UNIVERSITY OF SPLIT

FACULTY OF SCIENCE

The elaborate on the

Postgraduate University Study of Biophysics

- Short version –

Translated from Croatian by doc.dr.sc. Damir Kovačić

26 February 2018

Contents

INFORMATION ON HIGHER EDUCATION INSTITUTION

Name of the Higher Education Institution	UNIVERSITY OF SPLIT, FACULTY OF SCIENCE
Address	Ruđera Boškovića 33, 21000 Split, Hrvatska
Phone	+385 21 619 222
Fax	+385 21 619 227
E.mail	dekanat@pmfst.hr
Web	http://www.pmfst.unist.hr

INFORMATION ON STUDY PROGRAM

Name of the study program	Postgraduate University Study of Biophysics		
Provider of the study program	University of Split, Faculty of Science		
Co-Provider of the study program	-		
Study program type	Professional stufy program ☐	University Study Program ☒	
Study program level	Pregraduate ☐	Graduate ☐	Integrated ☐
	Postgraduate University Study ☒	Postgraduate specialistic ☐	Graduate specialistic ☐
Academic / Professional title obtained upon graduation	PhD in Natural Sciences		

1. Study Program

1.1. Program structure with credits

LIST OF COURSES							
Study year: 1.							
Semester: 1.							
STATUS	CODE	COURSE	HOURS IN SEMESTER				ECTS
			L	S	E	FE	
Obligatory	PMP500	**Biophysics of the cell**	24	4	0	0	10
	PMP502	**Experimental Methods of Physics in Biophysics**	26	4	30	0	10
	PMP505	**Interdisciplinary seminar**	0	21	0	0	4
	Total obligatory		50	29	30	0	24
Elective	PMP532	**Bioinformatics**	10	2	5	0	3
	PMP512	**Thermodynamics of irreversible processes**	45	0	0	0	6
	PMP515	**Molecular genetics**	24	10	12	0	5
	PMP525	**Structure and interactions in polyelectrolytes: basic theory and experimental verification**	10	5	15	0	6
	PMP530	**Planning of research and scientific writing**	10	6	4	0	6
	PMP519	**Laboratory Exercises in Molecular Biology**	0	0	30	0	6
	PMP528	**Biomechanics**	20	1	10	0	6
	PMP523	**Physics of Medical Diagnostics**	7	8	15	0	6
	PMP531	**Entrepreneurship and technology transfer**	10	10	5	0	3
	Total sum of ECTS of all chosen elective courses must be minimum 6						

LIST OF COURSES							
Study year 1.							
Semester: 2.							
STATUS	CODE	COURSE	HOURS IN SEMESTER				ECTS
			L	S	E	FE	
	PMP501	**Modeling of biomacromolecules and their complexes**	20	4	12	0	10

	PMP503	**Selected chapters at ICAST: Simulations of nano-biomolecules for biosensorics**	10	2	34	0	8
	PMP533	**Student's Research Work I**	0	2	60	0	12
	Total obligatory		30	8	106	0	30

LIST OF COURSES							
Study year: 2.							
Semester: 3.							
STATUS	CODE	COURSE	HOURS IN SEMESTER				ECTS
			L	S	E	FE	
	PMP534	**Student's Research Work II**	0	2	150	0	30
	Total obligatory		0	2	150	0	30

LIST OF COURSES							
Study year: 2.							
Semester: 4.							
STATUS	CODE	COURSE	HOURS IN SEMESTER				ECTS
			L	S	E	FE	
	PMP535	**Student's Research Work III**	0	2	130	0	26
		Submission and defence of PhD topic	0	2	30	0	4
	Total obligatory		0	4	160	0	30

LIST OF COURSES							
Study year: 3.							
Semester: 5.							
STATUS	CODE	COURSE	HOURS IN SEMESTER				ECTS
			L	S	E	FE	
	PMP536	**Student's Research Work IV**	0	2	150	0	30
	Total obligatory		0	2	150	0	30

LIST OF COURSES							
Study year: 3.							
Semester: 6.							
STATUS	CODE	COURSE	HOURS IN SEMESTER				ECTS
			L	S	E	FE	
	PMP537	**Student's Research Work V**	0	2	75	0	15
		Writing, submission and defence of the PhD thesis	0	2	75	0	15

	Total obligatory	0	4	150	0	30

1.2. Course Information

NAME OF THE COURSE	**Biophysics of the cell**					
Code	PMP500	Year of study	1			
Course teacher	Igor Weber, Iva Tolić	Credits (ECTS)	10			
Associate teachers		Type of instruction (number of hours)	L	S	E	F
			24	4		
Status of the course	Obligatory	Percentage of application of e-learning				

COURSE DESCRIPTION

Course objectives	Insight into the multidisciplinary approach to biological systems research using the example of eukaryotic cell. The emphasis is on physical principles and research methods as a complement to the predominant biochemical and genetic approaches to cell biology.
Course enrolment requirements and entry competences required for the course	Completed courses in Cell biology and General physics
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1) Apply the concept of quantitative modeling in cell biology and biophysics 2) Apply the concept of mechanochemical equilibrium to calculate forces in the cell 3) Understand transport processes in the cell 4) Describe components of the cytoskeleton and their static and dynamic properties 5) Define classes of molecular motors and their properties 6) Present research results based on scientific literature
Course content broken down in detail by weekly class schedule (syllabus)	1) Building elements of cells, models in biology (2) 2) Mechanical and chemical equilibrium (2) 3) The concept of time in cell biology (2) 4) Introduction to hydrodynamics and diffusion (2) 5) Mechanical properties of biological filaments (4) 6) Introduction to biology of the cytoskeleton (2) 7) Dynamics of the actin cytoskeleton (2) 8) Molecular motors (2) 9) Microtubule dynamics (2) 10) Biophysics of mitosis and meiosis (4)
Format of instruction	☒ lectures ☒ seminars and workshops ☐ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia ☐ laboratory ☐ work with mentor ☐ (other)
Student responsibilities		

Screening student work *(name the*	Class attendance	2	Research		Practical training	

proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Experimental work		Report		(Other)	
	Essay		Seminar essay	4	(Other)	
	Tests		Oral exam	4	(Other)	
	Written exam		Project		(Other)	

Grading and evaluating student work in class and at the final exam	Evaluation of seminars and oral exam.		
Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Rob Phillips, Jane Kondev, Julie Theriot: Physical Biology of the Cell, Garland Science 2009.		
Optional literature (at the time of submission of study programme proposal)	J. Howard, Mechanics of Motor Proteins and the Cytoskeleton, Sinauer Associates, 2001; Scientific articles from the recent literature.		
Quality assurance methods that ensure the acquisition of exit competences	Evaluation of the results according to the listed exit competences.		
Other (as the proposer wishes to add)			

NAME OF THE COURSE	**Modeling of biomacromolecules and their complexes**					
Code		Year of study				
Course teacher	Sanja Tomić and Larisa Zoranić	Credits (ECTS)	10			
Associate teachers		Type of instruction (number of hours)	L	S	E	F
			20	4	8	4
Status of the course	obliogatory	Percentage of application of e-learning				
COURSE DESCRIPTION						
Course objectives	Basic understanding of the methods used in molecular modeling and their application on the biological systems.					
Course enrolment requirements and entry competences required for the course	Basic knowledge in biology, physics, chemistry, statistics and computational science.					
Learning outcomes expected at the	On completion of this course a student should be able to:					

level of the course (4 to 10 learning outcomes)	1. recognize and articulate scientific basics of the modeling and its significance in modeling in biology and medicine 2. understand the idea of multidimensional molecular modeling. 3. define and discuss relations between the modeling of the 3D structure of molecules and their complexes with the experiments, and apply results in investigations of the nature of a disease, design of experiments and development of new active compounds. 4. recognize and define algorithms and techniques used in modeling of biological molecular systems. 5. define and discuss the basic concept of statistical physics such as ideas of statistical ensembles and apply these concepts in modeling biological systems.
Course content broken down in detail by weekly class schedule (syllabus)	<u>2 hours lecture 1 hour exercise</u> Structure of molecules and experimental methods for the 3D molecular structure determination. Familiarization with the macromolecules 3D structure database «Protein Data Bank» (PDB) as well as with the comparative modeling servers. <u>4 hours lectures</u> Methods of molecular modeling. Basics and differences between the empirical and quantum-mechanical methods. The concept of force field, parametrization of molecules. Calculation of the potential energy, molecular structural properties as well as its reactivity. Directed and accelerated molecular dynamic simulations. Coarse-grained simulation methods. <u>2 hours lecture 2 hours exercise</u> Molecular dynamics. Monte Carlo methods. The importance of solvent in molecular modeling. Ensembles: microcanonical, canonical, isothermal-isobaric. Hybrid molecular-mechanical-quantum-mechanical methods (QM/MM). <u>2 hours lectures</u> Application of statistical physics on modeling of biological systems. The idea of an ensemble. Ensemble and time average values. Mean values and fluctuations. Thermodynamic properties. <u>2 hours lecture</u> Simulations of Lennard-Jones systems. Algorithm and code for molecular dynamics, a definition of the input and output parameters. Calculation of static and dynamic properties. <u>3 hours lectures ; 3 hours exercises</u> Modeling of a peptide in biologically relevant solvents. Water, trifluoroethanol force field. Influence of the solvent on peptide properties. Examples and discussions. <u>3 hours lectures 3 hours exercises</u> Modeling of a peptide interactions with the membrane. Lipids force field. Connections with the experiments. Examples and discussions. <u>3 hours exercises</u> Visualisation program applied to the biological systems, proteins, peptides, and membranes. Programs Pymol and VMD. Different representations, option Multi Sequence Alignment, simulations movies. <u>2 hours lectures</u> Computational programs for molecular modeling. The concepts of modeling relationship between molecular structure and biological activity (Quantitative Structure-Activity Relationships-QSAR). The concepts and approaches used in defining QSAR. Principal component analysis, clustering, regression methods, neural networks and statistical tests.

<table>
<tr><td></td><td colspan="6">2 hours seminars
Using well-defined examples students will be introduced to the techniques of quantifying the relationship between the structurally depending properties with the biological activity. Interpretation of the models, predicting biological response. Desing of the medicaments.
2 hours seminars
Using well-defined examples students will be introduced to the modeling of the chemical reactions (QM/MM methods) and simulations of the long-range protein motions.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">x☐ lectures
x☐ seminars and workshops
x☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">x☐ independent assignments
x☐ multimedia
☐ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="6">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.9 (27h)</td><td>Research</td><td>3 (60h)</td><td>Practical training</td><td>3(60h)</td></tr>
<tr><td>Experimental work</td><td>3 (60h)</td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>3 (60h)</td><td>(Other)</td><td></td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td>1.1 (33h)</td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td></td><td colspan="5"></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Oral and practical exams on the ability to use programs for molecular modeling of the biomacromolecules. Evaluation of auditory exercises, homework, and seminars.</td></tr>
<tr><td rowspan="4">Required literature (available in the library and via other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td colspan="2">Availability via other media</td></tr>
<tr><td colspan="3">Kukol, Molecular modelling of Proteins, Humana Press, 2008</td><td></td><td colspan="2"></td></tr>
<tr><td colspan="3">Van Gunsteren W. F. , Weiner P. K., and Wilkinson A. J. (Eds) 'Computer Simulation of Biomolecular Systems', Spinger, London, 1997.</td><td></td><td colspan="2"></td></tr>
<tr><td colspan="3">Schwede, Peitsch M., 'Computational Structural Biology', World Scientific, Singapore, 2008.</td><td></td><td colspan="2"></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">• Bultinck P, Winter H., Langenaeker W., Tollenaere J. P., 'Computational Medicinal Chemistry for Drug Discovery', Marcel Dekker, Inc. New York-Basel, 2004.
• Leach A. R., Gillet V. J. An Introduction to Chemoinformatics, Springer, Dordrecht, 2007.
• Scientific articles</td></tr>
<tr><td>Quality assurance methods that ensure the</td><td colspan="6">Questionnaire before the course and at the end</td></tr>
</table>

acquisition of exit competences	
Other (as the proposer wishes to add)	

NAME OF THE COURSE	Experimental Methods of Physics in Biophysics					
Code	PMP502	Year of study	1st year			
Course teacher	Ante Bilušić	Credits (ECTS)	10 ECTS			
Associate teachers	Ante Bilušić, Ivica Aviani, Ivana Bočina, Damir Kovačić, Dražen Zanchi	Type of instruction (number of hours)	L	S	E	F
			26	4	30	
Status of the course	obligatory	Percentage of application of e-learning	20%			

COURSE DESCRIPTION

Course objectives	Understanding the theoretical background and the realization of selected experimental methods used in biophysics. Use of selected experimental devices in biophysics, understanding and interpretation of their experimental data.
Course enrolment requirements and entry competences required for the course	None
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	• ***to understand the theoretical background*** of the scanning and the transmission electron microscopy (SEM and TEM), the atomic force microscopy (AFM), the small angle X-ray scattering (SAXS), dynamic light scattering (DLS), cellular potentiometry and ultracentrifugation, • ***to describe the parts and principles*** of the scanning and the transmission electron microscopes (SEM and TEM), the atomic force microscope (AFM), the small sngle X-ray scattering (SAXS), dynamic light scattering (DLS), cellular potentiometry and ultracentrifuge, • ***to analyse the experimental results*** obtained by the scanning and the transmission electron microscopy (SEM and TEM), the atomic force microscopy (AFM), the small angle X-ray scattering (SAXS), dynamic light scattering (DLS), cellular potentiometry measurements, • ***to apply different biophysical models*** to experimental results obtained by the scanning and the transmission electron microscopy (SEM and TEM), the atomic force microscopy (AFM), the small angle X-ray scattering (SAXS), dynamic light scattering (DLS), cellular potentiometry.
Course content broken down in detail by weekly class schedule (syllabus)	***Lectures***: • principle of SEM, image analysis; 2 hours • principle of TEM, image analysis; 4 hours • SAXS spectra in diluted solutions and dispersions (proteins, polysaccharides...): structure factor S(q) and form factor P(q), analysis of SAXS profiles using different dana analysis software; 6 hours • separation by ultracentrifugation; 2 hours • AFM principles, analysis of 2D image; 6 hours • principles of DLS: autocorrelation function and inverse Laplace transform, standard strategies for generating distribution of diffusion times; 4 hours • principle of cellular potential measurements; 2 hours ***Laboratory***:

<table>
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imaging and analysis of biological sample on SEM; 4 hours
imaging and analysis of biological sample on TEM; 5 hours
SAXS experiments; 4 hours
ultracentrifugation experiments; 5 hours
AFM scanning of dry biological sample in tapping mode; 4 hours
DLS experiment and analysis of polydisperse samples; 4 hours
Cellular potentials experiments; 4 hours

Seminars:
The students in written and oral form will present results of measurements on the two experimental methods.

Legend:

SEM: scanning electron microscope
TEM: transmission electron microscope
SAXS: small angle X-ray scattering
DLS: dynamic light scattering

</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☒ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">☐ independent assignments
☐ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Work on experimental devices. Writing seminar. Attendance.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>2</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td>6</td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>2</td><td>(Other)</td><td></td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">The mark is defined on the oral exam. The condition for taking the oral exam is positively evaluated reports on experimental work in selected experimental techniques.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="3">Neutron, X-rays and Light. Scattering Methods Applied to Soft Condensed Matter,
Editors: Th. Zemb P. Lindner
eBook ISBN: 9780080930138,
North Holland, 2002</td><td></td><td>e-book</td></tr>
<tr><td colspan="3">Russel, W. B.; Saville, D. A. and Schowalter, W. R., Colloidal Dispersions, Cambridge University Press, 1989</td><td></td><td>e-book</td></tr>
</table>

	Bert Voigtländer, *Scanning tunneling microscopy and atomic force microscopy*, Springer 2015		e-book
	Ray F. Egerton, *Physical Principles of Electron Microscopy: An Introduction to TEM, SEM, and AEM*, Springer 2005		e-book
	David J. Aidley, *The Physiology of Excitable Cells*, Cambridge University Press, 1998		e-book
Optional literature (at the time of submission of study programme proposal)			
Quality assurance methods that ensure the acquisition of exit competences	Statistics of students' results and students' evaluation via anonymous questionnaires at the end of the course. The survey is conducted according to the rules of the University of Split and the Doctoral study.		
Other (as the proposer wishes to add)			

NAME OF THE COURSE	**Selected chapters at ICAST: Simulations of nano-biomolecules for biosensorics**					
Code	PMP503	Year of study	1			
Course teacher	Prof. dr. dr. h. c. Vlasta Bonačić- Koutecký	Credits (ECTS)	8			
Associate teachers		Type of instruction (number of hours)	L	S	E	F
			10	2	34	
Status of the course	Obligatory	Percentage of application of e-learning				
COURSE DESCRIPTION						
Course objectives	Capability of modelling nanostructures and their properties for interpretation of experimental results and stimulating new experiments					
Course enrolment requirements and entry competences required for the course	Knowledge of classical and basic quantum physics					
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. Selection of appropriate methods for simulating systems properties within nano- and biophysics 2. Independent evaluation and interpretation of results obtained from simulations 3. Comparison with the experimental results 4. Comparison of obtained results with the achievements in literature					
Course content broken down in detail by weekly	1. Fundamental theoretical methods for determination of structures and optical properties of molecules and nano-particles					

<table>
<tr><td>class schedule (syllabus)</td><td colspan="6">2. Their application for determination of optical properties of nano-biomolecule hybrid systems
3. Basic methods for molecular dynamics of ground and excited states for investigation of dynamical properties of molecules, nano-particles and their hybrid systems
4. Application of molecular dynamics for determining fluorescence of nano-bio systems for biosensing
5. Simulation of catalytic properties of metallic particles and their application for improvement of fuel cells
6. Computational methods for structural and optical properties of two-dimensional periodical systems and their application for improvement of materials properties for solar cells</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒lectures
☐seminars and workshops
☒exercises
☐on linein entirety
☐partial e-learning
☐field work</td><td colspan="3">☒independent assignments
☐multimedia
☐laboratory
☐work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">• Lecture and exercise attendance
• Two tests from lectures contents
• Written exam (the student who obtains more than 50% from both tests is free from taking the written exam)
• Oral exam
• Presentation of the scientific article according to choice</td></tr>
<tr><td rowspan="5">Screening student work(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>2</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Tests</td><td>2</td><td>Oral exam</td><td>2</td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td>2</td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">• Two tests from lectures contents
• Oral exam
• Project</td></tr>
<tr><td rowspan="7">Required literature (available in the library and via other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td colspan="2">Availability via other media</td></tr>
<tr><td colspan="3">F. Jensen: “Introduction to computational chemistry”, John Wiley and Sons, 2007.</td><td></td><td colspan="2">Yes</td></tr>
<tr><td colspan="3">M.P. Allen, D.J.Tildesley: “Computer Simulation in Chemical Physics”, Kluwer Academic Publishers, 1993</td><td></td><td colspan="2">Yes</td></tr>
<tr><td colspan="3">Carsten A. Ullrich: „Time-Dependent Density-Functional Theory; Concepts and Applications“, Oxford Graduate Texts, 2011</td><td></td><td colspan="2">Yes</td></tr>
<tr><td colspan="3"></td><td></td><td colspan="2"></td></tr>
<tr><td colspan="3"></td><td></td><td colspan="2"></td></tr>
<tr><td colspan="3"></td><td></td><td colspan="2"></td></tr>
</table>

Optional literature (at the time of submission of study programme proposal)	1. R. Antoine, V. Bonačić- Koutecký: Liganded Silver and Gold Quantum Clusters. Towards a New Class of Nonlinear Optical Nanomaterials, Springer Briefs and Materials, 2018 2. R. Mitrić, J. Petersen, V. Bonačić-Koutecký: Nonadiabatic Dynamics “on thefly” in Complex Systems and its Control by Laser Fields", in Conical Intersections II, Ed. by H. Köppel, W. Domckeand D. Yarkony, World Scientific 2011. 3. W. Domcke, D. R. Yarkony, H. Köppel Conical Intersections, World scientific Publishing, 2011 4. P. E. Hoggan, E. J. Brändas, J. Maruani, P. Piecuch, G. Delgado-Barrio Advances in theTheory of Quantum Systems in Chemistry and Physics, Springer, 2012		
Quality assurance methods that ensure the acquisition of exit competences	After the lectures, an anonymous questionnaire will occur to identify strong or weak points in the structure and teaching performance of the course.		
Other (as the proposer wishes to add)			

NAME OF THE COURSE	**Interdisciplinary seminar**					
Code	PMP505	Year of study	1.			
Course teacher	Prof.dr. Vlasta Bonačić Koutecky Prof.dr. Alessandro Tossi Doc.dr. Ljiljana Fruk	Credits (ECTS)	4			
Associate teachers		Type of instruction (number of hours)	L	S	E	F
			0	21	0	0
Status of the course	Obligatory	Percentage of application of e-learning				
COURSE DESCRIPTION						
Course objectives	Adopting specific and general knowledge and skills in direct communication with high-quality scientists to ensure a quality approach to scientific work in biophysics					
Course enrolment requirements and entry competences required for the course						
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	• To prepare and to discuss the research topic; • To read and elaborate scientific paper; • To present a scientific paper; • Active participation in a scientific discussion.					
Course content broken down in detail by weekly class schedule (syllabus)	A total of 21h seminar is planned with the mandatory reading of the most important articles and the active participation of students during the course. The lecturers are recognized by domestic and foreign scientists who are not engaged through the teaching of compulsory and elective subjects.					

Format of instruction	☐ lectures ☒ seminars and workshops ☐ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work			☐ independent assignments ☐ multimedia ☐ laboratory ☐ work with mentor ☐ (other)		
Student responsibilities	Active participation in seminars					
Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	4	Research		Practical training	
	Experimental work		Report		(Other)	
	Essay		Seminar essay		(Other)	
	Tests		Oral exam		(Other)	
	Written exam		Project		(Other)	
Grading and evaluating student work in class and at the final exam	Active participation in seminars					

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Research articles and other study materials given by lecturers		

Optional literature (at the time of submission of study programme proposal)	
Quality assurance methods that ensure the acquisition of exit competences	Obligatory active participation in seminars
Other (as the proposer wishes to add)	

NAME OF THE COURSE	**Bioinformatics**					
Code	PMP510	Year of study	1			
Course teacher		Credits (ECTS)	3			
Associate teachers		Type of instruction (number of hours)	L	S	E	F
			10	2	5	
Status of the course	Elective	Percentage of application of e-learning	0%			
COURSE DESCRIPTION						

Course objectives	The aim of the course is to introduce students with available tools used in bioinformatics for the analysis of sequences and protein structures and nucleic acids
Course enrolment requirements and entry competences required for the course	For successful following of the bioinformatics course, it is necessary to have fundamental knowledge of biochemistry and biophysics. Specifically, it is necessary to know the structure and physico-chemical properties of the nucleotides and amino acids as covered by the previous college courses.
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1) Knowing a tool for comparing nucleic acid sequences 2) Knowing a tool for comparing protein sequences 3) Predicting the protein structure 4) Independence in the selection of tools according to the needs of the analysis 5) Independence in the interpretation of results obtained using bioinformatic tools 6) Critical development of publicly available bioinformatic tools, i.e the ability to recognize false-negative and false-positive results.
Course content broken down in detail by weekly class schedule (syllabus)	Introduction to bioinformatics, familiarity with the history and development of bioinformatics - Database knowledge (NCBI), database of gene and protein sequences (NCBI, SWISSPROT, UNIPROT, CATH, SCOP), protein structures (PDBs), functional domains of proteins (PFAMs) and complete genomes (ENSEMBL) Aligning Nucleic Acid and Protein Sequence Sequence Tools: TCOFFEE, MCOFFEE, Clustal Prediction of secondary and tertiary structure of proteins: modeling by homology and tools used for said prediction (PSI-PRED, Modeller, Phyre, Threader) Protein structure visualization programs Introduction to Molecular Dynamics of Proteins Prediction of the secondary and tertiary structure of nucleic acids
Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work ☒ independent assignments ☐ multimedia ☐ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	3	Research		Practical training	
	Experimental work		Report		(Other)	
	Essay		Seminar essay		(Other)	
	Tests		Oral exam		(Other)	
	Written exam		Project		(Other)	

Grading and evaluating student work in class and at the final exam	Evaluation of attendance of seminars and oral exam.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Arthur Lesk: Introduction to Bioinformatics	0	Yes

	Charles Cantor: Biophysical Chemistry Part I, The Conformation of biological Macromolecules	0	Yes
Optional literature (at the time of submission of study programme proposal)	Des Higgins and Willie Taylor's *"Bioinformatics: Sequence Structure and Databanks*		
Quality assurance methods that ensure the acquisition of exit competences	Evaluation of the results according to the listed exit competences.		
Other (as the proposer wishes to add)			

NAME OF THE COURSE	**Thermodynamics of irreversible processes**					
Code		Year of study	1			
Course teacher	Prof.dr.sc. Paško Županović	Credits (ECTS)	6			
Associate teachers		Type of instruction (number of hours)	L	S	E	F
			45	0	0	0
Status of the course		Percentage of application of e-learning				

COURSE DESCRIPTION		
Course objectives	Introduce students to the mathematical description of irreversible processes Apply linear equilibrium thermodynamics on coupled processes such as thermoelectric effects and diffusion of a large number of components.	
Course enrolment requirements and entry competences required for the course	Completed graduate study of Engineering Physics, orientations Thermodynamics Devices or Mechanical Systems or graduate study Mechanical Engineering.	
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. Apply the conservation laws on continuum. 2. Establish a link between the rate of production of entropy and thermodynamic flows and forces using a local equilibrium approximation. 3. Apply Onsager relations of reciprocity on the problem of coupled thermodynamic processes. 4. Implement the Curie rule on the description of the fuel cell. 5.Design a model of a fuel cell within linear nonequilibrium thermodynamics	
Course content broken down in detail by weekly class schedule (syllabus)	Course content	Lectures
	Laws of thermodynamics	3
	Statistical interpretation of entropy	3
	Phase transitions. Evaporation and boiling	3
	Systems with variable number of particles. Chemical potential. Clausius-Clapeyron equation	3
	Chemical reactions. Phase rule	3

	Conservation laws for continuoum	6
	Linear irreversible thermodynamics. Entropy production	6
	Thermodynamic forces and flows	3
	Curie theorem	3
	Onsager reciprocity	6

Format of instruction	x lectures x seminars and workshops ☐ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	x independent assignments ☐ multimedia ☐ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	Active participation in all forms of teaching; lectures, consultations, literature search, independent work on the modeling of the given problem.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	1	Research		Practical training	
	Experimental work		Report		(Other)	
	Essay		Seminar essay	3	(Other)	
	Tests	2	Oral exam		(Other)	
	Written exam		Project		(Other)	

Grading and evaluating student work in class and at the final exam	The rating is the sum of points obtained on colloquia and seminars, which carry a maximum of 2 or 3 points.		
Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	P. Županović, Termodinamika s elementima statističke fizike, Element, Zagreb, 2016.		
	DENIS J. EVANS and GARY P. MORRISS Statistical Mechanics of Nonequilibrium Liquids ACADEMIC PRESS Harcourt Brace Jovanovich, Publishers London San Diego New York Boston Sydney Tokyo		https://www.google.hr/search?q=DENIS+J.+EVANS+and+GARY+P.+MORRISS+Statistical+Mechanics+of+Nonequilibrium+Liquids&ie=utf-8&oe=utf-8&gws_rd=cr&ei=JkvoVqnyOYGR6ASr6ZWQDQ

Optional literature (at the time of submission of study programme proposal)	SIGNE KJELSTRUP DICK BEDEAUX Non-Equilibrium Thermodynamics of Heterogeneous Systems World Scientific NEW JERSEY . LONDON . SINGAPORE . BEIJING . SHANGHAI . HOND KONG . TAIPEI . CHENNAI		
Quality assurance methods that ensure the acquisition of exit competences	Evaluation of results in accordance with the learning outcomes.		
Other (as the proposer wishes to add)			

NAME OF THE COURSE	**Molecular genetics**					
Code	PMP515	Year of study	1.			
Course teacher	Prof. dr. sc. Jasna Puizina	Credits (ECTS)	6			
Associate teachers	Doc.dr.sc. Ivica Šamanić Dr.sc. Željana Fredotović	Type of instruction (number of hours)	L	S	E	F
			24	10	12	
Status of the course	Elective	Percentage of application of e-learning	10%			
COURSE DESCRIPTION						
Course objectives	Students will become familiar with the structure of DNA and RNA molecules, genomes and transcriptomes in prokaryotes and eukaryotes. Special emphasis will be placed on understanding the development of human DNA mutations and their medical and evolutionary significance. This involves the emergence of various genetic diseases and tumors, but it is also the foundation of biodiversity among humans. Students will be acquainted with basic mechanisms of control of genetic information control as well as with genetically modified organisms and modern stem cell technologies, cloning, genome editing and gene therapy. Students will be trained for basic search of relevant databases and bioinformatics analysis of DNA molecules. Students will focus on a critical way of thinking and will be put in front of some ethical doubts. After completing the course, students will be able to follow the future development of genetics and critically observe new genetic phenomena. Seminars will enable students to understand how genetic discoveries are made and enable them to understand modern scientific works and solve genetic problems. Laboratory exercises will enable students to independently apply simpler DNA and RNA experiments.					
Course enrolment requirements and entry competences required for the course	M. Sc. in natural sciences, medicine, veterinary or agronomic.					
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After passing the exam from Molecular Genetics, students will be able to: 1. Show knowledge of the structure and organization of genetic information in prokaryotes and eukaryotes. 2. Show knowledge of the key molecular mechanisms of transmission, expression and control of genetic information. 3. Use basic online tools and databases.					

<table>
<tr><td></td><td colspan="6">4. Self-design less experiments with DNA, RNA and proteins.
5. Apply simpler molecular techniques, interpret the results obtained.
6. Use scientific literature.
7. Possess the skill of oral presentation of own scientific results, writing reports</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">LECTURES (24 hours)
1. Molecular basis of inheritance, genes, chromatin, chromosomes, cell cycle and division
2. Mutations, recombination and DNA repair.
3. Human genome, single nucleotide polymorphisms (SNPs), genome wide association studies (GWAS).
4. Organization of the eukaryotic genome, transposable genetic elements, repetitive DNA.
5. RNAs, different types and their roles, transcriptome.
6. Bioinformatics DNA, PubMed, OMIM. Finding genes in the genome.
7. Regulating gene activity and epigenetics.
8. Genetic engineering. Genetically modified organisms (GMOs).
9. Gene Therapy, Crispr-Cas
10. Immunogenetics
11. Genetics of cancer, oncogene and tumor-supressor genes
12. Molecular genetics of bacteria and viruses

SEMINARS (10 hours)
PCR, RT-PCR. In situ hybridization.
Electrophoresis and «blotting» DNA and proteins. Immunohistochemistry.
Sequencing DNA, next generation-sequencing, Cell culture.
Transgenic organisms, knock-out models
DNA and cDNA libraries. Centrifugation and dialysis
DNA chip, 2D electrophoresis. Chromatographic techniques.
Scientific article 1
Scientific article 2
Problem solving 1
Problem solving 2

PRACTICAL LABORATORY EXERCISES (12 hours)
Isolation of DNA
The amplification of the desired segment of DNA (PCR)
DNA digestion using restriction endonucleases
Electrophoresis DNA
Determination of genotype, interpreting the results</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☒ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">☒ independent assignments
☐ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Students actively participate in the realization of seminars. They need to write a short essay on their seminar topics that will be a test material. Students are self-conducting exercises with teacher supervision.</td></tr>
<tr><td rowspan="2">Screening student work (name the proportion of ECTS credits for each</td><td>Class attendance</td><td>2</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td>1</td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
</table>

activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Essay	1	Seminar essay		(Other)	
	Tests		Oral exam	1	(Other)	
	Written exam	1	Project		(Other)	

Grading and evaluating student work in class and at the final exam	Written exam. The practical part of the exam will be related to exercise and Internet search. The final part of the exam will be oral.

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	1. Puizina, J. 2017: Molecular genetics - web teaching materials.		
	2. Genetics - online tutorial (in croatian) http://www.genetika.biol.pmf.unizg.hr		
	3. Turnpenny PD i Ellard S, 2011: Emery's elements of medicinal genetics	1	
	2. Review and original scientifc papers from the Internet		

Optional literature (at the time of submission of study programme proposal)	1. Lewin, B., Genes VIII. 8th edition. Pearson Prentice Hall, Pearson Education, 2004.
Quality assurance methods that ensure the acquisition of exit competences	An anonymous student survey in which the teacher, the content and achievement of the planned goals will be evaluated.
Other (as the proposer wishes to add)	

NAME OF THE COURSE	**Laboratory Exercises in Molecular Biology**					
Code	PMP519	Year of study	1st			
Course teacher	Ivica Šamanić, Assistant Professor	Credits (ECTS)	6			
Associate teachers		Type of instruction (number of hours)	L	S	E	F
					30	
Status of the course	Elective	Percentage of application of e-learning	10%			
COURSE DESCRIPTION						
Course objectives	This is research projects-based course in which students will gain experience in a wider range of both basic and advanced experimental methods in molecular biology (focused on nucleic acids), e.g. isolation of RNA, real time quantitative PCR,					

<table>
<tr><td></td><td colspan="6">agarose gel electrophoresis and cultivation of cell culture. Students will also learn principles and practice of prominent nucleic acid labeling techniques and basics of computer based DNA sequence analysis and data acquisition over internet. This course develops technical skills and prepare students for a career in science or research work.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">Recommended fundamental knowledge of cell biology, genetics, biochemistry and microbiology.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">After successful completion of this course students will be able to:
use equipment and reagents properly, maintaining a safe laboratory environment
design PCR primers using computer-based methods
perform and analyze a PCR
manipulate RNA in the laboratory including isolation, quantification and detection of a specific mRNA using RT-PCR
use basic technique of blotting, probe preparation and detection methods
compare sequences against the DNA databases on the web using a BLAST search
discuss research results in the context of the scientific literature through written and oral communications
write a lab report that includes an evaluation of the results obtained in the laboratory
present research in a seminar form
work cooperatively in a molecular biology lab</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">The practical part of the course will include basic methods in Molecular Biology;
RNA isolation, quantitation and characterization
Reverse transcription – Conversion of RNA into complementary DNA
Quantitative PCR – Real Time PCR
Designing primers for PCR
Electrophoresis and Northern blotting
Hybridization and Non-radioactive probe detection
Bioinformatics (DNA sequence analysis) – sequence databases, sequence retrieval, simple pairwise alignments, multiple alignments</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☐ lectures
☒ seminars and workshops
☒ exercises
☐ on line in entirety
☒ partial e-learning
☐ field work</td><td colspan="3">☒ independent assignments
☒ multimedia
☒ laboratory
☒ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Students are required to attend laboratory exercises and write lab reports</td></tr>
<tr><td rowspan="4">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is</td><td>Class attendance</td><td></td><td>Research</td><td></td><td>Practical training</td><td>1,5</td></tr>
<tr><td>Experimental work</td><td>1,5</td><td>Report</td><td></td><td>Lab reports</td><td>1</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>1</td><td>(Other)</td><td></td></tr>
<tr><td>Tests</td><td>1</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
</table>

<table>
<tr><td>equal to the ECTS value of the course)</td><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Methods of Evaluation
Lab reports
All lab reports must contain complete and detailed outline of the experimental procedure, description of the results accompanied by analysis and interpretation.
Quizzes
Quizzes will cover both material from the previous labs as well as material on the experiment for the present lab session (based on theory and protocols found in the lab manual and interpretation of data)
Practical skills
At times, students will be asked to demonstrate techniques of accurate preparation of chemical solution and reagents, correct assembly of reactions according to protocol, ability to pipete correctly, competent use of standard and specialized equipment and sterile technique.
Research-based class seminar will be elevated.
Students will have to prepare presentation showing background of the problem they are dealing with. The presentation will be scored according to the content of the presentation (key words, critical review of literature, presentation of scientific results), format, innovativeness and language competence as well.
Final grades will be based on each student's performance as assessed by points total.</td></tr>
<tr><td rowspan="8">Required literature (available in the library and via other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="3">1. Cooper, G.M., Hausman, R.E., 2015: Stanica-molekularni pristup. Šesto izdanje, Medicinska naklada, Zagreb 2015.</td><td></td><td></td></tr>
<tr><td colspan="3">2. Metode u molekularnoj biologiji, 2007. Andreja Abramovič Ristov (ur). Institut Ruđer Bošković.</td><td></td><td></td></tr>
<tr><td colspan="3"></td><td></td><td></td></tr>
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<tr><td colspan="3"></td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">1. Molecular Biology of the Gene, Watson JD,Baker TA, Bell SP, Gann A, Levine M, Losick R, Pearson Education Inc., Benjamin Cummings, 2004.
2. Hancock, D., A. B. Jack Funnell, and J. Johnston. 2010. Introducing undergraduate students to real-time PCR. Biochemistry and Molecular Biology Education,38: 309-316.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">Student evaluation</td></tr>
</table>

Other (as the proposer wishes to add)	

NAME OF THE COURSE	Structure and interactions in polyelectrolytes: basic theory and experimental verification					
Code		Year of study				
Course teacher	Silvia Tomić	Credits (ECTS)				
Associate teachers	Tomislav Vuletić	Type of instruction (number of hours)	L	S	E	F
			10	10	5	
Status of the course	elective	Percentage of application of e-learning				

COURSE DESCRIPTION	
Course objectives	The aim of this course is to present physical concepts and phenomena specific to the polyelectrolytes, in particular to the biological polymers as is DNA in aqueous solutions: direct relationship between the structural and charge-derived properties with biological functions, fundamental length scales and power-law behavior, Manning-Oosawa counterion condensation theory, repulsion-to-attraction inversion of electrostatic imteraction, DNA condensation. Modern experimental methods and procedures commonly used in the studies of structure and dynamics of bio-polyelectrolytes in order to achieve better description of physical concepts will be introduced.
Course enrolment requirements and entry competences required for the course	Undergraduate physics background
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Once the course will be completed, students will be able to describe DNA structure, relationship between crystallographic and electronic structure and the influence of environment in which DNA is placed. They will master the basic knowledge of dielectric spectroscopy in 40 Hz to 100 MHz range, and how to analyze the measured data by using basic theoretical models. It is expected that students will master presentation of the results, how to extract remaining open questions and indicate prospects of particular research subject in future.
Course content broken down in detail by weekly class schedule (syllabus)	Charged polymers in the soft matter and in the biological context (DNA as a paradigm of a stiff, highly charged polymer); relationship between function, structure and environment; description of electrostatic interactions in stiff polyelectrolytes with monovalent counterions and added salt in aqueous solutions via the Poisson - Boltzmann (PB) theory; Manning-Oosawa (MO) counterion condensation; screening of electrostatic interactions described by the Debye-Hueckel equation; polyvalent counterions, correlations and repulsion-to-attraction inversion; flexibility of polymers described via the persistence length; Odijk-Skolnick-Fixman (OSF) theory; Fundamental length scales and scaling laws in dilute and semidilute polyelectrolyte solutions; de Gennes-Pfeuty-Dobrynin (dGPD) theory; Basics of dielectric spectroscopy of polyelectrolyte solutions.

Format of instruction	☒ lectures ☒ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☒ independent assignments ☐ multimedia ☐ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	Regular attendance; write and deliver in time seminar(s) on chosen subjects; pass the final exam (oral)	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance		Research		Practical training		
Experimental work		Report		(Other)		
Essay		Seminar essay	4	(Other)		
Tests		Oral exam	2	(Other)		
Written exam		Project		(Other)		

Grading and evaluating student work in class and at the final exam	

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	M.Daune, Molecular Biophysics (Oxford University Press, New York, 2003).		
	T.Vuletić, T.Ivek, M. Pinterić, S. Dolanski Babić, D. Grgičin and S.Tomić, Dielectric Spectroscopy Center – Manuel (2015).		
	S.Tomić, D.Grgičin, T.Vuletić, S.Dolanski Babić, T.Ivek, R.Podgornik: DNA in Aqueous Solutions with Repulsive Interactions: Structure Determined on the Basis of Dielectric Spectroscopy Measurements; Hrvatska akademija znanosti i umjetnosti, Odbor za bioinformatiku i biološku fiziku, Razred za matematičke, fizičke i kemijske znanosti, 2013. Str. 159-177. (CIP NSK, Zagreb: 862926.; ISBN 978-953-154-199-2)		

Optional literature (at the time of submission of study programme proposal)	Relevant current scientific publications
Quality assurance methods that ensure the	Interaction with students. Teaching adapted to the interests and needs of students.

acquisition of exit competences	
Other (as the proposer wishes to add)	

NAME OF THE COURSE	**BIOMECHANICS**					
Code		Year of study	I.			
Course teacher	Prof. Dr. Mile Dželalija	Credits (ECTS)	6			
Associate teachers	-	Type of instruction (number of hours)	L	S	E	F
			20	1	10	
Status of the course	Elective	Percentage of application of e-learning	50%			

COURSE DESCRIPTION

Course objectives	To prepare PhD students for research in Biomechanics.
Course enrolment requirements and entry competences required for the course	No specific requirements.
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	• Design and interpret research tasks in Biomechanics • Discuss and perform biomechanical measurements • Discuss and apply principles of physical modelling of biomechanical systems • Discuss and develop simulations of physical models of biomechanical systems and visualisations of results • Present in written and orally given research tasks and achieved results in Biomechanics
Course content broken down in detail by weekly class schedule (syllabus)	• Research activities in Biomechanics • Biomechanical measurements • Principles of physical modelling • Simulations • Visualisations • Presentations of research activities and achieved results
Format of instruction	☐ **lectures** ☐ **seminars and workshops** ☐ exercises ☐ *on line* in entirety ☐ **partial e-learning** ☐ field work ☐ independent assignments ☐ multimedia ☐ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	Active participations during the course. Written and oral presentation of research activities and achieved results.

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	1	Research	5	Practical training	
	Experimental work		Report		(Other)	
	Essay		Seminar essay		(Other)	
	Tests		Oral exam		(Other)	
	Written exam		Project		(Other)	

Grading and evaluating student work in class and at the final exam	Grading based on written and oral presentations of research activities achieved results: 2 (60-70%), 3 (70-80%), 4 (80-90%), 5 (90-100%)		
Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	P.M. McGinnis, Biomechanics of Sport and Exercises, Human Kinetics, ChampaignCollege Physics, Fifth Edition, Saunders College Publishing, Orlando, 2000.	1	Web
	Biomechanics of the Musculo-skeletal system, Second Edition, ed. B.M. Nigg, W. Herzog, John Wiley & Sons, Weinheim,1999	1	Web
Optional literature (at the time of submission of study programme proposal)	M. Dželalija, N. Rausavljević, Biomehanika sporta, Sveučilište u Splitu, 2003. Dželalija, M.; Rausavljević, N. & Jošt, B. (2003), Relationship between jump length and the position angle in ski jumping, Kinesiologia Slovenica, 9 (1), 70-79. Dželalija, M.; Rausavljević, N. & Žvan, M. (2003), Influence of body mass on performence in downhill skiing, Kinesiologia Slovenica, 9 (1), 15-21		
Quality assurance methods that ensure the acquisition of exit competences	PhD student evaluation of the course.		
Other (as the proposer wishes to add)	-		

NAME OF THE COURSE	**Planning of research and scientific writing**					
Code	PMP523	Year of study	1.			
Course teacher		Credits (ECTS)	6			
Associate teachers	Doc.dr.sc. Damir Kovačić	Type of instruction (number of hours)	L	S	E	F
			10	6	4	
Status of the course	Elective	Percentage of application of e-learning	10%			
COURSE DESCRIPTION						
Course objectives	Introduce students to the methods of planning research and writing a research paper					
Course enrolment requirements and entry competences	-					

<table>
<tr><td>required for the course</td><td colspan="6"></td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">• To define operative steps in planning scientific research in natural sciences
• To analyze a scientific paper
• To make the structure of a scientific article
• To define ways of scientific communication</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Structure of scientific research. Steps in planning scientific research. Short-term and long-term plans of scientific research. How to recognize scientific work. Choice of research problem - how to be both conservative and revolutionary. How to solve a scientific problem. How to interpret the results of research. How to quote references. How to make it easier for colleagues to find issues. A key role in improving communication with colleagues. Impact factor of journals. Citations of scientific papers - examples. Science on the Internet - what are the servers. Science in Croatia. Examples of good and bad research. Seminar papers from this course. Working principles of making Diploma and Doctoral Thesis. Evaluation of Research manuscript.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☒ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">☐ independent assignments
☐ multimedia
☐ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="6">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>3</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td>3</td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td colspan="6"></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">The grading is determined on the basis of the:
• Seminar work (50% of grades)
• Introductory Exam (50% rating)</td></tr>
<tr><td rowspan="6">Required literature (available in the library and via other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="3">V. Silobrčić: Kako sastaviti, objaviti i ocijeniti znanstveno djelo, Medicinska Naklada, Zagreb, 2003. ISBN 953-176-219-8.</td><td>2</td><td></td></tr>
<tr><td colspan="3">M. Marušić, M. Petrovečki, J. Petrak i A. Marušić: Uvod u znanstveni rad u medicini. Medicinska Naklada, Zagreb 2000. ISBN 953-176-104-3.</td><td></td><td></td></tr>
<tr><td colspan="3"></td><td></td><td></td></tr>
<tr><td colspan="3"></td><td></td><td></td></tr>
<tr><td colspan="3"></td><td></td><td></td></tr>
</table>

Optional literature (at the time of submission of study programme proposal)	• P. D. Leedy I J. E. Ormrod: PracticalResearch. PlanningandDesign. Pretince Hall, SAD. 2001. ISBN 0-13-121854-9. • R. N. Giere: UnderstandingScientificReasoning, Thomson-Wadsworth, SAD, 1997. ISBN 0-15-501625-3. • J. Kniewald: Metodika znanstvenog rada, Multigraf, Zagreb, 1993. ISBN 953-6060-01-9. • A. Simonić: Tragovima znanja u budućnost. Quo vadisscientia?, Vitagraf, Rijeka, 1999. ISBN 953-6059-26-2. • M. Vujević: Uvod u znanstveni rad. Školska knjiga, Zagreb, 2002. ISBN 953-0-30217-7. • Z. Lacković i suradnici: Struktura, metodika i funkcioniranje znanstvenog rada. Medicinska Naklada, Zagreb 2002. ISBN 953-176-121-3.
Quality assurance methods that ensure the acquisition of exit competences	• Evaluation of results according to the learning outcomes • Feedback from students through questionnaires • Self-evaluation of teachers • Institutional and non-institutional follow-ups
Other (as the proposer wishes to add)	

NAME OF THE COURSE	**Physics of Medical Diagnostics**					
Code	PMP523	Year of study	1.			
Course teacher	Doc.dr.sc. Damir Kovačić	Credits (ECTS)	6			
Associate teachers		Type of instruction (number of hours)	L	S	E	F
			10	7	8	
Status of the course	Elective	Percentage of application of e-learning	10%			
COURSE DESCRIPTION						
Course objectives	Prepare PhD students with the Basics of Medical Diagnosis Physics					
Course enrolment requirements and entry competences required for the course	-					
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	• Design and interpret research in the physics of medical diagnostics • Discuss and implement two protocols in medical diagnostics • Discuss and apply the principles of modeling in the physics of medical diagnostics • Oral and written presentation of the physical background of medical diagnostics					
Course content broken down in detail by weekly class schedule (syllabus)	• the basics of nuclear physics • radiation passage through matter, radiation field, biological effects, • magnetic resonance imaging, • the physical basis of nuclear medicine • radiological physics,ultrasound physics, which is a common method of image diagnostics					
	☒ lectures	☐ independent assignments				

Format of instruction	☒ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ multimedia ☐ laboratory ☐ work with mentor ☐ (other)
Student responsibilities		

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	3	Research		Practical training	
	Experimental work		Report		(Other)	
	Essay		Seminar essay		(Other)	
	Tests		Oral exam	3	(Other)	
	Written exam		Project		(Other)	

Grading and evaluating student work in class and at the final exam	The grading is determined on the basis of the: • Seminar work (50% of grades) • Introductory Exam (50% rating)

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	D. Eterović: Fizikalne osnove slikovne dijagnostike	2	

Optional literature (at the time of submission of study programme proposal)	S Webb (urednik): The physics of medical imaging, Institute of Physics Publishing, Bristol and Philadelphia, 2000
Quality assurance methods that ensure the acquisition of exit competences	• Evaluation of results according to the learning outcomes • Feedback from students through questionnaires • Self-evaluation of teachers • Institutional and non-institutional follow-ups
Other (as the proposer wishes to add)	

NAME OF THE COURSE	**Entrepreneurship and technology transfer**					
Code		Year of study	1			
Course teacher	Leandra Vranješ Markić Mile Dželalija	Credits (ECTS)	3			
Associate teachers		Type of instruction (number of hours)	L	S	E	F
			10	10	5	
Status of the course	Elective	Percentage of application of e-learning	50			

COURSE DESCRIPTION						
Course objectives	Develop entrepreneurial mindset, teach students knowledge and skills needed to develop a successful business venture and engage in technology transfer					
Course enrolment requirements and entry competences required for the course	None					
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After completing the course, a student will be able to: -understand how to become an entrepreneur; -identify opportunities, generate and test business ideas; -using tools and processes assess business environment and develop business model; -understand the importance of intellectual property, recognize different forms of IP - perform patent searching and suggest appropriate form of IP protection; -recognize appropriate mechanisms of technology transfer and commercialization of research results					
Course content broken down in detail by weekly class schedule (syllabus)	Introduction to entrepreneurship and technology transfer (2 L) Identifying opportunities, generating and testing ideas. (2L) Competitor Analysis; Strategy Canvas (1L, 1E) Business model and business plan; Business Model Canvas (1L, 2S, 2E) Introduction to intellectual property; Searching patent databases; IP commercialization (3L, 3S, 2E) Tech Startup; "Pitch"; Presentation of business ventures (1L, 5S)					
Format of instruction	☒ lectures ☒ seminars and workshops ☒ exercises ☐ *on line* in entirety ☒ partial e-learning ☐ field work		☐ independent assignments ☐ multimedia ☐ laboratory ☐ work with mentor ☐ (other)			
Student responsibilities	actively participating in classes and final business venture presentation					
Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1	Research		Practical training	
	Experimental work		Report		Presentation of business venture	2
	Essay		Seminar essay		(Other)	
	Tests		Oral exam		(Other)	
	Written exam		Project		(Other)	
Grading and evaluating student work in class and at the final exam	Grading based on active participation in class activities, written and oral presentations of business venure: 2 (60-70%), 3 (70-80%), 4 (80-90%), 5 (90-100%)					
Required literature (available in the library and via other media)	**Title**			**Number of copies in the library**	**Availability via other media**	
	Alex Ostervardel i Yves Pigneur: Business Model Generation (1-78)				Available at	

			http://www.businessmodelgeneration.com/
	A. Osterwalder, Y. Pigneur, G. Bernarda, A. Smith, Value Proposition Design (1-106)		Available at http://www.businessmodelgeneration.com/
	Articles and web pages on intellectual property and technology transfer		www.iprhelpdesk.eu
Optional literature (at the time of submission of study programme proposal)	1) Bruce R. Barringer and R. Duane Ireland, Entrepreneurship: Successfully Launching New Ventures, 5thd ed., Pearson, 2016. 2) B. Golob, Inovacija od ideje do tržišta		
Quality assurance methods that ensure the acquisition of exit competences	PhD student evaluation of the course.		
Other (as the proposer wishes to add)			

NAME OF THE COURSE	**Student's Research Work I, II, III, IV and V**					
Code	PMP533 PMP534 PMP535 PMP536 PMP537	Year of study	I., II. and III.			
Course teacher	From the mentor's list	Credits (ECTS)	113			
Associate teachers		Type of instruction (number of hours)	L	S	E	F
			-	-	-	-
Status of the course	Obligatory	Percentage of application of e-learning				
COURSE DESCRIPTION						
Course objectives	To enable PhD students to prepare research, to conduct research, to present at international scientific conferences and to publish in relevant peer-reviewed scientific journals					
Course enrolment requirements and entry competences required for the course	The requirement is the choice of the PhD mentor and the field of scientific research					
Learning outcomes expected at the level of the course	• To prepare and to discuss the topic of doctoral research; • To present and to discuss the progress of research and the results obtained at doctoral seminars;					

<table>
<tr><td>(4 to 10 learning outcomes)</td><td colspan="6">• As an author or co-author, to write and successfully to publish one or more original scientific papers in an international peer-reviewed journal referenced in the Current Contents or Web of Science database;
• To present and to discuss public research findings, results and scientific knowledge at an international scientific meeting;
• To prepare, to present and to defend a doctoral dissertation.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">• Preparation and selection of the PhD topic, preparation of the doctoral research plan in cooperation with the mentor;
• Application and defense of the PhD topic and plan of the doctoral research in co-operation with the mentor;
• Conducting research under PhD mentor’s supervision;
• Preparation and regular presentation of research and results at seminars within the PhD program;
• Preparation and presentation of research and results at scientific conferences and other domestic and international events;
• Preparation and publication of papers in international scientific journals
• Preparation and public defense of doctoral dissertation.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☐ lectures
☐ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">☐ independent assignments
☐ multimedia
☐ laboratory
☐ work with mentor
☒ research in co-operation with the mentor</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">• Implementation of scientific research;
• Preparation of dissertation;
• Presentation and defense of dissertation; preparation and publication of scientific monographs and at least one scientific work in the journals indexed in the Web of Science</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td></td><td>Research</td><td>113</td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Evaluation based on defense of doctoral these: not defended, successfully defended (100%)</td></tr>
<tr><td rowspan="2">Required literature (available in the library and via other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="3">In agreement with the mentor:
• Published scientific-research papers in journals with an international review
• Conclusions and conference papers</td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study</td><td colspan="6">In agreement with the mentor:
• Published scientific-research papers in journals with an international review
• Conclusions and conference papers</td></tr>
</table>

programme proposal)	
Quality assurance methods that ensure the acquisition of exit competences	PhD evaluation through semi-annual progress reports reported to PhD mentor and through an annual progress seminar in front of the Postgraduate Studies Board of Biophysics.
Other (as the proposer wishes to add)	

1.3. List of course teachers and collaborators

Code	Course	Teachers and collaborators
PMP500	Biophysics of the cell	Igor Weber Iva Tolić
PMP532	Bioinformatics	Ana Jerončić
PMP528	Biomechanics	Mile Dželalija
PMP502	Experimental Methods of Physics in Biophysics	Ante Bilušić Ivica Aviani Dražen Zanchi Ivana Bočina Damir Kovačić
PMP523	Physics of Medical Diagnostics	Damir Kovačić
PMP505	Interdisciplinary seminar	Vlasta Bonačić Koutecky Alessandro Tossi Ljiljana Fruk
PMP503	Selected chapters at ICAST: Simulations of nano-biomolecules for biosensorics	Vlasta Bonačić Koutecky
PMP519	Laboratory Exercises in Molecular Biology	Ivica Šamanić
PMP501	Modeling of biomacromolecules and their complexes	Sanja Tomić Larisa Zoranić
PMP515	Molecular genetics	Jasna Puizina
PMP530	Planning of research and scientific writing	Damir Kovačić
PMP531	Entrepreneurship and technology transfer	Leandra Vranješ Markić Mile Dželalija
PMP525	Structure and interactions in polyelectrolytes: basic theory and experimental verification	Silvia Tomić
PMP512	Thermodynamics of irreversible processes	Paško Županović
PMP533 PMP534 PMP535 PMP536	Student's Research Work I Student's Research Work II	From mentors' list

PMP537	Student's Research Work III Student's Research Work IV Student's Research Work V	

1.4. Detailed tables of course teachers

First and last name and title of teacher	Assoc. prof. dr. Ivica Aviani
The course he/she teaches in the proposed study programme	Experimental Methods of Physics in Biophysics
GENERAL INFORMATION ON COURSE TEACHER	
Address	Rudeška cesta 164, 10000 Zagreb/Ruđera Boškovića 16, 21000 Split
Telephone number	0915220593
E-mail address	iaviani@pmfst.hr
Personal web page	http://aviani.ifs.hr/
Year of birth	1955.
Scientist ID	76256
Research or art rank, and date of last rank appointment	Senior Research Associate, 07. 02. 2011.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Associate Professor, 11. 04. 2012.
Area and field of election into research or art rank	Area of Natural Sciences - Field of Physics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	University of Split, Faculty of Science
Date of employment	05. 07. 2012.
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Physics
Function	Head of Laboratory for Structural Characterization of Samples
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Doctor of Philosophy
Institution	University of Zagreb, Faculty of Science
Place	Zagreb
Date	20. 07. 1999.
INFORMATION ON ADDITIONAL TRAINING	
Year	2011.
Place	Vienna, Austria
Institution	Institute for Physical Chemistry, University of Vienna
Field of training	Transport and magnetic properties of thermoelectrics
Year	2009.
Place	Vienna, Austria
Institution	Institute for Physical Chemistry, University of Vienna
Field of training	Transport properties of thermoelectrics

Year	2007.
Place	Cambridge, England
Institution	Cavendish Laboratory, University of Cambridge
Field of training	Transport properties of CeGe under the pressure
Year	2003.
Place	Grenoble, France
Institution	Université Joseph Fourier
Field of training	Magnetostrction of rare-earth hexaborids
Year	2001.
Place	Grenoble, France
Institution	C.N.R.S. - Lab. Magnetisme Louis Néel
Field of training	Magnetostrction of rare-earth hexaborids
Year	1999. - 2000.
Place	Grenoble, France
Institution	C.N.R.S. - Lab. Magnetisme Louis Néel
Field of training	Construction of magnetostriction setup
Year	1996.
Place	Frankfurt am M., Germany
Institution	Physikalishes Institut, Univerzitet J.W. Goethe, Frankfurt am M.
Field of training	Ultrasound characterisation of heavy fermions elastic properties
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	French (2)
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	• *Solid State Physics*, University of Split, Faculty of Science, Graduate Study of Physics, 2012. - 2017. • *Selected chapters of the Methodology of Physics teaching*, University of Sarajevo, Doctoral Study - Physics in Education, (2014 – 2017) • *Magnetic Materials and Applications*, University of Rijeka, Graduate Study of Engineering and Physics of Materials, (2012 -2013) • Computer in the Experiment, University of Zagreb, Faculty of Natural Sciences, Physics Department, Integrated Physics Study (2008-2011)
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	• M. Očko, K. Zadro, Đ. Drobac, I. Aviani, K. Salamon, E.D. Bauer, J.L. Sarrao, *Transport properties of the CexLa1-xPt alloy system: Unusual concentration dependence of the Curie temperature*, J. Magn. Magn. Mater. 426, 40-45 (2017) • M. Očko, K. Zadro, Đ. Drobac, I. Aviani, K. Salamon, D. Mixson, E.D. Bauer, *Study of the magnetic properties of the CexLa1-xPt alloy system: Which interaction establishes ferromagnetism in Kondo systems*?, J. Magn. Magn. Mater. 417, 359 (2016)

	• C.R.S. Haines, N. Marcano, R.P. Smith, I. Aviani, J.I. Espeso, J.C. Gymez Sal, and S.S. Saxena, *Complex magnetic states of heavy fermion compound CeGe*, Low Temp. Phys. 38, 821 (2012) • M. Očko, Z. Samardžija, S. Žonja, I. Aviani, *Structural and electronic properties of the highly concentrated UxY1-xRu2Si2 alloy system*, J. Alloys Compd. 512, 79 (2012) • T. Muramatsu, T. Kanemasa, T. Kagayama, K. Shimizu, Y. Aoki, H. Sato, M. Giovannini, P. Bonville, V. Zlatic, I. Aviani, R. Khasanov, C. Rusu, A. Amato, K. Mydeen, M. Nicklas, H. Michor, E. Bauer, *Re-entrant quantum criticality in Yb2Pd2Sn*, Phys. Rev. B 83 180404(R)-1 (2011)
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	• N. Erceg, I. Aviani, V. Mešić, M. Glunčić, G. Žauhar, *Development of the kinetic molecular theory of gases concept inventory: Preliminary results on university students' misconceptions*, Phys. Rev. Phys. Educ. Res. 12, 020139 (2016). • I. Aviani, N Erceg, V Mešić, *Drawing and using free body diagrams: Why it may be better not to decompose forces*, Phys. Rev. ST Phys. Educ. Res. 11, 020137 (2015). • N. Erceg, I. Aviani and V. Mešić, *Using photographs to elicit student ideas about physics: The case of an unusual liquid-level phenomenon*, Canadian Journal of Physics 92, 9-17 (2014). • N. Erceg, I. Aviani, Students' *Understanding of Velocity-Time Graphs and the Sources of Conceptual Difficulties*, Croatian Journal of Education 16, 43-80 (2014). • N. Erceg, I. Aviani, V. Mešić, Z. Kaliman, D. Kotnik-Karuza, *Probing students' conceptual knowledge of satellite motion through the use of diagram*, Revista Mexicana de Fisica E. 60, 75-85 (2014).
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	• *Ultra-Low Power, Collective-State Device Technology Based on Electron Correlation in Two-Dimensional Atomic Layers*, Croatian-American (NSF) bilateral project, 2014 - 2018 (Principal Investigator) • *Transport and nonequilibrium effects in strongly correlated multilayered nanostructures*, Croatian-American (NSF) bilateral project, 2011-2014 (Principal Investigator) • *Materials with electronic structure modeled by modern techniques of preparation, Ministry of Science project: 035-0352827-2841, 2012-2014 (Principal Investigator)* • *Improvement of quality in higher education with application of Croatian Qualifications Framework (CQF): STEMp - Development of modern study programs for the education teachers of IT, technics, biology, chemistry, physics and math on the foundations of CQF development,* structural project HR.3.1.15-0032, 2015 - 2016. (Project co-worker) • *Developement of the National Curriculum for Science and for Physics, Ministry of Science and Education project, 2015 - 2016 (Project co-worker)*
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-	As part of the Education and Teacher Training Agency teachers education program, at county and state professional meetings of physics teachers (over 60).

didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	Ante Bilušić
The course he/she teaches in the proposed study programme	Experimental Methods of Physics in Biophysics
GENERAL INFORMATION ON COURSE TEACHER	
Address	Hrvatske mornarice 1H, HR-21000 Split, Croatia
Telephone number	+385 21 619295
E-mail address	bilusic@pmfst.hr
Personal web page	
Year of birth	1972
Scientist ID	226040
Research or art rank, and date of last rank appointment	scientific advisor March 8th 2013
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	full professor, first election May 15th 2013
Area and field of election into research or art rank	area of natural science, field physics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	University of Split, Faculty of Science
Date of employment	
Name of position (professor, researcher, associate teacher, etc.)	full professor
Field of research	solid state physics
Function	university professor
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	University of Zagreb, Faculty of Science
Place	Zagreb
Date	April 25th, 2003
INFORMATION ON ADDITIONAL TRAINING	
Year	2006-2008, 2009 (22 months in total)
Place	Regensburg, Germany
Institution	University of Regensburg, Institute for experimental and applied physics
Field of training	solid state physics
Year	2010.(2 weeks)
Place	Nijmegen, The Netherlands
Institution	Rodboud University, High magnetic field laboratory

Field of training	solid state physics
Year	2003 (2 months)
Place	Lausanne, Switzerland
Institution	Swiss Federal Institute of Technology (EPFL)
Field of training	solid state physics
Year	2001 - 2002 (9 months)
Place	Zürich, Switzerland
Institution	Swiss Federal Institute of Technology (ETHZ)
Field of training	solid state physics
Year	2001 (1 month)
Place	Grenoble, France
Institution	CNRS
Field of training	solid state physics
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English, 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	German, 2
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Experimental Methods of Physics in Biophysics
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	Baturina, Tatyana I.; Kalok, David; Bilušić, Ante; Vinokur, Valerii M.; Baklanov, Mikhail R.; Gutakovskii, Anton K.; Latyshev, Alexander V.; Strunk, Christoph. *Dual threshold diode based on the superconductor-to-insulator transition in ultrathin TiN films*. // Applied physics letters. 102 (2013) , 4 Barišić, Neven; Smiljanić, Igor; Popčević, Petar; Bilušić, Ante; Tutiš, Eduard; Smontara, Ana; Berger, H.; Jacimović, J.; Yuli, O.; Forró, L. *High pressure study of transport in $Co_{1/3}NbS_2$*. // Physical Review B - Condensed Matter and Materials Physics. 84 (2011) , 7; 075157-1-075157-7 Popčević, Petar; Stanić, Denis; Bihar Željko; Bilušić, Ante; Smontara, Ana. *Heat transport in aluminum based quasicrystals i-AlPdMn, i-AlCuFe, and d-AlCoNi*. // Israel journal of chemistry. 51 (2011) , 11/12; 1340-1348 Otto, Florian; Bilušić, Ante; Babić, Dinko; Vodolazov, Denis Yu; Surgers, Christoph; Strunk, Christoph. *Reversal of Nonlocal Vortex Motion in the Regime of Strong Nonequilibrium*. // Physical Review Letters. 104 (2010) ; 027005-1-027005-4

	Otto, Florian; Bilušić, Ante; Babić, Dinko; Vodolazov, Denis Yu; Sürgers, Christoph; Strunk, Christoph. *Nonlocal versus local vortex dynamics in the transversal flux transformer effect*. // Physical Review B - Condensed Matter and Materials Physics. 81 (2010) , 17; 174521-1-174521-11
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	Theoretical Studies in Very Strongly Correlated Matter 11/ 2016. – 11/2020. Funding agency: Ministry of Science and Education of the Republic of Croatia High-frequency ultrasound diagnostic probe for advanced ophthalmological applications 06/2016. – 06/2017 Funding agency: HAMAG-BICRO - Croatian Agency for SMEs, Innovations and Investments Strengthening the Capacities for Application and Technology Transfer of Microelectromehanical Systems at the University of Split 11/ 2014. – 03/2016. Funding agency: European Regional Development Fund
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	„The Best Professor of the Faculty of Science“ for academic year 2010-11
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	Ivana Bočina, PhD, Associate Professor
The course he/she teaches in the proposed study programme	Experimental methods of physics in Biophysics
GENERAL INFORMATION ON COURSE TEACHER	
Address	Žnjanska ulica 2, Split
Telephone number	+385 21 378 110
E-mail address	bocina@pmfst.hr
Year of birth	1970.
Scientist ID	210014
Research or art rank, and date of last rank appointment	Associate Professor, 19th December 2012.

Area and field of election into research or art rank	Natural Sciences, Biology
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Science, University of Split
Date of employment	24th November 1995.
Name of position (professor, researcher, associate teacher, etc.)	Associate Professor
Field of research	Histology, Embriology, light and electron microscopy
Function	Head of the Department of Biology 2010-2012
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Science, University of Zagreb
Place	Zagreb
Date	7th November 2005.
INFORMATION ON ADDITIONAL TRAINING	
Year	June 2010.
Place	Bergen, Norway
Institution	Institute for Marine Molecular Biology
Field of training	Electron Microscopy
Year	September 2011.
Place	Bergen, Norway
Institution	Institute for Marine Molecular Biology
Field of training	Electron Microscopy
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	French 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian 2
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	- Course Histology, study programme Biology and chemistry, undergraduate level, - Course Embryology, study programme Biology and chemistry, graduate level, - Course Basic histological techniques, study programme Biology and chemistry, undergraduate level,
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Filipović, Natalija; Vukojević, Katarina; **Bočina, Ivana**; Saraga, Marijan; Glavina Durdov, Merica; Kablar, Boris; Saraga-Babić, Mirna. Immunohistochemical and electronmicroscopic features of mesenchymal-to –epithelial transition in human developing, post-natal and nephrotic podocytes. // Histochemistry and cell biology. 147 (2017) , 4; 481-495

	2. Restović, Ivana; Vukojević, Katarina; Saraga- Babić, Mirna; **Bočina, Ivana**. Ultrastructural features of the dogfish Scyliorhinus canicula (Pisces: Scyliorhinidae) notochordal cells and the notochordal sheath. // The Italian journal of zoology. 83 (2016) , 3; 329-337 3. Deng, Wei; Nies, Florian; Feuer, Anja; **Bočina, Ivana**; Oliver, Dominik; Jiang, Di. Anion translocation through an Slc26 transporter mediates lumen expansion during tubulogenesis. // Proceedings of the National Academy of Sciences of the United States of America. 110 (2013) , 37; 14972-14977 4. Denker, Elsa; **Bočina, Ivana**; Jiang, Di. Tubulogenesis in a simple cell cord requires the formation of bi-apical cells through two discrete Par domains. // Development (Cambridge). (2013) , 140; 2985-2996 5. Saraga-Babić, Mirna; Vukojević, Katarina; **Bočina, Ivana**; Drnasin, Kristina; Saraga, Marijan. Ciliogenesis in normal human kidney development and post-natal life. // Pediatric nephrology. 27 (2012)
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	**HRZZ project: 5576 „Anisakis spp: genomic epidemiology“, project leader Prof. Ivona Mladineo**
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?	The methodological-psychological-didactic-pedagogical group of competences was obtained by passing the exams at graduate study programme in teaching Biology-chemistry.
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	Institutional award 2017. Faculty of Science, University of Split
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	Histology average grade 5.0 (grading scale 1-5) Embryology average grade 5.0 (grading scale 1-5)

First and last name and title of teacher	Prof. Dr. Dr. h. c. Vlasta Bonačić-Koutecký
The course he/she teaches in the proposed study programme	Izabrana poglavlja na ICAST-u: Simulacija nano-biomolekula za biosenzoriku

GENERAL INFORMATION ON COURSE TEACHER	
Address	Meštrovićevo šetalište 86, 21000 Split
Telephone number	+385 99 555 6018
E-mail address	vbk@stim.unist.hr
Year of birth	1943
Scientist ID	322856
Research or art rank, and date of last rank appointment	Redovni profesor – prvi izbor
Area and field of election into research or art rank	Znanstveno područje prirodnih znanosti, polje fizika
INFORMATION ON CURRENT EMPLOYMENT	INFORMATION ON CURRENT EMPLOYMENT
Institution where employed	University of Split
Date of employment	03.10.2016.
Name of position (professor, researcher, associate teacher, etc.)	Vanjski suradnik – Redovni profesor – prvi izbor
Field of research	Fizikalna i teorijska kemija, Nanotehnologija, Računalne simulacije u fizikalnoj kemiji i molekularnoj fizici
Function	Director of the Research Excellence Centre
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Doktor znanosti
Institution	Johns Hopkins University
Place	Baltimore, SAD
Date	1971
INFORMATION ON ADDITIONAL TRAINING	
Year	1971-1973
Place	New York, SAD
Institution	Belfer Graduate School of Science, Yeshiva University
Field of training	Postdoc mjesto –Fizikalna i teorijska kemija
INFORMATION ON ADDITIONAL TRAINING	
Year	1973-1979
Place	Berlin, Njemačka
Institution	Freie Universität Berlin
Field of training	Docent – Fizikalna i teorijska kemija
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Hrvatski
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Engleski jezik, poznavanje: 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Njemački jezik, poznavanje: 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	

Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	Ž. Sanader, R. Mitrić, V. Bonačić-Koutecky, B. Bellina, R. Antoine, P. Dugourd:"The nature of electronic excitations at the metal-bioorganic interface illustrated on histidine-silver hybrids", Phys. Chem. Chem. Phys., 16, 1257-1261 (2014). M. Girod, Ž. Sanader, M. Vojković, R. Antoine, L. MacAleese, J. Lemoine, V. Bonačić-Koutecky, P. Dugourd:"UV photo-dissociation of proline-containing peptide ions: Insight from molecular dynamics",J.Am.Soc.Mass Spectrom., 26, (3), 432-443, (2014). Ž. Sanader, M. Krstić, I. Russier-Antoine, F. Bertorelle, Ph. Dugourd, P. Brevet, R.Antoine, V. Bonačić-Koutecky:"Two-photon absorption of ligand-protected Ag15 nanoclusters. Towards a new class of nonlinear optics nanomaterials.", Phys. Chem. Chem. Phys., 18, 12404 - 12408 (2016.) I. Russier-Antoine, F. Bertorelle , Ž. Sanader, M. Krstić, C. Comby-Zerbino, Ph. Dugourd, P. Brevet, V. Bonačić-Koutecky, R. Antoine: "Ligand-Core NLO-phores: a combined experimental and theoretical approach of the two-photon absorption and two-photon excitedemission properties of small ligated silver nanoclusters", Nanoscale, 2017, 9, 1221-1228 F. Bertorelle, I. Russier-Antoine, N. Calin, C. Comby-Zerbino, A. Bensalah-Ledoux, S. Guy, Ph. Dugourd, P. Brevet, Ž. Sanader, M. Krstić, V. Bonačić-Koutecky and R. Antoine:"Au10(SG)10: A Chiral Gold Catenane Nanocluster with Zero Conned Electrons. Optical Properties and First-Principles Theoretical Analysis", J. Phys. Chem. Lett.2017, 8, 1979-1985
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	Centar izvrsnosti za znanost i tehnologiju – integracija Mediteranske regije (STIM), natječaj MZOS za osnivanje Znanstvenih centara izvrsnosti, 2014-2019 “Optimal control of light propagation and energy transfer in silver-cluster nanostructures at graphene”, DFG priority program SPP 1391 “Ultrafast Nanooptics”, 2009-2015 “Theoretical exploration of optical and electronic properties of metal cluster-carbon and silicon hybrids”, DFG research unit FOR 1282 “Controlling the electronic structure of semiconductor nanoparticles by doping and hybrid formation”, 2009-2015

	„Metal cluster sensors for biological aging“, French-Croatian Projet de Laboratoire International Associé (LIA), 2010-2015 „Ruthenium catalysts for the purification of the feed gas for fuel cells; Ab initio and Monte Carlo simulations“, DAAD Croatian-German Exchange Programme, 2013-2014 „Optical properties of metal cluster-protein hybrids“, DAAD PROCOPE French-German Exchange Programme, 2010-2012
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	Počasni doktorat (Dr. h. c.) na University Lyon 1, Francuska (2009) Nagrada Slobodne Dalmacije “Frane Bulić” za životno djelo u području znanosti (2012)

First and last name and title of teacher	Prof. Dr. Mile DŽELALIJA
The course he/she teaches in the proposed study programme	BIOMECHANICS; ENTREPNEURSHIP AND TECHNOLOGY TRANSFER
GENERAL INFORMATION ON COURSE TEACHER	
Address	PMF, Ruđera Boškovića 32, 21000 Split
Telephone number	+385.91.5075520
E-mail address	mdzelalija@gmail.com; mile@pmfst.hr
Personal web page	www.pmfst.unist.hr/~mile
Year of birth	1964
Scientist ID	172646
Research or art rank, and date of last rank appointment	Scientific advisor, September 2004.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full Professor – tenure position, November 2010.
Area and field of election into research or art rank	Natural Sciences, Physics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	University of Split, Faculty of Science
Date of employment	1 June 2008
Name of position (professor, researcher, associate teacher, etc.)	Full Professor in Physics – tenure position
Field of research	Physics, High energy physics, applied physics, education

Function	Teaching and research
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	University of Zagreb, Faculty of Science
Place	Zagreb
Date	17 July 1995
INFORMATION ON ADDITIONAL TRAINING	
Year	1991-2012
Place	Darmstadt (Germany), Geneve (Switzerland)
Institution	GSI-Darmstadt, CERN-Geneve
Field of training	Heavy ion physics; High energy physics
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English, 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	German, 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian, 2
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Bimechanics, Master study at the Faculty of Kinesiology; Entrepreneorship and Transfer Technology, PhD study TRIBE at the Faculty of Medicine
Authorship of university/faculty textbooks in the field of the course	Textbook, M. Dželalija, N. Rausavljević, Biomehanika sporta, 2004.
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Gasik, P.; ...; **Dželalija, M**.; Weber, I.; ..., "Strange meson production in Al+Al collisions at 1.9 A GeV", *European Physics Journal A* **52** (2016) 177 2. Piasecki, K.; ...; **Dželalija, M**.; Weber, I.; ..., "Centrality dependence of subthreshold phi meson production in Ni+Ni collisions at 1.9 A GeV", *Physical Review C* **94** (2016) 014901 3. Carević, I.; Hartmann, O.; **Dželalija, M**., "Investigating in-medium lambda production in pion induced reactions", *Hyperfine Interactions* **210** (2012) 115-118 4. Reisdorf, W.; ...; **Dželalija, M.**; ..., (The FOPI Collaboration) "Systematics of azimuthal asymmetries in heavy ion collisions in the 1 A GeV regime", *Nuclear Physics* **A 876** (2012) 1-60. 5. Chatrchyan, S.; …; **Dželalija, M.**; …, (The CMS Collaboration) "Combined results of searches for the standard model Higgs boson in *pp* collisions at $s\sqrt{}$=7 TeV", *Physics Letters* **B 710** (2012) 6-12
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	1. **Dželalija, M.**; Balković, M., "Theoretical Base for Multidimensional Classification of Learning Outcomes in reforming Qualifications Framework", *Interdisciplinary Description of Complex Systems* **12** (2014) 151-160 2. Balković, M.; **Dželalija, M.**; Šimović, V, "Stakeholders' attitude and expectations in respect to value and implementation principles of recognition of prior learning in Croatia", *International Journal of Innovation and Learning* **20** (2016) 399-421

	3. **Dželalija, M.**, "Methodology for the Design and Development of Learning Outcomes", *EOPEP, Grčka,* (2015) 4. **Dželalija, M.**, "Principles, Criteria and Procedures for the Development and Classification of other Titles", *EOPEP, Grčka,* (2015) 5. **Dželalija, M.**, "Introduction to Quality Assurance in HE and VET in the context of Qualifications Frameworks", *Ministry of Science, Education and Sports,* (2013)
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	1. Gasik, P.; ...; **Dželalija, M**.; Weber, I.; ..., "Strange meson production in Al+Al collisions at 1.9 A GeV", *European Physics Journal A* **52** (2016) 177 2. Piasecki, K.; ...; **Dželalija, M**.; Weber, I.; ..., "Centrality dependence of subthreshold phi meson production in Ni+Ni collisions at 1.9 A GeV", *Physical Review C* **94** (2016) 014901 3. Carević, I.; Hartmann, O.; **Dželalija, M**., "Investigating in-medium lambda production in pion induced reactions", *Hyperfine Interactions* **210** (2012) 115-118 4. Reisdorf, W.; ...; **Dželalija, M.**; ..., (The FOPI Collaboration) "Systematics of azimuthal asymmetries in heavy ion collisions in the 1 A GeV regime", *Nuclear Physics* **A 876** (2012) 1-60. 5. Chatrchyan, S.; …; **Dželalija, M.**; …, (The CMS Collaboration) "Combined results of searches for the standard model Higgs boson in *pp* collisions at $s\sqrt{}$=7 TeV", *Physics Letters* **B 710** (2012) 6-12
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	Within the study for Education in Mathematics and Physics, Univesity of Split (profesor matematike i fizike)
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	1991, Award for young scientists, Slobodana Dalmacija 1992, DAAD schoolarship award
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	Sveučilište u Splitu, average grade 4.5 to 4.9, Grading scale: 1-5.

Titula, ime i prezime nositelja	Dr. Ljiljana Fruk
Predmet koji predaje na predloženom studijskom programu	Bionanotehnologija
OPĆE INFORMACIJE O NOSITELJU	
Adresa	Department of Chemical Engineering and Biotechnology Universtiy of Cambridge, Philippa Fawcett Drive, CB30AS
Telefon	0044 1223 334778
E-mail adresa	lf389@cam.ac.uk
Osobna web stranica	fruk-lab.com
Godina rođenja	1975
Matični broj iz Upisnika znanstvenika	

Znanstveno ili umjetničko zvanje i datum posljednjega izbora	
Znanstveno-nastavno, umjetničko-nastavno ili nastavno zvanje i datum posljednjega izbora	
Područje i polje izbora u znanstveno ili umjetničko zvanje	
PODACI O SADAŠNJEM ZAPOSLENJU	
Ustanova zaposlenja	University of Cambridge
Datum zaposlenja	1.11.2015
Naziv radnoga mjesta (profesor, istraživač, suradnik i sl.)	Izvanredni profesor (lecturer)
Područje rada	Bionanotehnologija
Funkcija	
PODACI O ŠKOLOVANJU – Najviši postignuti stupanj	
Zvanje	Docent
Ustanova	Kalrsruhe Institute of Technology
Mjesto	Karlsruhe, Njemacka
Nadnevak	2014.
PODACI O USAVRŠAVANJU	
Godina	2004-2008
Mjesto	Dortmund, Njemačka
Ustanova	Universität Dortmund
Područje usavršavanja	nanotehnologija, organska kemija
MATERINSKI I STRANI JEZICI	
Materinski jezik	hrvatski
Strani jezik i poznavanje jezika na ljestvici od 2 (dovoljno) do 5 (izvrsno)	engleski (5)
Strani jezik i poznavanje jezika na ljestvici od 2 (dovoljno) do 5 (izvrsno)	njemacki (5)
Strani jezik i poznavanje jezika na ljestvici od 2 (dovoljno) do 5 (izvrsno)	talijanski (5)
KOMPETENCIJE ZA PREDMET	
Ranije iskustvo u nositeljstvu sličnih predmeta (navesti naziv predmeta, studijskoga programa na kojem se izvodi/izvodio i razinu studijskoga programa)	Kemijska biologija,bionanotehnologija (Karlsruhe Institute of Technology, dodiplomski studij 2009 -2014) Dizajn kemijskih produkata, Bionanotehnologija, Etika u znanosti (University of Cambridge, dodiplomski studij od 2016) Bionanotehnologija (postdiplomski studij in nanotehnologije, Maxwell Centre, University of Cambridge, od 2016)
Autorstvo sveučilišnih/fakultetskih udžbenika iz područja predmeta	Trenutno u fazi pisanja za Cambridge University Press
Stručni, znanstveni i umjetnički radovi objavljeni u posljednjih pet godina iz područja predmeta **(najviše 5 referenca)**	D. Naumenko, L. Stolzer, AS Quick, D. Abt, M. Wegener, C. Barner-KOwollik, L. Fruk, M. Lazzarino, Design of Broadband SERS Substrates by the Laser-induced Aggregation of Gold Nanoparticles, J. *Mater. Chem. C* **2016**, 4 (25), 6152. 2. L. Stolzer, A. Vigovskaya, C. Barner-Kowollik, Lj. Fruk, A Self Reporting Tetrazole Based Linker for the Biofunctionalization of Gold Nanorods, *Chemistry-A Eur. J.* **2015**, 21,14309. 3. D. Kendziora, I. Ahmed, Lj. Fruk, Multifunctional Linker for Orthogonal Decoration of Gold Nanoparticles with DNA and proteins, *RCS Advances* **2014**, 4(35), 17980.

	4. M. Miljevic, B. Geiseler, T. Bergfeldt, P. Brockstaller, Lj. Fruk, Enhanced Photocatalytic Activity of Au/TiO_2 Nanocomposite Prepared Using Bifunctional Bridging Linker, *Adv. Funct. Mater* **2014,** 24(7), 1028 5. G. Shtenberg, N. Massad-Ivanir, O. Moscowitz, S. Engin, M. Sharon, Lj. Fruk, E. Segal, Picking up the Pieces, A Generic Porous Si Biosensor for Probing the Proteolytic Products of Enzymes, *Anal. Chem*. **2013**, 85(3), 1951.
Stručni i znanstveni radovi iz metodike i kvalitete nastave objavljeni u posljednjih pet godina **(najviše 5 referenca)**	P. A. Youngman, Lj.Fruk, A Nanochemist and a Nanohumanist Take a Walk Through the German Museum: An Analysis of the Popularization of Nanoscience and Technology in Germany, *J. Conserv. Museum. Sci* **201**4, 12(1), 1
Stručni, znanstveni i umjetnički projekti iz područja predmeta koji su se provodili u posljednjih pet godina **(najviše 5 referenca)**	
U sklopu kojega programa i u kojem je opsegu nositelj stekao metodičko- psihološko-didaktičko - pedagoške kompetencije?	Habilitacija iz organske kemije, Karlsruhe Institute of Technology, srpanj 2014.
PRIZNANJA I NAGRADE	
Priznanja i nagrade za nastavni i znanstveni rad/umjetnički rad	Sidney Sussex College Fellowship, Humboldt Fellowship, Marie Curie Fellowship, Royal Society of Chemistry Fellowship

First and last name and title of teacher	Ana Jerončić
The course he/she teaches in the proposed study programme	Bioinformatics
GENERAL INFORMATION ON COURSE TEACHER	
Address	Ruđera Boškovića 12
Telephone number	+385 981380092
E-mail address	ajeronci@mefst.hr
Personal web page	http://www.mefst.unist.hr/znanost/istrazivacke-skupine-i-laboratoriji/okruzje-za-znanost/5014
Year of birth	
Scientist ID	255821
Research or art rank, and date of last rank appointment	Associate professor 2017.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Associate professor 2017.
Area and field of election into research or art rank	Biomedicne science
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Medicine, University of Split
Date of employment	2009.
Name of position (professor, researcher, associate teacher, etc.)	Associate professor
Field of research	biostatistics, bioinformatics
Function	

INFORMATION ON EDUCATION – Highest degree earned	
Degree	Dr.Sc.
Institution	University of Zagreb, Croatia a
Place	Zagreb
Date	10. 07. 2009.
INFORMATION ON ADDITIONAL TRAINING	
Year	
Place	
Institution	
Field of training	
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English, 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Faculty of Medicine, University of Split Biostatistics (graduate, physics)
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Carev, Merica; Kovačić, Ana; Novak, Anita; Tonkić, Marija; Jerončić, Ana. **Campylobacter jejuni strains coresistant to tetracycline and ciprofloxacin in patients with gastroenteritis in Croatia**. // *Infectious Diseases*. **49** (2017) , 4; 268-276 2. Galić, Ivan; Pacifici, Andrea; Carbone, Daniele; Pacifici, Luciano; Jerončić, Ana; Cameriere, Roberto. **Age estimation by the Cameriere's normalized measurements (CNM) of the single permanent mandibular tooth on a panoramic radiograph.**. // *Legal Medicine*. **26** (2017) ; 65-72 3.Jerončić, Ana; Gunjaca, Grgo; Mrsic Dudimir, Danijela; Mudnić, Ivana; Brizic, Ivica; Polašek, Ozren; Boban, Mladen. **Normative equations for central augmentation index: assessment of inter-population applicability and how it could be improved**. // *Scientific reports*. **6** (2016) ; 27016-27016 4. Pogorelić, Zenon; Brković, Tomislava; Budimir, Dražen; Todorić, Jakov; Košuljandić, Đurđica; Jerončić, Ana; Biočić, Mihovil; Saraga, Marijan. **Endoscopic placement of double-J ureteric stents in children as a treatment for primary hydronephrosis**. // *Canadian Journal of Urology*. **24** (2017) , 3; 8853-8858 5. Pogorelić, Zenon; Katić, Josip; Mrklić, Ivana; Jerončić, Ana; Šušnjar, Tomislav; Jukić, Miro; Vilović, Katarina; Perko, Zdravko. **Lateral thermal damage of mesoappendix and appendiceal**

	base during laparoscopic appendectomy in children: comparison of the harmonic scalpel (Ultracision), bipolar coagulation (LigaSure), and thermal fusion technology (MiSeal). // *The Journal of surgical research*. **212** (2017) ; 101-107
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	National *Science Awards of* the *Republic of Croatia, 2017*
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	Assistant Professor Damir Kovačić,PhD
The course he/she teaches in the proposed study programme	Experimental methods of physics in biophysics Planning Research and scientific writing Physics of medical diagnostics
GENERAL INFORMATION ON COURSE TEACHER	
Address	Ulica Tomislava Antunovića 17, 21212 Kaštela
Telephone number	+385 91 5267 120
E-mail address	Damir.Kovacic@pmfst.hr
Personal web page	www.kovaciclab.org
Year of birth	1973.
Scientist ID	254890
Research or art rank, and date of last rank appointment	Research associate (znanstveni suradnik), March 3rd 2013.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant professor of medical physics and biophysics, May 16th, 2013.
Area and field of election into research or art rank	Natural sciences, Medical Physics and Biophysics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	University of Split, Faculty of Science
Date of employment	Since October 28th, 2016 employed full time

Name of position (professor, researcher, associate teacher, etc.)	Assistant professor
Field of research	Auditory neurophysiology, biophysics of hearing, neuroelectronics
Function	Assistant Professor in Department of Physics
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	International School for Advanced Studies, Cognitive Neuroscience Sector
Place	Trieste, Italy
Date	November 14th, 2007
INFORMATION ON ADDITIONAL TRAINING	
Year	2008-2011
Place	Leuven, Belgium
Institution	Katholieke Universiteit Leuven (KU Leuven)
Field of training	Auditory neurophysiology
Year	2011
Place	Leuven
Institution	IMEC
Field of training	Auditory Neuroelectronics
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English 5 German 2 Italian 3
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Medical Physics and Biophysics, Faculty of Medicine, University of Split, graduate study Translational Research of Speech and Hearing, Faculty of Medicine, University of Split, Postgraduate Doctoral Study Biophysical basics of electrical stimulation of nervous tissue, Faculty of Medicine, University of Split, graduate study
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1.Radotić, Viktorija; Braeken, Dries; Kovačić, Damir. Microelectrode array-induced neuronal alignment directs neurite outgrowth: analysis using a fast Fourier transform (FFT). // European biophysics journal. 46 (2017),8; 9-9. [IF = 1.9, 0] 2. Adler, H.J.; ...; Kovačić, Damir; ...; Wong, V. Community network for deaf scientists. // Science. 356 (2017) , 6336; 386-387, [IF=37.2, 0] 3. Mattotti, Marta; Micholt, Liesbeth; Braeken Dries; Kovačić, Damir. Characterization of spiral ganglion neurons cultured on silicon micro-pillar substrates for new auditory neuro-electronic interfaces. // Journal of neural engineering. 12 (2015) , 2; 026001-1-026001-12 [IF=3.5, 10] 4. Michelet, Pascal; Kovačić, Damir; Joris, Philip. Ongoing temporal coding of a stochastic stimulus as a function of intensity: time-intensity trading. // The Journal of neuroscience. 32 (2012), 28; 9517-9527 [IF=5.9, 7] 5. Verschooten, Eric; Robles, Luis; Kovačić, Damir; Joris Philip.

	Auditory nerve frequency tuning measured with forward-masked compound action potentials. // JARO - Journal of the association for research in otolaryngology. 13 (2012) , 6; 799-817 [IF=2.5, 10]
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	2015-2016 EvoNA - Research scholarships for professional development of young researchers and postgraduate students in the field of medical neuroelectronics Structural grant European Commission HR.3.2.01-0320 Structural grant European Commission HR.3.2.01 208.000 € 2015-2016 STRIPMED - Strengthening the Capacity for Research, Development and Innovation of the University of Split in the Field of Medical Neuroelectronics Structural Grant European Commission RC.2.2.08.-0059 Structural Fund for Research and Innovation 796,807 € 2013-2014 CortexSTIM Science Innovation Investment Fund (SIIF) IPA IIIc 344,430 € 2014-2017 VoiceCI - voice pitch in cochlear implant users Science-Business Cochlear Corporation 40.920 € 2012-2013 Auditory Neuro-Electronic Interfaces Proof of Concept IV BICRO - Business Innovation Agency d.d. 46,300 €
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	„*The art of medical teaching*“, organized by Croatian Association of Medical Education, October 2012.
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	Slobodna Dalmacija “Kruno Prijatelj”, 2015 Marie Curie Fellow, European Commission 2008-2010, 2012-2015 Rector's Award, “Dynamics of Coupled van der Pol Oscillators as Generators of Otoacoustic Emissions“, 1996/1997

First and last name and title of teacher	Jasna Puizina, Prof. Dr.
The course he/she teaches in the proposed study program	Molecular genetics
GENERAL INFORMATION ON COURSE TEACHER	
Address	Ruđera Boškovića 33
Telephone number	021-619-222 (260)
E-mail address	puizina@pmfst.hr http://mapmf.pmfst.unist.hr/~puizina/index.php/en/
Year of birth	1964.
Scientist ID	171072
Research or art rank, and date of last rank appointment	Natural Sciences: Scientific Adviser 25.02.2014. Full Professor 20.3.2014. Biotechnical Sciences, 24.11.2017.
Area and field of election into research or art rank	Natural Sciences, Biology Biotechnical Sciences, Biotechnology

INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Science, University of Split
Date of employment	31.08.1988.
Name of position (professor, researcher, associate teacher, etc.)	Dean, Full Professor
Field of research	Genetics, molecular and cellular biology, molecular evolution
Function	Dean of the Faculty of Science in the period 2016.-2018. Head of the Committee for Improving Quality 2009.-2012. Vice Dean for Education, Faculty of Science 2008.-2009. Head of the Department of Biology, Faculty of Science, 2000.-2002.
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Science, University of Zagreb
Place	Zagreb
Date	7.07.1997.
INFORMATION ON ADDITIONAL TRAINING	
Year	June - July 2005., six weeks
Place	Vienna, Austria
Institution	Gregor Mendel Institute for Plant Molecular Biology, Austrian Academy of Science
Field of training	Molecular biology and genetics
Year	September 2002 - October 2004, a two-year postdoctoral training
Place	Vienna, Austria
Institution	Gregor Mendel Institute for Plant Molecular Biology, Austrian Academy of Science
Field of training	Molecular biology and genetics
Year	February 1998., a one-month training February 1996., a one-month training
Place	Ljubljana, Slovenia
Institution	Centre for Plant Biotechnology and Breeding, Biotechnical Faculty, University of Ljubljana, Slovenia
Field of training	Molecular biology and genetics
Year	October-November 1996, two months training
Place	Katowice, Poland
Institution	Department of Plant Anatomy and Cytology, Silesian University, Katowice, Poland
Field of training	Molecular cytogenetics
Year	November-December 1995, two months training
Place	Vienna, Austria
Institution	Department of Cytology and Genetics, Institute of Botany, University of Vienna, Austria
Field of training	Molecular cytogenetics
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian

Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English, very good (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	German, sufficient (2)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study program where it is/was offered, and level of study program)	• Genetics, Molecular Biology and Evolution at the undergraduate study Marine biology and ecology, • Genetics and molecular biology, integrated study of Pharmacy, • Genetics and molecular biology, integrated study of Teachers for primarily schools with emphasizes on Biology
Authorship of university/faculty textbooks in the field of the course	Web teaching materials for courses Genetics, Molecular Biology and Evolution
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Fredotović, Željana; Šprung, Matilda; Soldo, Barbara; Ljubenkov, Ivica; Budić-Leto, Irena; Bilušić, Tea; Čikeš-Čulić, Vedrana; Puizina, Jasna. Chemical Composition and Biological Activity of A. cepa L. and A. × cornutum (Clementi ex Visiani 1842) Methanolic Extracts. // Molecules. 22 (2017.), 34; 448-1-448-13. 2. Maravić, Ana; Skočibušić, Mirjana; Fredotović, Željana; Šamanić, Ivica; Cvjetan, Svjetlana; Knezović, Mia; Puizina, Jasna. Urban riverine environment is a source of multidrug-resistant and ESBL-producing clinically important Acinetobacter spp. // Environmental Science and Pollution Research. 23 (2016), 4; 3525-3535. 3. Šamanić, Ivica; Cvitanić, Ratko; Simunić, Juraj; Puizina, Jasna. Arabidopsis thaliana MRE11 is essential for activation of the cell cycle arrest, transcriptional regulation and the DNA repair upon the induction of double- stranded DNA breaks. // Plant biology. 18 (2016), 4; 681-694. 4. Maravić, Ana; Skočibušić, Mirjana; Cvjetan, Svjetlana; Šamanić, Ivica; Fredotović, Željana; Puizina, Jasna. Prevalence and diversity of extended-spectrum-β-lactamase-producing Enterobacteriaceae from marine beach waters. // Marine pollution bulletin. 90 (2015), 1/2; 60-67. 5. Fredotović, Željana; Šamanić, Ivica; Schneeweiss-Weiss, Hanna; Kamenjarin, Juraj; Jang, Tae-Soo; Puizina, Jasna. Triparental origin of triploid onion, Allium × cornutum (Clementi ex Visiani, 1842), as evidenced by molecular, phylogenetic and

	cytogenetic analyses. // Bmc plant biology. 14 (2014); 24-1-24-20.
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works)	-
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	•"Genomic and epigenomske changes in the auto and allopoliploids the model plants of pyrethrum, shallots and anemone" - a member of the project team (HRZZ project, 2017.-2020.) - Head of project Prof. Dr. Višnja Besendorf • "Mechanisms of maintaining the stability of the genome in higher plants" 177-11911196-0829 (MZOŠ project, 2007.-2013.) - Project leader •"Genetics of brown algae from the genus Cytoseira (Phaeophyceae, Fucales) from the Adriatic Sea" bilateral Croatian-Austrian project (2012th-2013th) - the co-leader of the project • "The organization, functions and mechanisms of evolution of plant genomes", a member of the project team (MZOŠ project, 2007-2013) 119-1191196-1201, Head of project Prof. Dr. Višnja Besendorfer
The name of the program and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?	Completed integrated four-year program for Teacher of biology and chemistry (1988)
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	• 1985 Award of the Rector of the University of Split • 1986 Award of the Rector of the University of Split • 1987 Award of the Rector of the University of Split • 1998 Award of the Croatian Academy of Sciences and Arts in the field of natural sciences (together with prof. Dr. Sc. Dražena Papeš)
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	Ivica Šamanić, Assistant Professor
The course he/she teaches in the proposed study programme	Laboratory Exercises in Molecular Biology
GENERAL INFORMATION ON COURSE TEACHER	
Address	Dinka Šimunovića 9, 21 000 Split
Telephone number	091 521 5436
E-mail address	isamanic@pmfst.hr
Year of birth	1971
Scientist ID	287826
Research or art rank, and date of last rank appointment	Research Assistant, February 25, 2014
Area and field of election into research or art rank	natural sciences, biology

INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	The Faculty of Science of the University of Split
Date of employment	May 26, 2016
Name of position (professor, researcher, associate teacher, etc.)	Assistant Professor in Biology
Field of research	Cytogenetics and Molecular Biology of Plants
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	*Ph.D.*
Institution	*Faculty of Science*, *University of Zagreb*
Place	Zagreb
Date	July 11, 2012
INFORMATION ON ADDITIONAL TRAINING	
Year	2007
Place	Zagreb
Institution	Ruđer Bošković Institute
Field of training	Methodological Courses in biology and medicine " DNA and RNA"
Year	2008
Place	Zagreb
Institution	Faculty of Science, University of *Zagreb*
Field of training	*In situ* hybridization to plant chromosomes – a practical introduction to its uses in biosystematics
Year	2013
Place	Vienna
Institution	*University of Vienna*, *Institute* for *Botany*
Field of training	In situ hybridization techniques
Year	2014
Place	České Budějovice
Institution	Institute of Plant Molecular Biology
Field of training	3rd Workshop on the Application of Next Generation Sequencing to Repetitive DNA Analysis in Plants
Year	2017
Place	Split
Institution	The Faculty of Science of the University of Split; Penn State University
Field of training	Active Learning in STEM Education
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian language
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English language
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme	Research rotation in the laboratory and participation in at least one scientific experiment, Biophysics, Graduate program;

where it is/was offered, and level of study programme)	Cytogenetic analysis of chromosomes, Biology and Chemistry, Undergraduate program
Authorship of university/faculty textbooks in the field of the course	Ivica Šamanić, Jasna Puizina Practical Course in Molecular Genetics The script is for internal use
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Fredotović Ž, Šamanić I, Kamenjarin J, Puizina J (2017) The triparental triploid onion Allium × cornutum (Clementi ex Visiani, 1842) possesses a sterile S-type of cytoplasm. *Genetic resources and crop evolution* 1: 1-13 2. Šamanić I, Cvitanić R, Simunić J, Puizina J (2016) *Arabidopsis thaliana* MRE11 is essential for activation of the cell cycle arrest, transcriptional regulation and the DNA repair upon the induction of double- stranded DNA breaks. *Plant biology* 18: 681-694 3. Fredotović Ž, Šamanić I, Schneeweiss-Weiss H, Kamenjarin J, Jang Tae-Soo, Puizina J (2014) Triparental origin of triploid onion, Allium × cornutum (Clementi ex Visiani, 1842), as evidenced by molecular, phylogenetic and cytogenetic analyses *Bmc plant biology* 14: 24-1-24-20 4. Šamanić I, Simunić J, Riha K, Puizina J (2013) Evidence for Distinct Functions of MRE11 in Arabidopsis Meiosis. *Plos One* 8: 1-12 5. Puizina J, Šamanić I (2013) Reduced fertility and meiotic abnormalities in late generations of telomerase-deficient *Arabidopsis thaliana*. *Acta biologica cracoviensia series botanica* 55: 7-15
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	2012. – 2013. Genetic of the brown algae, Cystoseira spp. (Phaeophycae, Fucales) from the Adriatic Sea; Ministry of Science, Education and Sports, researcher 2008. - 2013. Maintenance of genome stability in plants; MZOS, research fellow 2017. -2021. Genomic and epigenomic alterations in auto- and allopolyploid species Dalmatian pyrethrum, shallots and anemones; Croatian Science Foundation, researcher
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?	The Biology and Chemistry graduate program, professor of biology and chemistry, Certification for biology and chemistry teacher, Two-year leadership training for high school prevention programs HIV/AIDS education program MEMOAIDS for secondary school students

	Professional development of teachers for implementation of Croatian National Education Standards for Primary Schools in the 2005/2006 school year Active Learning in STEM Education
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	Prof. dr. sc. Iva Marija Tolić
The course he/she teaches in the proposed study programme	Cell biophysics
GENERAL INFORMATION ON COURSE TEACHER	
Address	Preradovićeva ulica 22, Zagreb, Croatia
Telephone number	+385 1 457 1370
E-mail address	tolic@irb.hr
Personal web page	http://www.irb.hr/eng/People/Iva-Tolic
Year of birth	1974.
Scientist ID	260543
Research or art rank, and date of last rank appointment	Senior Research Group Leader 20.11.2013.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full Professor 23.04.2015.
Area and field of election into research or art rank	Natural sciences, Biology
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Ruđer Bošković Institute
Date of employment	20.01.2014.
Name of position (professor, researcher, associate teacher, etc.)	Senior Research Group Leader, Full Professor
Field of research	Cell biophysics, cell biology of the cytoskeleton
Function	Group Leader
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Ph.D. in Biology
Institution	University of Zagreb
Place	Zagreb, Croatia
Date	08.04.2002.
INFORMATION ON ADDITIONAL TRAINING 1	
Year	2001
Place	Copenhagen, Denmark
Institution	Niels Bohr Institute
Field of training	Biophysics
INFORMATION ON ADDITIONAL TRAINING 2	
Year	2003
Place	Florence, Italy

Institution	LENS - European Laboratory for Non-Linear Spectroscopy
Field of training	Biophysics
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	German 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian 4
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	1. PhD Program in Biophysics at the University of Split, Croatia 2. Molecular Cytogenetics at the Faculty of Science, University of Zagreb, guest lecturer 3. Biophysics of the Cell at the Faculty of Science, University of Zagreb, guest lecturer 4. Biophysics of the Cell Practical at the Faculty of Science, University of Zagreb
Authorship of university/faculty textbooks in the field of the course	-
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Vukušić, K., R. Buđa, A. Bosilj, A. Milas, N. Pavin, I.M. Tolić. (2017) Microtubule sliding within the bridging fiber pushes kinetochore fibers apart to segregate chromosomes. ***Dev Cell*** 43(1): 11–23. (IF=9.174) 2. Simunić, J. and I.M. Tolić. (2016) Mitotic spindle assembly: Building the bridge between sister k-fibers. ***Trends Biochem Sci*** 41(10): 824–833. Review. (IF=16.630) 3. Kajtez, J., A. Solomatina, M. Novak, B. Polak, K. Vukušić, J. Rüdiger, G. Cojoc, A. Milas, I. Šumanovac Šestak, P. Risteski, F. Tavano, A.H. Klemm, E. Roscioli, J. Welburn, D. Cimini, M. Glunčić, N. Pavin, and I.M. Tolić. (2016) Overlap microtubules link sister k-fibres and balance the forces on bi-oriented kinetochores. ***Nat Commun*** 7: 10298. (IF=11.470) 4. Ananthanarayanan, V., M. Schattat, S.K. Vogel, A. Krull, N. Pavin, and I.M. Tolić-Nørrelykke. (2013) Dynein motion switches from diffusive to directed upon cortical anchoring. ***Cell*** 153(7): 1526–1536. (IF=33.116) 5. Kalinina I, A. Nandi, P. Delivani, M.R. Chacón, A.H. Klemm, D. Ramunno-Johnson, A. Krull, B. Lindner, N. Pavin, and I.M. Tolić-Nørrelykke. (2013) Pivoting of microtubules around the spindle pole accelerates kinetochore capture. ***Nat Cell Biol*** 15(1): 82–87. (IF=20.058)
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	-

Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	1. 2015 – 2020: ERC Consolidator Grant. Topic: A new class of microtubules in the spindle exerting forces on kinetochores. Total amount granted: 2,150,000 EUR. 2. 2015 – 2019: Research grant from the Croatian Science Foundation (HRZZ). Topic: Oscillatory dynamics of the cytoskeleton. Total amount granted: 1,000,000 HRK (≈130,000 EUR). 3. 2015 – 2016: Grant from the European Social Fund (ESF), together with Igor Weber (PI), Ruđer Bošković Institute. Topic: Cytoskeletal dynamics and spindle assembly during cell division. Total amount granted: 1,600,000 HRK (≈210,000 EUR). 4. 2013 – 2016: Research grant from the German Research Foundation (DFG) together with Nenad Pavin, University of Zagreb. Topic: Kinetochore oscillations in mitotic metaphase. Total amount granted: 255,950 EUR. 5. 2013 – 2015: Research grant from the Unity Through Knowledge Fund (UKF) together with Nenad Pavin (PI), University of Zagreb. Topic: The role of microtubule pivoting in formation of complex structures such as microtubule bundles and mitotic spindles. Total cost of the project: 1,110,000 HRK (≈150,000 EUR).
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?	-
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	• Ignaz L. Lieben Award of the Austrian Academy of Sciences, 2017 • Award "Didak" for science, 2017 • National Science Award of the Republic of Croatia, 2016 • Croatian Women of Influence Award, 2016 • Special award of the Ruđer Bošković Institute for outstanding contribution to the scientific excellence and international recognition of the institute, 2015 • European Biophysical Societies Association EBSA Young Investigators' Medal and Prize, 2015 • 5000th ERC grantee, 2015 • MRAK award for creativity in science awarded for the collaboration with the Ruđer Bošković Institute • Order of Danica Hrvatska for science, outstanding contributions to science and its promotion in the Republic of Croatia and the world, 2014 • European Life Science Award in the category Investigator of the Year, 2014 • Chosen by the journal Cell as one of 40 scientists from around the world and working in diverse biological fields, "40 under 40", 2014 • 2001 – 2002: NATO stipend, Danish Natural Science Research Council
Results of student evaluation taken in the last five years for the course that is comparable to the	-

course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	Sanja Tomić, Prof. Dr.
The course he/she teaches in the proposed study programme	Molecular Modelling of Biomolecules and its Complexes
GENERAL INFORMATION ON COURSE TEACHER	
Address	Bijenička 54, Zagreb
Telephone number	+385-1-4571251
E-mail address	Sanja.tomic@irb.hr
Personal web page	http://www.irb.hr/eng/People/Sanja-Tomic
Year of birth	1958
Scientist ID	113604 (CROSBI) (orcid 0000-0002-0550-0878)
Research or art rank, and date of last rank appointment	Senior scientist
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Senior scientist (2008) / titular professor (since 2012 University of Zagreb and since 2013 University of Rijeka)
Area and field of election into research or art rank	Chemistry (biophysics – biochemistry)
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Ruđer Bošković Institute
Date of employment	1.09.1982.
Name of position (professor, researcher, associate teacher, etc.)	Senior scientist
Field of research	Computational biophysics/biochemistry
Function	Researcher/lab leader
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Ruđer Bošković Institute
Place	Zagreb
Date	1993
INFORMATION ON ADDITIONAL TRAINING	
Year	1996-1998
Place	Heidelberg
Institution	EMBL
Field of training	Computational biophysics
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	German 2
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme	Modelling of Biomacromolecules: Structure, Complexes and Interactions (Doctorate Study of Biochemistry and Biophysics, PMF, University of Zagreb, since 2002/03)

where it is/was offered, and level of study programme)	Crystalography and Modelling of Biomacromolecules (Diploma Study of Biochemistry, PMF, University of Zagreb, since 2008/09) Computational Chemistry (Dpt for Biotehnology, University of Rijeka) Chemometrics (Dpt for Biotehnology, University of Rijeka, 2012/13-2014/15)
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	Tus, A.; Rakipović, A.; Peretin, G.; Tomić, S.; Šikić*, M. BioMe: biologically relevant metals, *Nucleic acids research*. **v40 (Web Server Issue)** (2012). Tomić, A.; Tomić, S.* Hunting the human DPP III active conformation: combined thermodynamic and QM/MM calculations, *Dalton transactions*. **43** (2014); 15503-15514. Brkić, H., Kovačević, B., Tomić, S.* Human 3-hydroxyanthranilate 3, 4-dioxygenase (3HAO) dynamics and reaction, a multilevel computational study, *Molecular biosystems*. **11** (2015), 898-907. Matić J., Šupljika F., Tir N., Piotrowski P., Schmuck C., Abramić M., Piantanida I., Tomić S.* Guanidiniocarbonyl-pyrrole -aryl conjugates as inhibitors of human dipeptidyl peptidase III: combined experimental and computational study, *RSC Advances*. (2016) **6**; 83044-83052. Tomić A., Kovačević B.* and Tomić S.*, Concerted nitrogen inversion and hydrogen bonding to Glu451 are responsible for protein-controlled suppression of the reverse reaction in the human DPP III, *Physical Chemistry Chemical Physics* (2016) **18**; 27245-27256.
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	2011.–2012. Cogito bilateral project with France (coordinator M. Hranjec, University of Zagreb) - participants 2013-2016: FP7-REGPOT '**Enhancement of the InnovationPotential in SEE through new Molecular Solutions in Research and Development**' (EUR 4,738,978.00). Member of the in Work package 5 ('Dissemination'). HRZZ projekt: **'Flexibility, activity and structure correlations in the dipeptidyl peptidase III family' (01.07.2014-30.06.2017)** 'Alexander von Humboldt, Research Group Linkage' program: '**Study of plant enzymes from metallopeptidase families M20 and M49'** (1.3.2012-31.12.2015) **Coordinator** 2016. – 2017. Bilateral project with Austria (Karl Gruber, TU, Graz), **'An Interdisciplinary Study on Atypical Dipeptidyl Peptidases III (DPPs III) Structure and Dynamics** '.
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of	

competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	1996. Alexander von Humboldt fellowship 2012. Ruđer Bošković Institute award for scientific publication
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	Prof.Dr. Silvia Tomić
The course he/she teaches in the proposed study programme	Structure and interactions in polyelectrolytes: basic theory and experimental verification
GENERAL INFORMATION ON COURSE TEACHER	
Address	Medveščak 21, Zagreb
Telephone number	01 4698820
E-mail address	stomic@ifs.hr
Personal web page	http://sceinlom.ifs.hr/people/silvia-tomic/
Year of birth	1953
Scientist ID	065594
Research or art rank, and date of last rank appointment	Senior Research Advisor, 2004
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full profesor, 2014, University Split
Area and field of election into research or art rank	Natural sciences; Physics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Institut za fiziku
Date of employment	1977
Name of position (professor, researcher, associate teacher, etc.)	Senior Research Advisor
Field of research	Condensed matter physics
Function	Project leader
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Doctorat d'Etat es-Sciences Physiques
Institution	Universite Paris Sud
Place	Orsay
Date	1986
INFORMATION ON ADDITIONAL TRAINING	
Year	1987
Place	Orsay
Institution	Laboratoire de Physique des Solides
Field of training	Organic conductors and superconductors

MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English, 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	French, 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	German, 2
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Doctoral study, Split Doctoral Physics study, Biophysics, Zagreb
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	2 biophysics; 6 dielectric spectroscopy - „The effect of magnesium ions on dielectric relaxation in semidilute DNA solutions“, D.Grgicin, S.Dolanski Babić, T.Ivek, **S.Tomic**, R.Podgornik, Phys.Rev.**E88**, 052703 (2013). - “Effect of magnesium ions on the structure of DNA thin films: an infrared spectroscopy study”, K. Serec, S. Dolanski Babić, R. Podgornik and **S. Tomić**, Nucleic Acid Research **44**, 8456-8464 (2016). -
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	Croatian Academy of Sciences and Arts: Associate member in The Department of Mathematical, Physical and Chemical Sciences
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form	

(evaluation organizer, average grade, note on grading scale and course evaluated)	

Titula, ime i prezime nositelja	Prof.dr.sc. Alessandro Tossi
Predmet koji predaje na predloženom studijskom programu	Interdisciplinarni seminar
OPĆE INFORMACIJE O NOSITELJU	
Adresa	Odjel za znanosti o životu (Life Science), Sveučilište u Trstu
Telefon	+39 040 558 8705
E-mail adresa	atossi@units.it
Osobna web stranica	http://www.bbcm.units.it/~antimic/
Godina rođenja	-
Matični broj iz Upisnika znanstvenika	-
Znanstveno ili umjetničko zvanje i datum posljednjega izbora	Izvanredni profesor
Znanstveno-nastavno, umjetničko-nastavno ili nastavno zvanje i datum posljednjega izbora	Izvanredni profesor
Područje i polje izbora u znanstveno ili umjetničko zvanje	područje prirodnih znanosti, polje fizika
PODACI O SADAŠNJEM ZAPOSLENJU	
Ustanova zaposlenja	Sveučilište u Trstu, Odjel za znanosti o životu
Datum zaposlenja	
Naziv radnoga mjesta (profesor, istraživač, suradnik i sl.)	profesor
Područje rada	Molekularna kemija, peptidi, biologija, znanost o životu
Funkcija	sveučilišni nastavnik
PODACI O ŠKOLOVANJU – Najviši postignuti stupanj	
Zvanje	doktor znanosti
Ustanova	
Mjesto	
Nadnevak	1987
PODACI O USAVRŠAVANJU	
Godina	1978-1980 University of Melbourne, chemistry;
Mjesto	
Ustanova	
Područje usavršavanja	
Godina	1980-1982 University of Dublin, degree in chemistry;
Mjesto	
Ustanova	
Područje usavršavanja	
Godina	1990-1992 International Centre for Genetic Engineering and Biotechnology (ICGEB)
Mjesto	
Ustanova	
Područje usavršavanja	
Godina	1987-1990 Max-Planck-Institut fur Strahlenchemie, Germany.
Mjesto	
Ustanova	
Područje usavršavanja	
Godina	

Mjesto	
Ustanova	
Područje usavršavanja	
MATERINSKI I STRANI JEZICI	
Materinski jezik	talijanski
Strani jezik i poznavanje jezika na ljestvici od 2 (dovoljno) do 5 (izvrsno)	engleski, 5
Strani jezik i poznavanje jezika na ljestvici od 2 (dovoljno) do 5 (izvrsno)	
Strani jezik i poznavanje jezika na ljestvici od 2 (dovoljno) do 5 (izvrsno)	
KOMPETENCIJE ZA PREDMET	
Ranije iskustvo u nositeljstvu sličnih predmeta (navesti naziv predmeta, studijskoga programa na kojem se izvodi/izvodio i razinu studijskoga programa)	Interdisciplinarni seminar
Autorstvo sveučilišnih/fakultetskih udžbenika iz područja predmeta	
Stručni, znanstveni i umjetnički radovi objavljeni u posljednjih pet godina iz područja predmeta **(najviše 5 referenca)**	• A Tossi, M Scocchi, S Zahariev, R Gennaro. (2012) Use of Unnatural Amino Acids to Probe Structure-Activity Relationships and Mode-of-Action of Antimicrobial Peptides. Methods Mol Biol. 2794:169-83. • M. Scocchi, A. Tossi, R. Gennaro (2011) Proline-rich antimicrobial peptides: converging to a non-lytic mechanism of action. Cell Mol. Life Sci. 68(13):2317-30. • F. Morgera, S. Pacor, L. Creatti, N. Antcheva, L. Vaccari, A. Tossi. (2011) Effects on APC antigen presenting cells of short-term interaction with the human human host defense peptide beta-defensin 2. Biochem. J. 436:537-546 • D. Juretić, D. Vukičević, D. Petrov, M.Novković, V. Bojović, B. Lučić,N. Ilić, A. Tossi, (2011) Knowledge-based computational methods for identifying or designing novel, non-homologous antimicrobial peptides. Eur. J. Biophys. 40(4):371-85 • L. Padovan, L. Segat, A. Pontillo, N. Antcheva, A.Tossi, S.Crovella (2010) Histatins in non-human primates: gene variations and functional effects. Protein Pept Lett. 17(7):909-18. • V. Sass, T. Schneider, M.Wilmes, C. Koerner, A. Tossi, N. Novikova, O. Shamova, and H.-G. Sahl (2010) Human □□-defensin 3(hBD3) inhibits cell wall biosynthesis in staphylococci Infect. Immun. (Epub ahead of print).
Stručni i znanstveni radovi iz metodike i kvalitete nastave objavljeni u posljednjih pet godina **(najviše 5 referenca)**	
Stručni, znanstveni i umjetnički projekti iz područja predmeta koji su se provodili u posljednjih pet godina **(najviše 5 referenca)**	Marie Curie IAPP (NAM - New AntiMicrobials) in the 7th FP; FVG regional project R3A2 (Regional Research Network on Antiinfective Agents). Regional Biophysical Conference 2016 Trieste 25-28 agosto 2016 Fondi residui FRA 201 FRA 2011 - Activity of host defence peptides ART. 23 LR 26/2005 - R3A2 Progetto Nerviano FP7-PEOPLE-2007-3-1-IAPP, Marie Curie Actions

	Conjugation of antibiotics to a peptide vector
U sklopu kojega programa i u kojem je opsegu nositelj stekao metodičko- psihološko-didaktičko - pedagoške kompetencije?	
PRIZNANJA I NAGRADE	
Priznanja i nagrade za nastavni i znanstveni rad/umjetnički rad	

First and last name and title of teacher	Prof. dr. Leandra Vranješ Markić
The course he/she teaches in the proposed study programme	Entrepreneurship and technology transfer
GENERAL INFORMATION ON COURSE TEACHER	
Address	Šoltanska 32
Telephone number	021 485 105
E-mail address	leandra@pmfst.hr; lvranjesmarkic@gmail.com
Personal web page	www.pmfst.hr/~leandra
Year of birth	8.6.1973.
Scientist ID	234884
Research or art rank, and date of last rank appointment	Scientific advisor, 17.12.2015.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full professor, 1. 6. 2016.
Area and field of election into research or art rank	Natural sciences, physics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	University of Split, Faculty of Science
Date of employment	April 15 1997
Name of position (professor, researcher, associate teacher, etc.)	Full professor
Field of research	Physics, Condensed matter physics, Quantum fluids, Ultracold atoms
Function	Teaching and research
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	University of Zagreb, Faculty of Science
Place	Zagreb
Date	October 10 2002
INFORMATION ON ADDITIONAL TRAINING	
Year	2000. 3months, 2004.-2006 1 month each.; 2013.-2014.
Place	Linz, Barcelona, Newark (USA)
Institution	Johannes Kepler Universitat Linz; Universidad Politecnica de Catalunya; University of Delaware
Field of training	Quantum fluids and Quantum Monte Carlo simulations
INFORMATION ON ADDITIONAL TRAINING	
Year	2006 and 2007
Place	Zagreb
Institution	CARDS 2003 National Programme for Croatia

Field of training	„Intellectual Property Rights Infrastructure for the Research and Development Sector in Croatia“ – Specialist Training Workshops
INFORMATION ON ADDITIONAL TRAINING	
Year	2008 and 2009
Place	Zagreb, Split
Institution	PHARE 2006 Croatia:“ Capacity building in technology transfer institutions in order to enhance research commercialization activities“
Field of training	Workshops and individual consultations in the area of technology transfer
INFORMATION ON ADDITIONAL TRAINING	
Year	2010
Place	Zagreb
Institution	Državni zavod za intelektualno vlasništvo, Zagreb (Croatia)
Field of training	Intelectual property for business (IP4INNO)
INFORMATION ON ADDITIONAL TRAINING	
Year	2012.
Place	Cambridge and surrounding, Great Britain
Institution	BioPark Hertfordshire, University of Cambridge, University of Hertfordshire Hatfield
Field of training	Building innovation systems, commercialization of research results, preparation of science and technology projects
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English, 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	German, 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Spanish, 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	French, 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian, 4
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Enterpreneurship and tecnology transfer at the PhD program TRIBE, Medical faculty in Split Genrating ideas, testing and developing business opportunity, Business plan, Program postakademskog zapošljavanja i stjecanja upravljačkih sposobnosti studenata Sveučilišta u Splitu
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five	

years in the field of the course (5 works at most)	
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	1)"Services in support of business and innovation" 2008-2016 (2008-2012 manager, later collaborator) 2) IPA IIIc projekt TTAdria - „Technology transfer infrastructure in the Croatian Adriatic Region", project advisor, april 2013- september 2015 3)Program for support to Technology transfer offices 2015-2016 4) IPA IIIc projekt CortexStim, „Enhancement of science-business cooperation for intraoperative neurophysiologic technology in Croatia", april 2014 – march 2015, collaborator 5) STRIP projekt STRIPmed 'Enhancement of University of Split capacity for research, development and innovation in medical neuroelectronics' december 2014 – may 2016., collaborator
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	Within the study for Education in Mathematics and Physics, Univesity of Zagreb (profesor matematike i fizike)
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	Faculty of Science in Split award for research in 2017. Fulbright Grant, „Liquid and Solid Helium in Porous Media", rseptember 2013- may 2014 Austrian "Ernst Mach", three-month scholarship in 2000.
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	Prof. dr. sc. Igor Weber
The course he/she teaches in the proposed study programme	Cell biophysics
GENERAL INFORMATION ON COURSE TEACHER	
Address	Trstenik 149, 10040 Zagreb
Telephone number	01-4571219
E-mail address	iweber@irb.hr
Personal web page	http://www.irb.hr/eng/People/Igor-Weber
Year of birth	1963.
Scientist ID	162634
Research or art rank, and date of last rank appointment	Senior scientist, 11.7.2006.

Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full professor, 17.12.2014.
Area and field of election into research or art rank	Natural sciences, Biology
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Ruđer Bošković Institute
Date of employment	1.8.2002.
Name of position (professor, researcher, associate teacher, etc.)	Senior scientist
Field of research	Cell biophysics, cell biology of the cytoskeleton
Function	Head of the Laboratory of cell biophysics
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Ph. D.
Institution	Technical University Munich
Place	Munich, Germany
Date	12.5.1995.
INFORMATION ON ADDITIONAL TRAINING	
Year	1996
Place	Martinsried, Germany
Institution	Max-Planck-Institute for Biochemistry, postdoctoral training
Field of training	Cell biology
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English, 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	German, 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Slovenian, 2
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	2007-2016 Cell biophysics I, postgraduate course, postgraduate doctoral programme in Biophysics, University of Split 2005-2015 Cell biophysics, postgraduate course, postgraduate doctoral programme in Biophysics, Faculty of Natural Sciences, University of Zagreb
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	- Filić, V., Marinović, M., Šoštar, M., Weber, I. (2018). Modulation of small GTPase activity by NME proteins. Lab. Invest. (in press) (IF=4.8; Q1) - Junemann, A., Filić, V., Winterhoff, M., Nordholz, B., Litschko, C., Schwellenbach, H., Stephan, T., Weber, I. and Faix, J. (2016). A Diaphanous-related formin links Ras signaling directly to actin assembly in macropinocytosis and phagocytosis. Proc. Natl. Acad. Sci. USA 113: E7464. (IF=9.6; Q1) - Marinović, M., Šoštar, M., Filić, V., Antolović, V., Weber, I. (2016). Quantitative imaging of Rac1 activity in Dictyostelium cells with a fluorescently labelled GTPase-binding domain

	from DPAKa kinase. Histochem. Cell Biol. 146: 267. (IF=2.5; Q1) - Ramalingam, N., Franke, C., Jaschinski, E., Winterhoff, M., Lu, Y., Brühmann, S., Junemann, A., Meier, H., Noegel, A.A., Weber, I., Zhao, H., Merkel, R., Schleicher, M. and Faix, J. (2015). A resilient formin-derived cortical actin meshwork in the rear drives actomyosin-based motility in 2D-confinement. Nat. Commun. 6: 8496. (IF=12.1; Q1) - Filić, V., Marinović, M., Faix, J. and Weber, I. (2014). The IQGAP-related protein DGAP1 mediates signaling to the actin cytoskeleton as an effector and a sequestrator of Rac1 GTPases. Cell. Mol. Life Sci. 71: 2775. (IF=5.7; Q1)
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	2016–19 COST action NEUBIAS (Network of European BioImage Analysts), Management Committee member. 2015–19 Croatian science fundation (HRZZ), Oscilatory dynamics of the cytoskeleton - OSCITON (PI: Iva Tolić), colaborator. 2015–16 Ministry of science and education of the Republic of Croatia (MZO) / European social fund, Research stipends for professional development of young researchers and postdocs: Interdisciplinary research in cell biology – InterBio, coordinator. 2015–16 DAAD (Germany) and MZO (Croatia), bilateral project: Highly resolved imaging of the signaling protein Rac1 in motile cells (co-PI with Carsten Baom, University of Potsdam). 2013–16 EU, FP7-REGPOT, Enhancement of the Innovation Potential in SEE through new Molecular Solutions in Research and Development-InnoMol (coordinator: Oliver Vugrek), Management Committee member.
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	Dr Dražen Zanchi
The course he/she teaches in the proposed study programme	Experimental methods of physics in biophysics

GENERAL INFORMATION ON COURSE TEACHER	
Address	Tolstojeva 33, Split
Telephone number	098 597 480 / +33 6 78 95 47 35
E-mail address	drazen.zanchi@ens.fr
Personal web page	https://zanchinet.wordpress.com/
Year of birth	1968
Scientist ID	277963
Research or art rank, and date of last rank appointment	PHD
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Maître de conférences
Area and field of election into research or art rank	Physics, condensed matter physics and statistical physics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	1) Université de Paris 7 Denis Diderot, Paris & 2) Ecole Normale Supérieure, Paris
Date of employment	1999 & 2010
Name of position (professor, researcher, associate teacher, etc.)	Lecturer and Researcher
Field of research	Biophysics and soft matter physics
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Université de Paris 11
Place	Orsay
Date	11/09/1996
INFORMATION ON ADDITIONAL TRAINING	
Year	1996-1998
Place	Berlin, Germany
Institution	Free University
Field of training	Condensed matter physics
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	French 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	German 4
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	1) Biophysics for medicine and biology undergraduate students at the University Paris 7 2) Experimental project (Dynamical light scattering and 3D particle tracking methods) for students of physics at Ecole Normale Supérieure, Paris, undergraduate
Authorship of university/faculty textbooks in the field of the course	/
Professional, scholarly and artistic articles published in the last five	1) Mixed copolymer adlayers allowing reversible thermal control of single cell aspect ratio, F Dalier, GV Dubacheva, M

years in the field of the course (5 works at most)	Coniel, D Zanchi, A Galtayries, M Piel, ACS applied materials & interfaces doi: 10.1021/acsami.7b18513. (2018) 2) Rolling and aging in temperature-ramp soft adhesion G Boniello, C Tribet, E Marie, V Croquette, D Zanchi, PHYSICAL REVIEW E 97, 012609-012705 (2018) 3) Reversible and dynamical control of aggregation and soft adhesion of T-responsive polymer-coated colloids G Boniello, J Malinge, C Tribet, E Marie, D Zanchi Colloids and Surfaces A: Physicochemical and Engineering Aspects (2017) 4) Aggregation of antibody drug conjugates at room temperature: SAXS and light scattering evidence for colloidal instability of a specific subpopulation B Frka-Petesic, D Zanchi, N Martin, S Carayon, S Huille, C Tribet Langmuir 32 (19), 4848-4861 (2016) 5) Tailored stimuli-responsive interaction between particles adjusted by straightforward adsorption of mixed layers of Poly (lysine)-g-PEG and Poly (lysine)-g-PNIPAM ... J Malinge, F Mousseau, D Zanchi, G Brun, C Tribet, E Marie Journal of colloid and interface science 461, 50-55 (2016)
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	/
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	Participant as researcher in: Dynamic control of aggregation and purification of patchy particles, single partner, ANR (Agence Nationale de Recherche), 310 k€, 2013-2017 Partner participant lieder in: Colloidal destabilisation of limpid drinks: apple juice, apple cider, beer, red and white wines, 6 partners, CASDAR, French project, 900 k€, 2014-2018.
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	University teaching experience since 1998. (192 h/year)
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	Humboldt Fellow (1996)
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	Biophysics: Written exam, evaluation 1-20, average 10 Experimental project: final report, evaluation 1-20, average 16

First and last name and title of teacher	Larisa Zoranić
The course he/she teaches in the proposed study programme	Modeling of biomacromolecules and their complexes
GENERAL INFORMATION ON COURSE TEACHER	
Address	Papandopulova 5
Telephone number	0981815187
E-mail address	larisaz@pmfst.hr
Personal web page	http://projekti.pmfst.unist.hr/~larisa1/
Year of birth	
Scientist ID	254280
Research or art rank, and date of last rank appointment	assistant professor 2011.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	assistant professor 2011.
Area and field of election into research or art rank	Natural Science, Physics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Science, University of Split
Date of employment	15.11. 2000.
Name of position (professor, researcher, associate teacher, etc.)	assistant professor
Field of research	biophysics and condensed matter physics
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Dr.Sc.
Institution	University of Zagreb, Croatia and University Pierre and Marie Curie, Paris, France
Place	Zagreb
Date	18. 12. 2008.
INFORMATION ON ADDITIONAL TRAINING	
Year	2011. (7 months)
Place	Brisbane, Australia
Institution	School of Chemistry and Molecular Bioscience, The University of Queensland, Brisbane, Australia
Field of training	Biophysics, molecular dynamic simulations of peptides and membranes
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English, 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	French, 3
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian, 2
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme	Faculty of Sciences, University of Split Biophysics (graduate, physics) Course in computational modeling, molecular dynamics and statistical physic of liquids (graduate and

where it is/was offered, and level of study programme)	postgraduate, biophysics) Numerical methods in Physics (undergraduate, physics) Statistical mechanics (undergraduate, physics)
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Rončević, Tomislav; Gajski, Goran; Ilić, Nada; Goić-Barišić, Ivana; Tonkić, Marija; Zoranić, Larisa; Simunić, Juraj; Benincasa, Monica; Mijaković, Marijana; Tossi, Alessandro; Juretić, Davor. PGLa-H tandem-repeat peptides active against multidrug resistant clinical bacterial isolates. // *Biochimica et biophysica acta. Biomembranes*. 1859 (2017) , 2; 228-237 2. Požar, Martina; Kerasidou, Ariadni; Lovrinčević, Bernarda; Zoranić, Larisa; Mijaković, Marijana; Primorac, Tomislav; Sokolić, Franjo; Teboul, Victor; Perera, Aurélien. The microscopic structure of cold aqueous methanol mixtures. // *The Journal of chemical physics*. 145 (2016) ; 144502-1-144502-10 3. Požar, Martina; Lovrinčević, Bernarda; Zoranić, Larisa; Mijaković, Marijana; Sokolić, Franjo; Perera, Aurélien. A re-appraisal of the concept of ideal mixtures through a computer simulation study of the methanol-ethanol mixtures. // *The Journal of chemical physics*. 145 (2016) , 6; 064509-1-064509-10 4. Požar, Martina; Lovrinčević, Bernarda; Zoranić, Larisa; Primorac, Tomislav; Sokolić, Franjo; Perera, Aurélien. Micro-heterogeneity versus clustering in binary mixtures of ethanol with water or alkanes. // *Physical chemistry chemical physics*. 18 (2016) , 34; 23971-23979 5. Požar, Martina; Seguier, Jean-Baptiste; Guerche, Jonas; Mazighi, Redha; Zoranić, Larisa; Mijaković, Marijana; Kežić-Lovrinčević, Bernarda; Sokolić, Franjo; Perera, Aurélien. Simple and complex disorder in binary mixtures with benzene as a common solvent. // *Physical Chemistry Chemical Physics*. 17 (2015) , 15; 9885-9898
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	2014-2017: Installation Research Projects : Multi-scale description of meso-scale domain formation and destruction - Principal Investigator - funded by Croatian Science Foundation 2016-2017: Anomalous properties and solvation in alcohols and mixtures of water and alcohols – project leader for Croatia- International collaboration between Slovenia and Croatia

	2015-2016: Fluctuations of energy and entropy in complex mixtures – project leader for Croatia COGITO project-International collaboration between France and Croatia
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	Fellowship of The Group of Eight, Australia
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	dr.sc. Paško Županović
The course he/she teaches in the proposed study programme	Thermodynamics of irreversible processes
GENERAL INFORMATION ON COURSE TEACHER	
Address	Palmotićeva 9, Split
Telephone number	091 731 3126
E-mail address	pasko@pmfst.hr
Personal web page	
Year of birth	1954
Scientist ID	**071071**
Research or art rank, and date of last rank appointment	Scientific Adviser 1.06.2012
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full professor 11.07.2012
Area and field of election into research or art rank	Science, physics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Science Splitu
Date of employment	1.09.1979
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Physics
Function	Head of physics department
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Ph.D.
Institution	Faculty of Science
Place	Zagreb
Date	May 1998
INFORMATION ON ADDITIONAL TRAINING	
Year	Prirodoslovno-matematički fakultet u Splitu
Place	1.09.1979

Institution	Profesor
Field of training	Fizika
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatina
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	General Physics IV Undergraduate study of Engineering Physics, Thermodynamics and Mechanics Thermodynamics of irreversible processes, Graduate study of Engineering Physics, orientation Thermodynamics Devices
Authorship of university/faculty textbooks in the field of the course	P. Županović, Termodinamika s elementima statističke fizike, Element, Zagreb, 2016.
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1.Domagoj Kuić, Paško Županović and Davor Juretić Macroscopic Time Evolution and MaxEnt Inference for Closed Systems with Hamiltonian Dynamics Foundations of Physics DOI 10.1007/s10701-011-9604-x 1. Andrej Dobovišek, Paško Županović, Milan Brumen, Željana Bonačić Lošić, Domagoj Kuić and Davor Juretić: Enzyme kinetics and the maximum entropy production principle *Biophysical Chemistry 2011,*
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	

Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	