;	Po min	ints max
teaching and students'	outcome	of ECTS 0.25	Lecture	learning and teaching Critical conversation and discussion; inquiry-based learning Independent simulation of inquiry-based	monitoring and evaluationRecords related to active and independent participation in conversations and discussions; monitoring of student performance at inquiry-based learning with provision of feedbackAnalysis of simulation with provision of feedback; Records related to	20	ints max 30
teaching and students'	outcome	of ECTS 0.25	Lecture	learning and teaching Critical conversation and discussion; inquiry-based learning	monitoring and evaluationRecords related to active and independent participation in conversations and discussions; monitoring of student performance at inquiry-based learning with provision of feedbackAnalysis of simulation with provision of feedback;	20	ints max 30
teaching and students'	outcome	of ECTS 0.25	Lecture	learning and teaching Critical conversation and discussion; inquiry-based learning	monitoring and evaluationRecords related to active and independent participation in conversations and discussions; monitoring of student performance at inquiry-based learning with provision of feedbackAnalysis of simulation with provision of feedback; Records related to	20	ints max 30

		0.25	Written exam	Planning of professional	Professional development plan	10	20	
			CXann	development				
	Total	2				60	100	
	Final grade: 60-70 points 71-80 points 81-90 points 91-100 points	s: grade 3 s: grade 4 ts: grade	(good) (very good)				
Consultation hours	By appointm	ient						
Teaching	Lec	tures		Seminars	P	ractices		
Hours - total	15 0 45							
Course content / teaching units	 Nat Cur liter Res Scie The Sim 	 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 The importance of lifelong learning 						
Recommended reading	Klipert H. (20 Mužić V. (20 Sarajevo. Sikirica M. (2 Sikirica M. (2	201) Kako 201) Meto 2003) Meto 2011) Zbir	učiti u timu odologija po odika nasta ka kemijskil	i. EDUCA, Zagreb. edagoškog istraži ive kemije. Školsk n 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) Metoc ao sredstvo	o i cilj prirodozna	nom odgojno-obraz anstvenog obrazovar sti Hrvatske, Zagreb,	ija: psiho	ologijska	
Conditions for obtaining teacher's signature	Students are the course.	e obliged t	o participat	e in lectures activ	ely and to fulfil all as	signment	ts within	
Exam passing procedure	awarding po feedback, w their learnin are required	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 t	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 (g his/her evaluate	

Course title	Chemistry	/ in Ever	yday Life					
Code	K083							
Study	<u> </u>			·				
programme	Graduate (Jniversity	/ Study Prog	gramme in Biology and	I Chemistry Teac	ner Educati	on	
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	ace in the pility to a ocesses. pility to a	eir environn assess positi nalyse the r	•	ict of humans or ature.	nature an		
Link between learning						essment		
outcomes,	Learning	Share	Form of	Activities of				
teaching and	outcome	of	teaching	learning and	Methods of		ading	
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 an	d Interf	acial Chem	istry				
Code	K054			•				
Study	<u> </u>						•	
programme	Graduate C	Iniversity	/ Study Prog	ramme in Biology an	d Chemistry Teac	ner Educat	lion	
Semester	III semeste	r						
Workload/ECTS	2							
credits								
Course status	Elective							
Course teacher	Assoc. Prof	Assoc. Prof. Dr. Berislav Marković						
Associate								
teachers								
Course entry								
requirements	Passed exa	ms withi	n the course	s Fundamentals of P	hysical Chemistry	1 and 2		
(Preceding								
courses)	T				-+:	- 11 - 1 - 1 - 1		
Course				ties and wide applic	ation of various c	olioidal sys	stems and	
objective			surface reac					
Learning outcomes		•		ification of colloidal s e of colloidal system	•	annlicatio	20	
outcomes				ific properties of diff				
		plication		the properties of un	lerent conoluar sy	stems in u	merent	
		•		ole of surface thermo	dynamics: surfac	e tension	surface	
			sorption on		Juynamics. Sunac	e tension,	Sunace	
			-	priate methods for d	letermination of a	biollo		
		aracteris				Conora		
				and written present	ation of scientific	work.		
Link between								
learning					Asse	essment		
-	Learning Share		Form of	Activities of	Methods of Grading			
outcomes,	Learning		Form of		Methods of	Gra	ding	
outcomes, teaching and	Learning outcome	of	Form of teaching	learning and	Methods of monitoring		ding nts	
	U				Methods of monitoring and	Poi	nts	
teaching and	U	of		learning and	monitoring		-	
teaching and students'	U	of		learning and	monitoring and	Poi	nts	
teaching and students'	U	of		learning and teaching	monitoring and	Poi	nts	
teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical	monitoring and evaluation	Poi min	nts max	
teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and	monitoring and evaluation	Poi min	nts max	
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 analysis and interpretation of	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	monitoring and evaluation Records	Poi min 7	nts max 10	
teaching and students'	outcome	of ECTS	teaching	learning and teaching Critical conversation and discussion Independent analysis and interpretation of scientific papers by applying	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 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	of ECTS 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	Poi min 7	nts max 10	
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	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 written exam	monitoring and evaluation Records Presentation	Poi min 7 10	nts max 10 20	
teaching and students'	outcome 1-6 1-6	of ECTS 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	Poi min 7 10	nts max 10 20	
teaching and students'	outcome 1-6 1-6 1-6 1-6	of ECTS 0.5 0.5 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 written 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 T-6 Total	of ECTS 0.5 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	nts max 10 20 30	
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 Final grade 60-70 point	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 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 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	
teaching and students'	outcome 1-6 1-6 1-6 1-6 Final grade 60-70 point 71-80 point 81-90 point	of ECTS 0.5 0.5 0.5 0.5 0.5 0.5 2 :: ts: grade 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	

	Final exam: achieved minimu	m number of points refers to th	ne lowest grade (sufficient)				
		nts refers to the highest grade					
Consultation hours	One hour a week during a sen	nester, according to schedule a	nnounced in advance.				
Teaching	Lectures	Seminars	Practices				
Hours - total	15	15	0				
Course content / teaching units Recommended reading	 technological and bid Thermodynamics of contact angle and su Sedimentation and v Particles and their chmethods Adsorption at interfa Surface charge: deveeelectrokinetics and z Association colloids: Interaction of colloid colloidal stability Modern methods for Colloid chemistry too 	 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 					
Optional reading	York. Hunter R.J. (1994) Introductio Oxford. Hiemenz P.C., Rajagopalan R. Marcel Dekker, New York.	n to Modern Colloid Science, 2n (1997) Principles of Colloid ar	nd ed. Oxford University Press, nd Surface Chemistry, 3rd ed.				
Conditions for obtaining teacher's signature	Students are obliged to partic the course (practices, seminal	·	o fulfil all assignments within				
Exam passing procedure	semester. Final exam is taken	ated within one preliminary of oral exam	exam taken in the middle of				
Main language of instruction; other languages	Croatian language, English lar						
Method of monitoring the quality and efficiency of teaching	Continuous communication survey.	between teacher and studen	ts and anonymous student				

Course title	Medicinal	Plants					
Code	BBZ51						
Study	Cura dura ta 11				l Chanaista Taasha		
programme	Graduate U	niversity	Study Progr	amme in Biology and	Chemistry Teache	r Educat	ion
Semester	III semester						
Workload/ECTS	-						
credits	3						
Course status	Elective						
Course teacher	Assoc. Prof.	Dr. Ljilja	na Krstin				
Associate							
teachers	Assist. Prof.	Dr. Zora	na Katanic				
Course entry							
requirements							
(Preceding							
courses)							
Course objective	To teach stu	udents a	bout the mo	ost important medic	inal plants and the	e ways o	f making
	and using m	edicinal	preparation	S.			
Learning	-			phological and anato	mical characteristi	cs and	
outcomes	phy	ytochemi	cal properti	es of some medicina	l plants.		
	2. Abi	ility to se	lect and use	e professional and sci	entific literature in	the	
	det	terminati	on of medic	inal plants.			
	3. Abi	ility to se	lect approp	riate method for coll	ecting and storing	of medic	inal
	pla	nts.					
	4. Abi	ility to de	etermine ph	ytochemical content	of medicinal plants	s and its	effect
	on	human h	ealth.				
	5. Abi	ility to us	e scientific l	iterature for critical	evaluation of using	medicin	al
	pla	nts.					
Link between					Asses	sment	
learning	Learning	Share	of Form of teaching	Activities of learning and	Assessment		
outcomes,	outcome				Methods of	Gra	ding
teaching and students'		ECTS		teaching	monitoring and	Po	ints
activities					evaluation	min	max
activities					Records related		
				Critical	to active		
	1-5	0.5	Lecture	conversation and	participation in	10	20
				discussion	conversations		
				-	and discussions		
				Interpretation of	Monitoring of		
				scientific papers	student's		
				and application	interpretations		
	1-5	1	Seminar	of obtained	and	20	30
				results in	performance at		
				concepts learned	tasks		
				within lectures			
	1.2	0.5	Practice	Work on	Monitoring of	10	20
	1-3	0.5	S	experimental	student	10	20
				task	performance		
		0.5	Written	Preparation for	Written exam	10	15
	1-5		01/0 00	written exam		10	
	1-5	0.0	exam	Whiteen exam			
			Oral	Preparation for	Oral oyam	10	15
	1-5 1-5	0.5			Oral exam	10	15
			Oral	Preparation for	Oral exam	10 60	15 100
	1-5	0.5 3	Oral	Preparation for	Oral exam		
	1-5 Total	0.5 3	Oral exam	Preparation for oral exam	Oral exam		

	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 contes Seminars: Each teaching unit professional literatu 	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 plant	ir modes of action appropriate scientific and ill 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 , Zagreb.
Optional reading	Frances Lincoln in association Wyk B.E., Wink M. (2017) Me	rving J. (2017) Gardener s Cor with RBG Kew edicinal Plants of the World - A s and Their Uses. Revised Editions	An Illustrated Scientific Guide
Conditions for obtaining teacher's signature	Students are obliged to partic the course.	ipate in lectures actively and t	o fulfil all assignments within
Exam passing procedure	awarding points according to exam after they have atten	her monitors and evaluates to b determined criteria. Studen ded lectures, practices and s ded to the points obtained up t e converted to final grade.	ts can take written and oral eminars. Points achieved at
Main language of instruction; other languages	Croatian language		
Method of monitoring the quality and efficiency of teaching	of delivered lectures within a	y to express their opinion abou n anonymous survey, and to ma itoring of students' success at	ake oral or written comments

Code K	(026			 Technology and 			
Study							
			<u>.</u>				
programme	braduate C	Iniversity	/ Study Progr	amme in Biology and	Chemistry Teac	ner Edu	cation
	II semeste	r					
Workload/FCTS							
credits 2	-						
	lective						
		Dr Beri	islav Markovi	ć			
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	o 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							
			ber 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							
Course content / teaching units	 Materials in modern technology: basic concepts and methods of modern materials science and engineering Determination and role of mechanical, electrical, magnetic, and optical properties of materials Correlation between materials and environment in manufacturing, processing, recycling and waste disposal Usage of primary and secondary raw materials and their impact on environment Renewable resources of raw materials on Earth Modern materials that will transform the life in the 21st century: new polymers, photonic materials, materials for information storage, smart materials, biomaterials, biomedical materials, porous materials, hard materials, materials for clean energy, renewable materials Within the seminars, students will select a topic of their interest and present it in a written and oral form 							
Recommended	Ball P. (1999) Made to Measu	ure: New Materials for the 21st	Century. Princeton University					
reading		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	the course (practices, semin	cipate in lectures actively and ar tasks). taken after the attended lectu						
procedure	regular attendance and activ	e participation in lectures – 10 success at the final exam – 50 $\%$	%, written seminar paper and					
Main language of instruction; other languages	Croatian language, English la	nguage						
Method of monitoring the quality and efficiency of teaching	-	rse; reviews during the course es; monitoring of student succe						

Course title	Animal Be	haviour							
Code	BM969								
Study									
programme	Graduate U	Iniversity	Study Program	mme in Biology and	Chem	istry Teache	r Educat	ion	
Semester	III semester	r							
Workload/ECTS									
credits	2								
Course status	Elective	Flective							
Course teacher		ssist. 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				Juppon	•	
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 anima				5''	
			•	haviour of animals	and hi	imans			
				cience literacy by le			ically int	ernret	
		•		ehaviour, or those p		-	•	cipici	
			l literature.		Jiesen	ieu in scient	inc and		
Link between									
learning						Assess	sment		
-		Share		Activities of	Assessment				
outcomes	Looming	Jilaie	Form of	Activities of					
outcomes, teaching and	Learning	of	Form of	learning and		ethods of		ding	
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	of ECTS 0.5	Lectures	Lecture attendance and active participation Attendance of lectures,	ev F re acti I	and aluation Records elated to itudent vity during	<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	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	of ECTS 0.5	Lectures	Lecture attendance and active participation Attendance of lectures, Independent preparation of seminar paper	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	teaching 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	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	ponitoring 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	of ECTS 0.5	teaching 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 1-4	of ECTS 0.5 1 0.5	teaching 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	teaching 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 Od 60-70 p	of ECTS 0.5 1 0.5 2 : oints: gra	teaching Lectures Seminars Oral exam	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	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	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 Oral exam de 2 (sufficie de 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 Oral exam de 2 (sufficie de 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	teaching Lectures Seminars Oral exam Oral exam de 2 (sufficie de 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 Oral exam de 2 (sufficie de 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) 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	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 de 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
	 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	r ·····

	Sexuality of	f Living C	Creatures					
Code	BBZ53	0 -						
Study	Graduate Un	iversity S	tudy Prograr	nme in Biology and	Chemi	strv Teacher	Educatio	on
programme								
Semester	III semester							
Workload/ECTS	III Semester							
	3							
credits								
Course status	Elective							
Course teacher	Prof. Dr. Enri	h Merdić						
Associate								
teachers								
Course entry								
requirements								
(Preceding								
courses)								
Course	The aim of t	ho course	a is to provid	de an overview of s	ovualit	v of living c	caturos	to raise
objective			-	s, and to define sim	martue	s and untere	inces of s	Sexuality
	in plants, ani							
Learning				ortance of bisexual				
outcomes		•		vioural patterns of s			• •	
	3. Abil	ity to con	npare the dif	ferences in sexuality	y betw	een men and	d womer	1.
	4. Abil	ity to crit	ically estima	te the quality of sex	ual life	in humans.		
	5. Kno	wledge a	bout differer	nt forms of sexual be	ehavio	ur of human	s.	
Link between								
learning		Share		Activities of		Assess	sment	
outcomes,	Learning		Form of				_	
teaching and	outcome	of	teaching	learning and		ethods of		ding
students'		ECTS		teaching		onitoring	Po	ints
activities					and	evaluation	min	max
activities								
					F	Records		
				Attendance of		Records lated to		
					re			
	1-5	1	Lecture	lectures;	re	lated to active	18	30
	1-5	1	Lecture	lectures; discussions and	re part	lated to active icipation in	18	30
	1-5	1	Lecture	lectures;	re part con	lated to active icipation in versations	18	30
	1-5	1	Lecture	lectures; discussions and	re part con	lated to active icipation in	18	30
	1-5	1	Lecture	lectures; discussions and conversations	re part con	lated to active icipation in versations	18	30
				lectures; discussions and conversations Independent	re part con and	elated to active icipation in versations discussions		
	1-5	1	Lecture Seminar	lectures; discussions and conversations Independent research work	part con and Asse	elated to active icipation in versations discussions	18	30
				lectures; discussions and conversations Independent research work on a seminar	part con and Asse	elated to active icipation in versations discussions		
				lectures; discussions and conversations Independent research work	part con and Asse	elated to active icipation in versations discussions		
	1-5	1		lectures; discussions and conversations Independent research work on a seminar paper topic	part con and Asse sem	elated to active icipation in versations discussions essment of inar paper	24	40
			Seminar	lectures; discussions and conversations Independent research work on a seminar	part con and Asse sem	elated to active icipation in versations discussions		
	1-5	1	Seminar Oral	lectures; discussions and conversations Independent research work on a seminar paper topic Preparation for	part con and Asse sem	elated to active icipation in versations discussions essment of inar paper	24	40
	1-5	1	Seminar Oral	lectures; discussions and conversations Independent research work on a seminar paper topic Preparation for	part con and Asse sem	elated to active icipation in versations discussions essment of inar paper	24	40
	1-5 1-5 Total	1	Seminar Oral	lectures; discussions and conversations Independent research work on a seminar paper topic Preparation for	part con and Asse sem	elated to active icipation in versations discussions essment of inar paper	24	40
	1-5 1-5 Total Final grade:	1 1 3	Seminar Oral exam	lectures; discussions and conversations Independent research work on a seminar paper topic Preparation for	part con and Asse sem	elated to active icipation in versations discussions essment of inar paper	24	40
	1-5 1-5 Total Final grade: 60-70 points	1 1 3 : grade 2	Seminar Oral exam (sufficient)	lectures; discussions and conversations Independent research work on a seminar paper topic Preparation for	part con and Asse sem	elated to active icipation in versations discussions essment of inar paper	24	40
	1-5 1-5 Total Final grade:	1 1 3 : grade 2	Seminar Oral exam (sufficient)	lectures; discussions and conversations Independent research work on a seminar paper topic Preparation for	part con and Asse sem	elated to active icipation in versations discussions essment of inar paper	24	40
	1-5 1-5 Total Final grade: 60-70 points	1 1 3 : grade 2 : grade 3	Seminar Oral exam (sufficient) (good)	lectures; discussions and conversations Independent research work on a seminar paper topic Preparation for	part con and Asse sem	elated to active icipation in versations discussions essment of inar paper	24	40
	1-5 1-5 Total Final grade: 60-70 points 71-80 points 81-90 points	1 1 3 : grade 2 : grade 3 : grade 4	Seminar Oral exam (sufficient) (good) (very good)	lectures; discussions and conversations Independent research work on a seminar paper topic Preparation for oral exam	part con and Asse sem	elated to active icipation in versations discussions essment of inar paper	24	40
Consultation	1-5 1-5 Total Final grade: 60-70 points 71-80 points 81-90 points 91-100 point	1 3 : grade 2 : grade 3 : grade 4 :s: grade 4	Seminar Oral exam (sufficient) (good) (very good)	lectures; discussions and conversations Independent research work on a seminar paper topic Preparation for oral exam	part con and Asse sem	elated to active icipation in versations discussions essment of inar paper	24	40
Consultation	1-5 1-5 Total Final grade: 60-70 points 71-80 points 81-90 points	1 3 : grade 2 : grade 3 : grade 4 :s: grade 4	Seminar Oral exam (sufficient) (good) (very good)	lectures; discussions and conversations Independent research work on a seminar paper topic Preparation for oral exam	part con and Asse sem	elated to active icipation in versations discussions essment of inar paper	24	40
hours	1-5 1-5 Total Final grade: 60-70 points 71-80 points 81-90 points 91-100 point By appointm	1 1 3 : grade 2 : grade 3 : grade 4 :s: grade ! ent	Seminar Oral exam (sufficient) (good) (very good)	lectures; discussions and conversations Independent research work on a seminar paper topic Preparation for oral exam	part con and Asse sem	elated to active icipation in versations discussions essment of inar paper ral exam	24 18 60	40
hours Teaching	1-5 1-5 Total Final grade: 60-70 points 71-80 points 81-90 points 91-100 point By appointm	1 3 : grade 2 : grade 3 : grade 4 :s: grade 4	Seminar Oral exam (sufficient) (good) (very good)	lectures; discussions and conversations Independent research work on a seminar paper topic Preparation for oral exam	part con and Asse sem	elated to active icipation in versations discussions essment of inar paper ral exam	24	40
hours	1-5 1-5 Total Final grade: 60-70 points 71-80 points 81-90 points 91-100 point By appointm	1 1 3 : grade 2 : grade 3 : grade 4 :s: grade ! ent	Seminar Oral exam (sufficient) (good) (very good)	lectures; discussions and conversations Independent research work on a seminar paper topic Preparation for oral exam	part con and Asse sem	elated to active icipation in versations discussions essment of inar paper ral exam	24 18 60	40

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 L	niversity	Study Program	me in Biology an	d Chemistry Teac	hor Educa	tion	
programme		Thersity		The in blology an	u chemistry reac		uon	
Semester	III semester	-						
Workload/ECTS credits	2							
Course status	Elective							
Course teacher	Assoc. Prof	Dr. Beri	slav Marković					
Associate								
teachers								
Course entry requirements (Preceding courses)	Passed exa	Passed exams within the courses Fundamentals of Physical Chemistry 1 and 2						
Course	To acquain	t studen	ts with the pr	onerties of elec	tromagnetic radi	ation the	hasics of	
objective			•	•	instruments and			
objective			•	•	these methods.	Some of th	ie moderni	
Learning				•	ferent areas of t	he electr	omagnetic	
outcomes	ra	diation sp	pectrum.					
		-		avelength radia	tion to obtain d	ifferent ir	nformation	
		out mate					c	
		-		ental techniques	that are the mos	t suitable	for testing	
		•	llar material.	hotwoon surfa	ce chemistry and	ite influe	aca an tha	
			of nanomaterial		Le chemistry and	its innue	ice on the	
		•			or determinatio	n of cha	aracteristic	
		operties.	bien abbiebi					
	•	•	sary for oral and	d written presen	tation of scientific	: work.		
Link between				·				
learning		Share		Activities of	ASSE	essment		
outcomes,	Learning	of	Form of	learning and	Methods of	Gra	ding	
teaching and	outcome	ECTS	teaching	teaching	monitoring	ро	ints	
students'					and	min	max	
activities					evaluation			
	1-6	0.5	Lecture	Critical conversation and discussion	Records	7	10	
				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	V Study Prog	ramme in Biology and	Chemistry Teache	r Educati	on		
programme	Graduate (JIIVEI SIC	y Study 110g	ramme in biology and	a chemistry reache		011		
Semester	III semeste	r							
Workload/ECTS credits	3								
Course status	Elective								
Course teacher	Assist. Pro	f. Dr. Ma	rija Jozanovi	ć					
Associate									
teachers									
Course entry									
requirements (Preceding courses)	Attended o	obligator	y courses rel	ated to chemistry, ba	sics of physics				
Course	To enable s	students	to acquire b	asic knowledge of che	mical sensors and	piosenso	rs. and to		
objective				iples, and their app					
				protection. To expla					
	-	-		usage of chemical sen			. ,		
Learning				basic principles of che			ſS.		
outcomes		-		lifference between ch					
	3. Al	bility to c	letermine th	e basic characteristic	s of the sensory ele	ment.			
	4. Al	bility to c	ritically eval	uate the performance	e of chemical senso	rs and bi	osensors.		
	5. Kr	nowledge	about the	types of chemical sense	sors with respect to	the tran	sducer.		
	6. Al	bility to	assess the r	new technologies and	d approaches in th	e produc	tion and		
	ap	 Ability to assess the new technologies and approaches in the production and application of chemical sensors and biosensors in physiological processes and 							
	er	nvironme	ental protect	ion.					
	7. D	eveloped	opinion on	solutions referring to	application of sens	ors in pra	actice.		
Link between learning		Share		Activities of	Assessment				
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				Critical	Records related				
				conversation and	to active				
			Lecture						
	1-3	1	Lecture	discussion, collaborative	participation in conversations	10	20		
				learning	and discussions				
				learning					
					Monitoring of				
				Interpretation of	student				
				scientific papers,	performance at				
				case study	interpreting				
	2-7	1	Seminar	analysis.	and solving of	10	20		
				Independent	exercises.	_	_		
				preparation of	Analysis of				
				practice proposals	created lesson				
				P P .P	plans				
			Written	Preparation for	F * *				
	1-7	0.5		written exam	Written exam	15	30		
			exam						
	1-7	0.5	Oral	Preparation for	Oral exam	15	30		
		0.5	exam	oral exam			30		
	Total	3				50	100		

	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	 the sensor system. To mass converters Sensing elements: m biomimetic systems, systems, methods of of materials in the se Measuring of sensor repeatability, reversi Electrochemical sensors and thermal sensors Applications of chem protection, medicine Manufacturing and c degree integration or 	ors and biosensors, optical sen ical sensors: industrial process lesign of sensors, new material f sensors, microfluidics, micro- S, Micro-Total-Analytical-Syste	emical, optical, thermal and logical recognition, ingredients in the sensory nts immobilisation, the role tivity, precision, accuracy, sors and biosensors, mass es, environmental s and technologies: high- electromechanical systems
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	makes up to 20% of the fina preliminary exams, which car they achieve at least 50% of to	er monitors and evaluates the I grade. During the course, sto be considered as a substitute otal points. Preliminary exams o le oral exam makes up to 50% of	udents will be taking written for the written final exam if or final written exam make up
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	Vegetatio	n Mapp	ing				
Code	BMZ92						
Study				: D : I		·	
programme	Graduate C	Iniversity	Study Progra	amme in Biology and	I Chemistry Teache	r Educati	on
Semester	III semeste	r					
Workload/ECTS							
credits	2						
Course status	Elective						
Course teacher	Prof. Dr. Ja	nja Horva	atić				
Associate			5				
teachers	Aleksandra	KOCIC, PI	n.D.				
Course entry							
requirements							
(Preceding							
courses)							
Course	To enable s	tudents	to apply meth	ods for making flora	inventory, to deter	mine an	d identify
objective	habitat typ	es and to	o create, use a	and interpret flora a	nd vegetation maps	s. Studen	ts will be
	taught ho	w to us	se vegetation	n-mapping techniq	ues along differer	nt enviro	onmental
	gradients v	vithin a re	esearch proje	ct.			
Learning	1. Sk	ills in usi	ng methods f	or making flora inve	ntory.		
outcomes				ent habitat types.			
	3. At	oility to d	etermine rela	tions between inher	ent and differential	species	and plant
		mmunity					
			sing vegetation	on-mapping technic	ques along differe	nt enviro	onmental
		adients.					
	5. Sk	ills in app	olying researc	h into vegetation in	future teaching act	ivity.	
Link between learning		C 1			Assess	sment	
outcomes,	Learning	Share of	Form of	Activities of			
teaching and	outcome	ECTS	teaching	learning and teaching	Methods of		ding
students'		ECIS		teaching	monitoring and evaluation		ints
activities				Lootuno	evaluation	min	max
				Lecture attendance and	Records related		
	1-5		Locturos	attenuance and	to student	C	10
	II T-2	0.5	Lectures	activo	to student	6	-
	C-T	0.5	Lectures	active	performance	0	-
		0.5	Lectures	participation		6	
		0.5	Lectures	participation Practical classes		0	
	1-2	0.5	Lectures	participation Practical classes attendance and		0	
				participation Practical classes attendance and active	performance Records and evaluation of		
	1-5	0.5	Practices	participation Practical classes attendance and active participation,	performance Records and evaluation of performed	24	40
				participation Practical classes attendance and active participation, work on a	performance Records and evaluation of performed activities and		40
				participation Practical classes attendance and active participation, work on a research project	performance Records and evaluation of performed		40
				participation Practical classes attendance and active participation, work on a	performance Records and evaluation of performed activities and		40
				participation Practical classes attendance and active participation, work on a research project within a	performance Records and evaluation of performed activities and		40
			Practices	participation Practical classes attendance and active participation, work on a research project within a	performance Records and evaluation of performed activities and		40
			Practices Exam in	participation Practical classes attendance and active participation, work on a research project within a workshop	performance Records and evaluation of performed activities and skills		40
	1,2,3,4	0.5	Practices Exam in form of a	participation Practical classes attendance and active participation, work on a research project within a workshop Preparation for	performance Records and evaluation of performed activities and skills Assessment of	24	
	1,2,3,4	0.5	Practices Exam in form of a research	participation Practical classes attendance and active participation, work on a research project within a workshop Preparation for designing a	performance Records and evaluation of performed activities and skills Assessment of a research	24	
	1,2,3,4	0.5	Practices Exam in form of a research project	participation Practical classes attendance and active participation, work on a research project within a workshop Preparation for designing a	performance Records and evaluation of performed activities and skills Assessment of a research	24	
	1,2,3,4	0.5 1 2	Practices Exam in form of a research project	participation Practical classes attendance and active participation, work on a research project within a workshop Preparation for designing a	performance Records and evaluation of performed activities and skills Assessment of a research	24 30	50
	1,2,3,4 1,4,5 Total Final grade	0.5 1 2	Practices Exam in form of a research project	participation Practical classes attendance and active participation, work on a research project within a workshop Preparation for designing a research project	performance Records and evaluation of performed activities and skills Assessment of a research	24 30	50
	1,2,3,4 1,4,5 <u>Total</u> Final grade 60-69.9 pc	0.5 1 2 :: ints: gra	Practices Exam in form of a research project design	participation Practical classes attendance and active participation, work on a research project within a workshop Preparation for designing a research project	performance Records and evaluation of performed activities and skills Assessment of a research	24 30	50
	1,2,3,4 1,4,5 Total Final grade 60-69.9 pc 70-79.9 pc	0.5 1 2 vints: gra	Practices Exam in form of a research project design de 2 (sufficie	participation Practical classes attendance and active participation, work on a research project within a workshop Preparation for designing a research project	performance Records and evaluation of performed activities and skills Assessment of a research	24 30	50

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, maps of climazonal vegetation Searching of databases of flora, vegetation and environment Vegetation sampling Monitoring methods 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	Constants I				l Chandatan Tarahan F		
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. Mel	ita Mihaljevi	ć			
Associate							
teachers							
Course entry							
requirements	Torrostrial	Fcosyster	ms or Aquati	ic Ecosystems			
(Preceding	Terrestilar	LCOSYSIC		ie Leosystems			
courses)							
Course	To teach st	udents h	ow to assess	and protect aquatic	ecosystems, and how	to appl	У
objective	revitalisatio						
Learning	1. At	ility to c	ritically evalu	uate issues related to	aquatic ecosystems a	and find	an
outcomes			e solution.				
		-			of endangered aquat	-	stems.
		•	•	· ·	d to water revitalisati	on.	
	4. Sk	ills in sus	tainable wat	ter management.			
Link between					Accorem	ont	
learning	Learning	Share	Form of	Activities of	Assessm	ent	
outcomes,	_	of	teaching	learning and	Methods of Grading		ding
teaching and	outcome	ECTS	teaching	teaching	monitoring and	Ро	ints
students'					evaluation	min	max
activities				Lecture			
		0.05		attendance and	Records,	10	45
	1-4	0.25	Lecture	active	evaluation	10	15
				participation			
				Attendance at			
				the seminar,			
				prepared	Pocordo		
	1-4	0.25	Cominar	seminar paper	Records, evaluation of	15	20
	1-4	0.25	Seminar	containing results		15	20
				and conclusions	seminar paper		
				of the performed			
				analyses			
			Written	Preparation for	Written		
	1-4	0.5	exam	written	exam/preliminary	15	20
			Crain	preliminary exam	exam		
			Oral	Exam			
	1-4	1	exam	preparation	Oral exam	20	45
	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	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.					