

UNIVERSITYOFSPLIT

FACULTY OF ELECTRICAL ENGINEERING, MECHANICAL ENGINEERING AND NAVAL ARCHITECTURE

DETAILED PROPOSAL OF THE STUDY PROGRAMME

UNDERGRADUATE VOCATIONAL STUDY IN COMPUTING

SPLIT, February 2022

1.1. List of mandatory and elective courses

List of courses									
Year of study	:1.								
Semester: I.									
	CODE	COURSE	N SEN	MEST	ECTS				
STATUS	CODE	COURSE	L	S	AE	LE	DE	ECIS	
STATUS	FENP02	Electrical engineering	lectrical engineering 30 0 15 15 0						
	* L = lecture	es, S = seminars, AE = auditory excercise, LE = labor	atory ex	cercis	e, DE =	desigi	n excer	cise	

List of courses									
Year of study:1.									
Semester: II	Semester: II.								
OTATUO	CODE	COURSE	НО	URSI	N SEI	MEST	ER*	ECTS	
31A103	CODE	COURSE	L	S	AE	LE	DE	ECIS	
	FEMY02	Applied mathematics	30	0	30	0	0	5	
Mandatory	FELP03	Programming 2	60	0	30	30	0	10	
	* L = lecture	es, S = seminars, AE = auditory excercise, LE = labor	atory ex	xcercis	e, DE =	= desigi	n excer	cise	

List of courses									
Year of study	:2.								
Semester: III.									
	CODE	COURSE	НО	URSI	N SEN	MEST	ER*	ECTS	
STATUS	CODE	COORSE	L	S	AE	LE	DE	ECIS	
01/(100	FELP24	Algorithms and data structures	30	0	0	30	0	5	
	* L = lecture	es, S = seminars, AE = auditory excercise, LE = labor	atory ex	xcercis	e, DE =	= desigi	n excer	cise	

List of courses									
Year of study	:2.								
Semester: IV									
	CODE	COURSE	HOURS IN SEMESTER*						
STATUS	CODE	COURSE	L	S	AE	LE	DE	LOIS	
01/(100	FELP11	FELP11 Programming in Java		0	0	30	0	6	
	* L = lectures, S = seminars, AE = auditory excercise, LE = laboratory excercise, DE = design excercise								

List of courses									
Year of study: 3.									
Semester: V.									
STATUS	CODE	COURSE	НО	URSI	N SEN	IEST	ER*	ECTS	
STATUS CODE		COURSE	L	S	AE	LE	DE	ECIS	
Mandatory	FELP25	Software engineering	30	0	0	30	0	5	
FELP15 Databases 2				0	0	30	0	5	
* L = lectures, S = seminars, AE = auditory excercise, LE = laboratory excercise, DE = design excercise									

1.2. Course description

NAME OF THE COURSE	ELECTRICAL ENGINEER	RING								
Code	FENP02	Year of study								
Course teacher	Vicko Dorić, Ph.D., Associate Professor	Credits (ECTS)	6							
Associate teachers	Ivana Zulim, Ph.D.	Type of instruction	L	S	AE	LE	DE			
		Percentage of	30	0	15					
Status of the course	Obligatory	application of e-learning	0							
	COURSE	E DESCRIPTION								
Course objectives	 Training students for: understanding and app engineering, setting up and solving permanent adoption ar engineering. 	understanding and application of basic principles and laws of electrical engineering, setting up and solving simple electrical circuits, permanent adoption and deepening of knowledge in the field of electrical engineering								
Course enrolment requirements and entry competences required for the course	None	ne								
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: define the fundamental phenomena, the quantities and the laws of electrical engineering, apply fundamental laws of electrical engineering for the calculation of electromagnetic quantities, apply methods and techniques for solving of linear electrical networks, formulate simple electrical networks, analyse simple electrical networks, calculate quantities of simple magnetic circuits,									
	Course content			L	or S	4	ΑE			
	Introduction to Electrical Er	ngineering. Brief history of	electric	al	2	nc	0			
	Electric charges. Electrosta	atic field and potential.			2		1			
	Electrical capacity, capacit	ors.			2		1			
	Magnetic field. Magnetic field	eld lines. Magnetic flux			2		1			
	Electromagnetic induction.				2		1			
	Electric currents. Ohm's La	w. Voltage and Current so	ources.		2		1			
Course content	Kirchhoff's lows. Power an	d energy of DC current.			2		1			
broken down in	Analysis methods for linear	r circuits.			2		2			
detail by weekly class schedule	Time varying currents and voltages. AC currents effect	voltages. Alternating curre	ents and	ł	2		1			
(sylladus)	Average and effective valu circuits.	e. I-U characteristics within	n AC		2		1			
	Power and energy of AC c	urrent.			2		1			
	Fazor representation of the AC circuits analysis using of	e harmonic voltages and co complex number represent	urrents. tation.		2		1			
	Resonance. Simple time de	omain problems.			2		1			
	List of laboratory or design	exercises				LE or DE hours				
	Introduction to laboratory se	etup.				2				
	Serial, parallel and combine	ed resistors.					2			

	Kirchhoff's lows, sup	chhoff's lows, superposition principle and Thevenin's theorem. 2									
	Resistor, capacitor a	nd indu	ctor in AC	circuits	i.			2			
	Serial (voltage) resor	al (voltage) resonance.									
	Practical skills exam										
Format of instruction	 ☑ lectures □ seminars and wo ☑ exercises □ on line in entirety □ partial e-learning □ field work 	lectures □ independent assignments seminars and workshops □ multimedia exercises □ laboratory on line in entirety □ work with mentor partial e-learning □ (other)									
Studentresponsibiliti es	The presence on lect Performed all require	tures in ed labor	the amoratory exe	unt of at ercises.	least 7	0 % of the time	es sche	duled.			
Screening student	Class attendance	2,0	Researc	:h		Practical traini	ng				
proportion of ECTS	Experimental work		Report			Individual work	<	2,7			
eachactivity so that the total number of	Essay		Seminar essay	ſ		Laboratory exe	ercises	0,5			
ECTS credits is	Tests	0,2	Oral exa	am		Preparation fo laboratory exe	r rcises	0,5			
value of the course)	Written exam	0,1	Project			(Other)					
Grading and evaluating student work in class and at the final exam	lecturing and the se take tests they didn't min. and consists of the exam, students 50% of total points a Final grade is detern system. Students wh of the students get e (3) grade and last 1 exam, have another min. and consists of gain more than 50%	cond on t pass o 5 theore are required af hich hav xcellent 5% suf exam ir 5 theor on the	te is after n the mid etical ques uired to fi midterm e ter the se ve passed (5) grade ficient (2) n the autu etical que last exam	the nex term exa stions ar inish all exam or cond fin d the exa a, next 38 o grade. imn exa estions a n are giv	tt 6 wee ams. Ea nd nume laborate at the fi nal test a am are 5% very Studen minatior and num en suffie	eks. In the final ach midterm tes erical problems ory exercises a nal exam. according to the divided into 4 good (4) grade of good (4) grade n periods. Exar herical problem cient (2) grade	exams st lasts and ga e relativ groups e, next failed m lasts ns. Stud	s students for the 90 er to pass in at least 'e grading : top 15% 35% good both final for the 90 dents who			
		Title	ġ			Number of copies in	Availa	ability via			
			•			the library	othe	r media			
Required literature	V. Pinter: Osnove el Zagreb, 1987.	ektroteh	inike, Teł	nnička k	njiga,	5					
library and via other	Felja, I., Koračin, D.: primiera iz osnova e	: "Zbirka lektrote	i zadataka hnike (I i	a i riješe II dio)". 2	enih Zagreb	5					
media)	E. Šehović, i drugi: (primjera (prvi dio), Š	Dsnove kolska l	elektroteł knjiga, Za	nnike zb Igreb, 19	992.	5					
Optional literature (at the time of submission of study programme proposal)	B. Jajac: Teorijske o B. Jajac: Teorijske o	B. Jajac: Teorijske osnove elektrotehnike, svezak 1, Graphis, Zagreb, 1998. B. Jajac: Teorijske osnove elektrotehnike, svezak 2, Graphis, Zagreb, 2002.									
Quality assurance methods that ensure the acquisition of exit competences	 Evaluation of res Feedback from s Self-evaluation o Institutional and 	ults in a tudents f teache non-inst	ccordanc via surve ers itutional e	e with theys evaluation	he abov	e learning outo	comes				
uner (as the proposer											

NAME OF THE	APPLIED MATHEMATICS									
COURSE	FEMY02	Vear of study	1							
Course teacher	M Sc. Ivančica Mirošević	Credits (FCTS)	5							
			.	~			55			
Associate teachers	Lea Dujić	Type of instruction (number of hours)	L 30	S	AE 30	LE	DE			
Status of the course	Obligatory	Percentage of application of e-learning	10							
	COURSE	DESCRIPTION								
	Training students for:									
Course objectives	 application of mathema differential equations, r analyze and solve engine 	 application of mathematical concepts and tools from the area of ordinary differential equations, numerical mathematics, statistics and probability to analyze and solve engineering problems. 								
Course enrolment requirements and entry competences required for the course	Good knowledge of High S Mathematics.	Good knowledge of High School mathematics and passed State Exam in Aathematics.								
	Students will be able to:									
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 state definitions and t illustrate theorems wi solve some first and s apply Laplace transfor find approximate solution approximate function approximate empirication solve definite integral use statistical techniq find probability distribution 	 state definitions and theorems from the enitre course, illustrate theorems with examples, solve some first and second order differential equations, apply Laplace transform to linear differential equations find approximate solution of a nonlinear equation approximate function with Lagrange interpolation polynomial approximate empirical data with constant, linear or quadratic function solve definite integral and Cauchy problem of the first order approximately use statistical techniques in data analysis find probability distributions of random variables in random experiments 								
	Course content				L or S	<i>F</i>	٩Ε			
			<u> </u>		hours	hc	ours			
	1. Introduction to Differen	tial Equations. Basic con	cepts a	nd	2		2			
	2. Homogeneous differen	ntial equations. Linear of	different	tial	2		2			
	3. Differential equations of equations of the second or	the second order. Linear der with constant coefficie	different nts.	tial	2		2			
	 Laplace transform – defi Laplace transform and bas 	nition and basic propertie ic properties.	s. Inver	se	2		2			
	5. Solving linear differen coefficients using Laplace	itial equations with with transform.	consta	ant	2		2			
broken down in detail by weekly	 Introduction to Numeric equations. Graphical me method. 	al mathematics. Solving thod. Bisection method.	nonline Iterati	ear ve	2		2			
class schedule	7. Lagrange interpolation p	olynomial			2		2			
(synabus)	8. Least square method. constant, linear or quadrati	Approximating empirical c function.	data w	rith	2		2			
	9. Numerical integration. Euler's method for Cauchy	Trapezoidal rule. Simps problems.	on's ru	le.	2		2			
	10. Descriptive statistics. Numerical characteristics.	Discrete data and continu	ious da	ta.	2		2			
	11. Introduction to Probab Basics of Combinatorics.	bility theory. Elementary of	outcome	es.	2		2			
	12. Discrete random va Binomial distribution. Poiss	riable. Expectation and on distribution.	variano	ce.	2		2			
	13. Continuous random v Normal distribution.	ariable. Expectation and	variano	ce.	2		2			

	List of laboratory or	at of laboratory or design exercises								
Format of instruction	 ☑ lectures □ seminars and wor ☑ exercises □ on linein entirety □ partial e-learning □ field work 	Sectores independent assignments seminars and workshops multimedia exercises laboratory on linein entirety work with mentor partial e-learning (other)								
Studentresponsibiliti es	Regular attendence	to and a	active par	ticipation	in lect	ures and exce	rcises.			
Screening student	Class attendance 2 Research Pra		Practical traini							
proportion of ECTS credits for	Experimental work		Report			Self study		2.6		
eachactivity so that the total number of	Essay		Seminal essay	·		(Other)				
ECTS credits is	Tests	0.2	Oral exa	ım		(Other)				
value of the course)	Written exam	0.2	Project			(Other)				
Grading and evaluating student work in class and at the final exam	During semester two weeks of lectures, a term exam students through assignemen course is minimum points. After semester, two Students which did r during final exams. Students which did comprehensive cour is 80. The condition and a total of at leas The grade is formed of FESB: 15% of the best stud next 35% students g next 35% students g and the last 15% stu Students who did no at least 10 points, ca number of points is points. Mid-term exa exam schedule.	o mid-te nd the s can ge ts durin 20 poin final exa not pass 1 not p se cont for pas t 50 poin after the lents ge let the m dents g of pass an atten 100, ar ms, fina	rm exam second ir g lectures its on ea ams and a one mid bass any ent. In the sing the nts. e second t the mar hark very hark good et thet mar the cours d the cor al exams	s are held the weel tts, while s and exc ch mid-ter a correction -term exa mid-term at case, n course is final exar k exceller good (4), d (3), ark suffici e after fin rection ex nimum re and corre	d. The k follov the releases on exa m, can n exa maximu minim n acco nt (5), ent (2), al exa cam. O equiren ction e	first exam is s wing the lecture maining 20 po s. The condition ams and a tot m are held. In take only this m, take the um numbers of um 40 points it rding to article	chedule es. At e ints are n for pa al of at part of final ex favailat n the fin 75 of th obtaine n exam sing gra accord	ed after 7 each mid- e attained issing the least 50 the exam cam with ole points nal exam le Statute ed total of maximal ade is 50 ing to the		
Required literature		Title	9			copies in the library	Availa othei	bility via r media		
(available in the	Lecture materials on	FESB	e-learning	g portal.			https://	/elearnin		
media)							y.16	,50.111/		
Ontional literature	T Bradić J Pečarić	R Rok	ci M. Stru	inie: Mate	matika	a za tehnološki	e fakulti	ete		
(at the time of submission of study	Element, Zagreb, 19	98.	a, ivi. Out	nije. Mate	mauna			5.0,		

programme proposal)	B. P. Demidovič: Zbirka zadataka iz više matematike, Školska knjiga, Zagreb 1998.
,	Ivo Pavlić, Statisticka teorija i primjena, Zagreb, 1971
	- homework
Quality assurance	- short tests
methods that ensure	- quizzes
the acquisition of	- mid-term exams
exit competences	- final exam
	- student questionnaires
Other (as the	
proposer wishes to add)	

NAME OF THE COURSE	PROGRAMMING 2							
Code	FELP03	Year of study	1					
Course teacher	Linda Vicković, Ph.D., Associate Professor	Credits (ECTS)	10					
Associate teachers	Ivica Crnjac, Teaching Assistant	Type of instruction (number of hours)	L 60	DE				
Status of the course	Obligatory	Percentage of application of e-learning	0					
	COURSE DESCRIPTION							
Course objectives	 Training students for: understanding and app programming language usage of standard functions Writing C program functions structures. 	 raining students for: understanding and appliance of basic programming knowledge in C programming language, usage of standard functions from C libraries like input / output and mathematical functions, Writing C program functions, pointer usage, dynamic memory allocation and 						
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)	 Students will be able to: describe fundamentals programs, write, build and execute using functions, pointee using user's data types imply data input from d using debugger for pro 	udents will be able to: describe fundamentals related to writing, compiling, linking and executing C programs, write, build and execute simple C programme, using functions, pointers and dynamic memory allocation in programmes, using user's data types like structures and unions, imply data input from data files and data storage in data files,						
Course content broken down in	Course content	Comments Basic data tv	nes	L or hou	S s	A ho	\E urs	
detail by weekly	Variables.	Commente. Dasie data ty	p00.	4			2	

class schedule	Pre-processor's state	ements.	Arithmet	ic expre	essions.		4	2	
(Syllabus)	Data input from keyr	ta input from keypad. Relation operators, for loop. 4							
	Making decisions – i	f statem	ent Logi	cal one	rators in		-	-	
	compound relations.	while lo	op. do w	hile loo	p and swite	ch	4	2	
	statement.		- - - - - - - - - - -				-		
	Working with arrays.	Definin	g an arra	y. Char	racter array	ys –			
	strings. Standard fur	nctions f	or manip	ulating	arryas of		4	2	
	characters. String ar	nd char i	input fron	n keypa	ıd.				
	Multidimensional arr	ays.					4	2	
	Functions. Scope of	the vari	able. Par	ameter	s transfer b	by value	4	2	
	functions	ray as a	a function	s argui	nent. recu	ISIVE	4	2	
	Data conversion in (C. ASCC	l values				4	2	
	Structures Enumera	ated data	a type U	nions A	Array of str	uctures			
	Structure containing	ucture containing structures.						2	
	Pointers. Address or	perator.	Pointer to	o intege	er and char	acter.			
	Pointer to arrays of i	ntegers	and chai	acters.	Pointers to	С	4	2	
	structures. Pointers	ctures. Pointers inside structures							
	Input and output ope	ut and output operations with files.							
	Dynamic memory all	namic memory allocation.						2	
	break, continue state	ements.	exit func	tion. Sy	stem calls	•		•	
	Arguments of the ma	ain funct	tion. Pre-	process	sors statem	nents.	4	2	
	Conditional compliat	ion, Poi	niers io i	unction	5.			I E or [
	List of laboratory or	design e	exercises					hour	s
	First C program. Prog screen. For loop exa	gram co mples	mpiling, l	inking a	and execut	ing. Writi	ng to the	2	
	Data input from keyp	ad. If sta	atement	and logi	ical operate	ors in cor	npound	2	
	while loop, do-while I	oop and	random	numbe	rs.			2	
	Switch statement and	d intege	r arrays.		-			2	
	Character arrays and	l standa	rd functio	ons for r	manipulatir	ng charac	ter	2	
	arrays.							2	
	Two-dimensional arra	ays of in	itegers.					2	
								2	
	Recursive functions							2	
	Pointers to basic data	a types	Pointers	to array	vs and stru	ictures		2	
	Input and output ope	rations v	with files.	to ana	yo ana olio			2	
	Dynamic memory all	ocation.						2	
	⊠ lectures				an an dan ta				
	□ seminars and wo	rkshops			ependent a	issignmei	nts		
	⊠ exercises			⊠ Inui					
Format of Instruction	□ on line in entirety				Jialory Ik with mor	tor			
	□ partial e-learning				(other)	itoi			
	\Box field work	☐ field work □ (other)							
Studentresponsibiliti es	The presence on lec Performed all require	he presence on lectures in the amount of at least 70 % of the ti erformed all required laboratory exercises.					imes sche	eduled.	
Screening student	Class attendance	Class attendance 4 Research Practical tra					aining		
proportion of ECTS	Experimental work		Report			(Oth	er)	3	3
credits for eachactivity so that	Essay		Seminal essay	•		(Oth	er)	1,	4
the total number of ECTS credits is	Tests	0,2	Oral exa	am		(Other)			3

equal to the ECTS value of the course)	Written exam	0,1	Project		(Other)					
Grading and evaluating student work in class and at the final exam	There are two parts exam is held on con final exams. Theoret exams. The first mic after the next 6 wee and some theoretica laboratory part of ex Grade (in percentag where: • LV – grade f • T – grade fro	of the enputers ical part iterm exits. Eac al. The am and e) is form from lab	xam, theoretical at the end of all of exam is writte am is after 7 we h midterm test of requirement for 50 % points on med according to Grade = 0,5 L oratory part of ex heoretical part of	and lat laboration and t eeks of l consists passing each m o the for V + 0,5 kam, f exam.	and laboratory part. Laboratory part aboratory exercises, and after that n and there are two midterms and fin- exists of lecturing and the second one onsists of 15 questions some practi- assing grade is the positive grade each midterm exam or the final exa the formula: + 0,5 T am, exam. Number of Availability v					
Poquired literature		Title	Number of copies in the library	Availabi other r	ility via nedia					
	Vicković, L. Prog predavanja.	ramiran		e-lear port	ning tal					
(available in the library and via other	Mateljan I. Računala Split, 2004									
media)	Byron S.Gottfried: "F Outlines, McGraw-H									
	Besplatne knjige http://www.freeprogr ml									
Optional literature	-									
(at the time of submission of study programme proposal)										
Quality assurance	 Evaluation c Evaluation fr 	of results	in accordance v	with the	above learning	outcome	S			
the acquisition of exit competences	- Self-evaluat	ion of te non-ins	achers titutional evaluat	ions						
Other (as the proposer wishes to add)										

NAME OF THE COURSE	ALGORITHMS AND DAT	A STRUCTURES							
Code	FELP24	Year of study	2.						
Course teacher	Linda Vicković, Ph.D., Associate Professor	Credits (ECTS)	5						
Associate teachers	Ivica Crnjac, Teaching Assistant	Type of instruction (number of hours)	L 30	S 0	AE 0	LE 30	DE		
Status of the course	Obligatory	Percentage of application of e-learning	0						
	COURSE	E DESCRIPTION							
Course objectives	 Training students for: understanding and app permanent adoption ar memory allocation, as queues and binary tree understanding and app 	pliance of basic algorithm and deepening of knowledge well as management of ab as,	analysis e form estract o	s princ the are data ty ting al	iples, ea of d pes lik	lynami ke stad	ic :ks,		
Course enrolment requirements and entry competences required for the course	Students have to pass Pro	understanding and appliance of simple and complex sorting algorithms.							
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: define basic terms relate describe and perform ad linked lists, create functions for adding recognise appliance of a describe steps of adding using basic AVL rotation name and use different r 	udents will be able to: define basic terms related to algorithm analysis, describe and perform adding, deleting, searching, of elements in single and double linked lists, create functions for adding and deleting of stack and queue elements, recognise appliance of abstract data types in problem solving, describe steps of adding, deleting and searching of elements in binary search trees, using basic AVL rotations to reach a balance condition, name and use different recursive searching algorithms.							
	Course content			L	or S	/ bc	/E		
	Introduction to the course. programming language (re pointers, dynamic memory	,	2	ne					
	Algorithm analyses mather time calculation of algorithr	natical background and ru n.	nning		2				
	Abstract data types, simple its basic operations.	e implementation of linked	lists an	d	2				
Course content	Linked lists sorting.				2				
broken down in detail by weekly	Doubly linked lists, circular	ly linked lists.			2				
class schedule	Stack and its applications (queue.	stack frames, balancing sy	ymbols),	2				
	Binary search trees and ba trees.	isic operations on binary s	earch		2				
	AVL trees.				2				
	Basic sorting methods.				2				
	Shellsort i Quicksort.				2				
	Mergesort.				2				
	Heaps and Heapsort.				2				
	Hashing.				2				
	List of laboratory or design	exercises				LE o ho	or DE ours		
	Basic operations in the arra	y of structures.					2		
	Adding new element at the Printing and deleting eleme	end and beginning of linke nts.	ed list a	s well	as		2		

	Adding new element list. Sorting of elemer list elements in file	dding new element behind and in front of the specified element in list. Sorting of elements in list, reading list elements from file and writh st elements in file.							
	Using linked lists for	polynon	nial addin	g and n	nultiplyin	ig.		2	
	Union and cross sect	ion of ty	vo linked	lists.				2	
	Stack and queue imp	lementa	ation of li	nked list	ts.			2	
	Circular stack and pri	iority qu	eue imple	ementa	tion of lir	nked lists.		2	
	Using stack for postfi	x expre	ssion. me like ei	vebang		ion insertion a	nd	2	
	bubble sort for rando	mlv aen	erated n	umbers	sortina.		inu	2	
	Using Shllsort, Quick sorting.	sort and	d Merges	ort for ra	andomly	generated nui	mbers	2	
	⊠ lectures				nondon	t oppignmente	•		
	\Box seminars and wor	kshops			ependen timodio	tassignments			
Format of instruction	exercises			⊠ Inui ⊠ Iabo					
Format of instruction	□ on line in entirety				k with m	ontor			
	□ partial e-learning					·)			
	☐ field work				(other)			
Studentresponsibiliti es	The presence on lec Performed all require	tures in ed labor	the amo atory exe	unt of a ercises.	t least 70	0 % of the time	es schec	uled.	
Screening student	Class attendance	1	Researc	:h		Practical traini	ng		
proportion of ECTS	Experimental work		Report			Individual work	ĸ	1,5	
eachactivity so that	Essay		seminal essay	ai		Laboratory exercises		1,5	
ECTS credits is	Tests	0,2	Oral exa	exam		Preparation fo laboratory exe	r rcises	0,7	
value of the course)	Written exam	0,1	Project			(Other)			
Grading and evaluating student work in class and at the final exam	There are two parts of the exam, theoretical and laboratory part. Laboratory part of exam is held on computers at the end of all laboratory exercises, and after that on final exams. Theoretical part of exam is written and there are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. Each midterm test consists of 5 questions some practical and some theoretical. The requirement for passing grade is the positive grade of laboratory part of exam and 50 % points on each midterm exam or the final exam. Grade (in percentage) is formed according to the formula: Grade = $0.5 \text{ LV} + 0.5 \text{ T}$ where:							t of exam al exams. . The first 6 weeks. tical. The and 50 % s formed	
	 I – grade fro 	om the t	heoretica	l part o	r exam.				
		Title				Number of	Availa	bility via	
		THE	;			the library	other	media	
Poquired literature	 Vicković I Algor 	itme on	d data str	ucturos	locturo	the horary	0-10	arning	
(available in the	notes.	iuns an	u uala Sli	uciuies	, lecture			ortal	
library and via other		ta Stri	ictures	and A	laorithm		р.		
media)	Analysis in C (s	sections	1-6), A	ddison-'	Wesley,				
	 Sedgewick, R. Al 1990. 	gorithm	s in C, A	ddison-'	Wesley,				
Optional literature (at the time of submission of study programme proposal)	- Neapolitan, R., N Learning, 2015.	Naimipo	ur, K. Fo	undatio	ns of Alg	gorithms, Jones	s & Barl	ett	

Quality assurance methods that ensure the acquisition of exit competences	 Evaluation of results in accordance with the above learning outcomes Feedback from students via surveys Self-evaluation of teachers Institutional and non-institutional evaluations
Other (as the proposer wishes to add)	

NAME OF THE COURSE	PROGRAMMING IN JAV	VA							
Code	FELP11	Year of study	3.						
Course teacher	Eugen Mudnić, Ph.D., Assistant Professor	Credits (ECTS)	6						
		Type of instruction	L	S	AE	LE	DE		
Associate teachers		(number of hours)	30	0	0	30			
Status of the course	Obligatory	Percentage of application of e-learning	0						
	COURSI	E DESCRIPTION							
Course objectives	Training students for - Use Java language an - Use object oriented pro	d environment. ogram design.							
Course enrolment requirements and entry competences required for the course	Previously taken courses : C programming								
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: Establish Java developm Write Java applications. Use object oriented programely and the statement of the statement	Students will be able to: Establish Java development environment. Write Java applications. Use object oriented programming model. Use Java system libraries. Use complex development environment.							
	Course content				L	A	١E		
					nours	ho	ours		
	Introduction to Java and co Basic Java application.	omparison to other C langu	lages.		2		0		
	Java class, methods and a access.	ttributes declaration. Class	s memb	ber	2		0		
Course content	Encapsulation. Constructo	rs. Packages.			2		0		
detail by weekly class schedule	Identificators, keywords an assignment. Construction a References. Java coding c	d data types. Variables, de and initialization of objects. onventions.	eclaratio	on,	2		0		
(syliadus)	Variable scope. Operators. Program flow control (loops and branches). Arrays						0		
	Inheritance. Class derivation	on. Polymorphism. Access	control		2	1	0		
	Methods and constructor o class. Wrapper classes.	verload. Methods override	. Objec	t	2		0		
	First midterm exam.		First midterm exam.						

	Advanced class feat	ures. A	bstract cl	asses.	Interface	es.	2		0
	Exceptions. Exception Custom exceptions.	ons han	dling. Exc	ception	categori	es.	2		0
	Java console applica	ations. J	ava com	mand li	ne argur	nents.	2		0
	Using console I/O fu	nctions.	Using fil	e I/O fu	nctions.		Z		0
	Java utility classes.						2		0
	Java GUI. Frame an	d panel	compone	ents.			2		0
	Java threads. Java t	hreads	control. J	ava thr	eads		2		0
	Second midterm exa	m							
	List of laboratory exe	ercises						IF	- hours
	Java virtual machine	Hello V	Vorld apr	lication).				2
	Eclipse development	environ	ment.						2
	Numbers and Strings	. Readi	ng input.						2
	Class design.Class	Student.							2
	Java applets.								2
	Conditional operators	S.							2
	Class definition – cla	ss Robo	ot						2
	Arrays and complex of	data stru	uctures.	1					2
	Class extension. Cor	nbining	related c	asses.					2
	Exceptions in input/o	utput op	perations.	brood	woobror	ization			2
	Java Infeads. Thread	a manag dling	jement. I	nreads	synchror	lization.			2
	lava database conne	ection							2
	\boxtimes lectures								-
	\Box seminars and wor	rkshops		⊠ inde	ependen	t assignmer	its		
	\square exercises	monopo		⊠ mu	timedia				
Format of instruction	\Box on line in entirety	□ on line in entirety							
	\Box partial e-learning	□ partial e-learning							
	\square field work				(othe	r)			
Studentresponsibiliti	The presence on lec	tures in	the amo	int of a	t least 7	0 % of the ti	mes sc	hedu	led
es	Performed all require	ed labor	atory exe	rcises.			1103 30	icuu	icu.
Screening student work (name the	Class attendance	2,0	Researc	h		Practical tra	ining		
proportion of ECTS	Experimental work		Report			Individual w	ork		2,0
eachactivity so that	Essay		essay		0,2	Laboratory	exercise	es	1,5
the total number of ECTS credits is	Tests	0,2	Oral exa	ım		Preparation	for	_	0,0
equal to the ECTS						laboratory e	xercise	S	
value of the course)	Written exam	0,1	Project			(Other)			
	There are two midter	rms and	final exa	ms. Th	e first m	idterm exam	is after	·7 w	eeks of
	lecturing and the seco	ona one	is after th	e next (theoreti	o weeks.	tions and pu	m test c merical	onsis	lome In
	the final exams stude	nts that o	did not pa	ss the n	ridterm e	xams take p	art. The	midte	erm and
Grading and	final exams are carri	ed out a	as written	tests.	The requ	irement for p	bassing	grad	e is the
evaluating student	positive assessment of laboratory exercises and 50 % points on each midterm exam or								
work in class and at	the final exam. Grade	e (in perc	centage) is	s forme	d accord	ing to the for	mula:		
the final exam	Grade(%) = 0,05 NP + 0,15 LV + 0,4 (M1 + M2)								
	the activities in perce	entage:							
	NP - attenda	ance at I	ectures,						
		ory asse	essment,						
		SUIESUIL	з.			Number	of		
Required literature		Title				conies in	Ava	ilabi	ility via
(available in the		inte				the librar	ot	her r	nedia
						the librar	7		

library and via other	E. Mudnic, Authorized lectures.		
media)	The Java Language Specification, Java SE 7	0	free available
	Edition (Java Series)	0	on Internet
Optional literature (at the time of submission of study programme proposal)	The Java Tutorial: A Short Course on the Basics (5th Edition	on)	
Quality assurance methods that ensure the acquisition of exit competences	 Evaluation of results in accordance with the above lea Feedback from students via surveys Self-evaluation of teachers Institutional and non-institutional evaluations Feedback from graduated students 	rning outcomes	
Other (as the proposer wishes to add)	-		

NAME OF THE COURSE	SOFTWARE ENGINEER	SOFTWARE ENGINEERING							
Code	FELP25	Year of study	2.						
Course teacher	Linda Vicković, Ph.D., Associate Professor	Credits (ECTS)	5						
Associate teachers		Type of instruction (number of hours)	L	S	AE	LE	DE		
Status of the course	Obligatory	Percentage of application of e-learning	30	0	30				
	COURS	E DESCRIPTION							
Course objectives	 Fraining students for: understanding and usage of engineering approach to software development, how to write user requirements specification, software design specification and test plan documents in software development process, applying acquired knowledge in the practical software development. 								
Course enrolment requirements and entry competences required for the course	Students have to pass Obj	ect oriented programming	from the	e seco	ond ye	ar of s	study.		
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: define fundamental terms of engineering approach in software development, identify different steps in software development, differ agile and classical software development methods, provide required documents during software development process, using UML diagrams for software architecture description, recognize different architecture and design patterns, describe different software verification and validation phases, 								
Course content broken down in	Course content			L AE					

detail by weekly	Introduction in Softw	are eng	ineering.				2	0	
class schedule	Software processes	and sof	tware pro	cess m	odels.		2	0	
(syllabus)	Agile software devel	opment	. Extreme	e progra	mming.		2	0	
	Scrum and Scaling a	agile me	thods.		0		2	0	
	Software requiremer	nts.					2	0	
	The software require	ements	documen	t. Requi	irements	6	2	0	
	elicitation, analysis a	and valid	dation.	A1			-	0	
	System modelling. In	itroduct	ION TO UN	1L.			2	0	
	Architectural design.						2	0	
	Architectural pattern	S.	<u> </u>				2	0	
	Design and impleme	entation.	Design	batterns			2	0	
	Software testing.						2	0	
	Test driven developr	nent					2	0	
	Software maintenan	ce and e	evolution	·			2	0	
	List of laboratory or o	design e	exercises					LE hours	
	Advanced features of	f Micros	oft Office	for doc	cument f	ormatting.		2	
	Using Microsoft Proje	ect in pr	oject mar	nageme	nt.			2	
	Using Microsoft Visio	tor sys	tem mod	elling (L	JIVIL DIAQ	grams).		2	
	Visiting lecture Pro	iect mar		sual Stu +	1010.			2	
	Visiting lecture – Fro	iting lecture – Estimation effort for software development p							
	Visiting lecture – Scr	iting lecture – Scrum methodology for software developmer							
	Visiting lecture – Kar	ban me	thodolog	y for so	ftware d	evelopmen	t.	2	
	Visiting lecture – Sof	tware te	sting					2	
	Visiting lecture – Sof	isiting lecture – Software engineering in Ericsson Nikola Tesla						2	
	environment, market	and evo	Diution.						
	\square seminars and workshops						nts		
		rsnops		🛛 mul	timedia				
Format of instruction				⊠ labo	oratory				
	<i>□ on line</i> in entirety <i>□</i> work with mentor				entor				
	□ partial e-learning								
	□ field work								
Studentresponsibiliti es	The presence on lect Performed all require	tures in ed labor	the amo	unt of a ercises.	t least 7	0 % of the t	imes sche	eduled.	
Screening student	Class attendance	1	Researc	ch		Practical tra	aining	1	
work (name the proportion of ECTS	Experimental work		Report			Individual v	vork	2	
credits for eachactivity so that	Essay		Semina essay	r		Laboratory	exercises	0,5	
ECTS credits is equal to the ECTS	Tests	0,2	Oral exa	am		Preparation laboratory	n for exercises	0,2	
value of the course)	Written exam	0,1	Project			(Oth	ier)		
Grading and evaluating student work in class and at the final exam	Written exam0,1Project(Other)There are two parts of the exam, practical and theoretical. For practical part stude have to make a software project and related documentations. It is done in grou from 3 to 5 students. Project is divided in three phases and each is graded. Fin- project grade is counted as average.Theoretical part of exam is written and there are two midterms and final exams. T first midterm exam is after 7 weeks of lecturing and the second one is after the ne 6 weeks. Each midterm test consists of 10 theoretical questions. The requirement passing grade is the positive grade from project part and 50 % points on ea midterm exam or the final exam. Grade (in percentage) is formed according to the formula:						rt students in groups led. Finale xams. The er the next rement for s on each ding to the		

	Grade = 0,6 P + 0,4 T	Grade = 0,6 P + 0,4 T								
	 where: P – project grade, T – grade from the theoretical part of exam. 									
	Title	Number of copies in the library	Availability via other media							
Required literature (available in the library and via other media)	Vicković, L. Programsko inženjerstvo, prezentacije s predavanja.		e-learning portal							
	Somerville, I. Software engineering, Addison Wesley, 9 edition, 2011.									
	Sach, S. Object Oriented Software Engineering, McGraw-HIII, 2008.									
	Fowler, M. UML Distilled, Addison Wesley, third edition, 2003.									
Optional literature (at the time of submission of study programme proposal)										
Quality assurance	 Evaluation of results in accordance with the abov 	e learning out	comes							
the acquisition of exit competences	 Feedback from students via surveys Self-evaluation of teachers Institutional and non-institutional evaluations 									
Other (as the proposer wishes to add)										

NAME OF THE COURSE	DATABASES 2								
Code	FELP15	Year of study	3.						
Course teacher	Eugen Mudnić, Ph.D., Assistant Professor	Credits (ECTS)	5						
Associate teachers		Type of instruction (number of hours)	L 30	S 0	AE 0	LE 30	DE		
Status of the course	Elective	Percentage of	0	_	_				
	COURSE	E DESCRIPTION	<u> </u>						
	Training students for								
Course objectives	 Understanding and use Deepening basic know 	e of advanced relational da ledge of projecting and us	atabase e of rel	e techr lationa	niques I datal	bases.			
Course enrolment requirements and entry competences required for the course	Previously taken courses :	Databases							
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to:-Use database function-Understand different database transact-Use database transact-Implement database et-Administrate multiuser-Connect database with-Make suitable choice ct	Itents will be able to: Use database function calls, batch scripts, stored procedures and views. Understand different database locking mechanisms. Use database transactional mechanisms. Implement database error recovery methods. Administrate multiuser environment. Connect database with other informational systems. Make suitable choice of database implementation.							
	Course content				L	4	٩Ε		
	Introduction		nours	nc	ours				
	Functions and their applies		2		0				
	Views: creating structure		2		0				
	Paging of database multius		views.		Ζ		0		
	Dasics of ualabase multius	er access. Security and			2		0		
	SQL batch instructions.				2		0		
	Program flow control.				2		0		
	Transactions: committing r	equests, rollback, checkpc	oints,				0		
	database recovery.	· · ·			2		0		
	First midterm exam.								
Course content	Stored procedures.				2		0		
broken down in	Error handling.				2		0		
detail by weekly	Triggers.				2		0		
(syllabus)	Connecting database with	other informational system	IS.		2		0		
(cynabac)	Overview of database impl	ementations.			2		0		
	Database tuning.				2		0		
	Second midterm exam								
	List of laboratory exercises					LE	nours		
	Introduction to developmen	t environment. Writing con	nplex S	SQL qu	eries.	_	2		
	Functions						2		
	Multiuser access						2		
	Batch SQL Instructions						2		
	Program flow control.						2		
	Transactions.					1	2		
	Stored procedures.						2		
	Error handling.						2		

	r								
	Triggers. Connecting with Java	iggers.							
	MvSQL and POSTG	RES dat	tabases.					2	
	Database performan	ce tunin	g.					2	
Format of instruction	 ☑ lectures □ seminars and wor □ exercises □ on line in entirety 	rkshops		⊠ inde ⊠ mul ⊠ labo □ wor	epender timedia pratory k with m	nt assignments nentor			
	☐ partial e-learning				(othe	er)			
Studentresponsibiliti es	The presence on lec Performed all require	ne presence on lectures in the amount of at least 70 % of the times schedu erformed all required laboratory exercises.						duled.	
Screening student	Class attendance	1,0	Researc	h		Practical traini	ng		
proportion of ECTS	Experimental work		Report			Individual work	ĸ	1,5	
credits for eachactivity so that	Essay		Semina essay	•		Laboratory exe	ercises	1,0	
ECTS credits is equal to the ECTS	Tests	0,2	Oral exa	ım		Preparation for laboratory exe	r rcises	0,5	
value of the course)	Written exam	0,1	Project		0,7	(Other)			
Grading and evaluating student work in class and at the final exam	lecturing and the ser of 20 questions and problems. In the fina The midterm and fir passing grade is the each midterm exam the formula: Gr the activities in perce • NP - attenda • LV – laborat • M1, M2 – te	lecturing and the second one is after the next 6 weeks. Each midterm test consolor 20 questions and final tests consist of 20 theoretical questions and numer problems. In the final exams students that did not pass the midterm exams take p The midterm and final exams are carried out as written tests. The requirement passing grade is the positive assessment of laboratory exercises and 50 % points each midterm exam or the final exam. Grade (in percentage) is formed accordin the formula: Grade(%) = 0,05 NP + 0,15 LV + 0,4 (M1 + M2) the activities in percentage: NP - attendance at lectures, LV - laboratory assessment,							
Required literature	Title					Number of copies in the library	Availa othe	ability via er media	
(available in the library and via other media)	Baze podataka; Rob ISBN: 98795319757 Oracle PL/SQL Prog	ert Man 6 Jrammin	iger; Elen	nent; 20 tion, Ste)12; even		free	available	
	FeuersteinBill Pribyl	, 2009.	<u> </u>			0	on	nternet	
Optional literature (at the time of submission of study programme proposal)									
Quality assurance methods that ensure the acquisition of exit competences	 Evaluation of res Feedback from s Self-evaluation of Institutional and Feedback from s 	sults in a students of teach non-ins graduate	accordan s via surv ers titutional ed studer	ce with eys evaluat its	the abo ions	ve learning out	comes		
Other (as the proposer wishes to add)									