UNIVERSITY OF SPLIT

FACULTY OF ELECTRICAL ENGINEERING, MECHANICAL ENGINEERING AND NAVAL ARCHITECTURE

DETAILED PROPOSAL OF THE STUDY PROGRAMME

GRADUATE UNIVERSITY STUDY PROGRAMME IN ELECTRONICS AND COMPUTER ENGINEERING

SPLIT, July 2017

CONTENT

GENERAL INFORMATION OF HIGHER EDUCATION INSTITUTION

Name of higher education institution	FACULTY OF ELECTRICAL ENGINEERING, MECHANICAL ENGINEERING AND NAVAL ARCHITECTURE
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GENERAL INFORMATION OF THE STUDY PROGRAMME

Name of the study programme	ELECTRONICS AND COMPUTER ENGINEERING		
Provider of the study programme	FACULTY OF ELECTRICAL ENGINEERING, MECHANICAL ENGINEERING AND NAVAL ARCHITECTURE		
Other participants			
Type of study programme	Vocational study programme ☐	University study programme ☒	
Level of study programme	Undergraduate ☐	Graduate ☒	Integrated ☐
	Postgraduate ☐	Postgraduate specialist ☐	Graduate specialist ☐
Academic/vocational title earned at completion of study	Master of Engineering in Electronics and Computer Engineering		

1. INTRODUCTION

1.1. Reasons for starting the study programme

The reasons for starting study programme in Electronics and Computer Engineering are as following:

- Demands of the society for experts with these competences are continually growing,
- FESB has at its disposal staff and physical resources necessary for quality teaching activities
- FESB has extensive experience in delivering courses at study programmes in Electronics and Computer Engineering
- Study programme in Electronics and Computer Engineering represents a logical continuation of undergraduate study programme in Electrical Engineering and Information Technology, field of study Electronics and Computer Engineering

Electronics and Computer Engineering represent a branch of the scientific and engineering field of Electrical Engineering. In the initial period of electrical engineering development, which served as a link between mathematics, physics and other natural sciences on the one hand and the practical applications on the other hand, a division of the "weak" and "strong" current was valid. Today, the division is considerably wider as new branches of Electrical Engineering are developing: computer engineering, optoelectronics, communication systems, signals processing, control systems, semiconductor technology and microelectronics. Due to the wide development of electrical engineering, it is not possible to cover all its branches within one study, so it is common that it is taught within several different study programmes. The following division of the study programme in electrical engineering is common in many European universities: Power Engineering, Communication Technology, Automation, Electronics and Computer Engineering, and the same courses are introduced at this faculty.
There is a trend toward treating computing as a special science. However, the most important world universities (MIT, Berkeley, Princeton, Stanford, Harvard, Cornell) continue to believe that the development of computing is essentially determined by the development of electronic technological base and engineering. For this reason, at these universities, computer engineering is studied in institutions related to the field of electrical engineering, together with the study programme in computing (at these universities, the study programme in Electrical Engineering is titled Electrical and Computer Engineering). The same trend is evident in many European universities, where the term information engineering is often used for computer engineering.
The name of the study programme in Electronics and Computer Engineering highlights the fact that this study programme puts emphasis on the study of electronic analogue and digital circuits and devices, their design and use in computer, control, telecommunication and audio-visual systems. Programming technique, necessary for computer engineering, will be studied as well. The study programme will last 4 semesters (three teaching semesters and one semester for producing diploma thesis). The following two mechanisms will allow student to partly define the study programme profile. Firstly, student is allowed to choose more elective courses; secondly, in the third semester the student is allowed to choose one of two fields of study: field of study Electronics or field of study Computer Engineering.
Study programme in Electronics and Computer Engineering was developed in order to enable students to acquire basic theoretical knowledge and practical expertise, and to train them for permanent adoption of new knowledge and technologies. In addition, during the course of studies each student develops skills of creative thinking, independent and team work and ability to make

business decisions at all levels of decision-making. The teaching process conforms with global and particularly with European trends in higher education and with the needs of the economy, and accordingly, appropriate curricula are created.
Study programme in Electronics and Computer Engineering is closely related to current scientific achievements in the scientific area of engineering and natural sciences, field of electrical engineering, computing and information technology. FESB researchers are actively involved in the development of above mentioned scientific and professional fields. They published a large number of scientific papers in the international academic journals and at international scientific conferences. Scientific cooperation with renowned international scientific and development institutions is one of the fundamental commitments of FESB.

1.2. Relationship with the local community (economy, entrepreneurship, civil society, etc.)

Split is the economic and university hub of the major part of the Dalmatian region, as well as one part of the neighbouring region of Bosnia and Herzegovina. The Faculty of Electrical Engineering in Split was established in 1960, with the aim of educating skilled professionals for the sectors of economy based on electrical engineering. Purpose of the study programme in Electrical Engineering has been confirmed by the number of students who successfully completed their studies and are employed in various sectors of economy. After having completed the study programme, students can, due to their acquired knowledge, be employed in many sectors of economy, such as in the computing and communication companies, education institutions and in the service sectors. There is virtually no working environment in which experts with completed graduate university degree in Electronics and Computer Engineering could not find employment and the labour market demand for this profile of experts are very high. This is especially relevant in this moment, with social and economic changes driving the development of new, small and medium technologically advanced enterprises that could serve as the new driving force for economic development. Graduates who complete the graduate university study programme in Electronics and Computer Engineering acquire the knowledge and skills necessary for work in various areas: development, design, manufacture, inspection and maintenance of complex electronic and computer systems. The study programme represents the final stage of the comprehensive two-cycle educational process which results in producing a fully educated expert capable of solving the most complex engineering tasks and participating in scientific research. Study programme was developed in order to enable modern engineer of Electrical Engineering to acquire knowledge in analogue electronics, digital electronics and programming. Modern engineer knows how to make a computer and treats it as an electronic component which is used in almost all electronic devices.
Demand for experts with these competences considerably exceeds the available number of educated experts in the region, Croatia and the world.

1.3. Compatibility with requirements of professional organizations

The study programme is compatible with the requirements of the Croatian chamber of electrical engineers.

1.4. Name possible partners outside the higher education system that expressed interest in the study programme

Study programme in Electronics and Computer Engineering has been recognized by a number of enterprises related to the field of electronics and computing, as well as by numerous public institutions.

FESB is a signatory to a number of cooperation agreements with the aim of promoting academic and educational activities, concluded with private enterprises and public organisations, e.g. Split-Dalmatia County, Ministry of Defence, Hrvatska elektroprivreda (national power company, Energy institute "Hrvoje Požar", Croatian Telecom, Croatian academic and research network - CARNet, Ericsson Nikola Tesla, Technology Centre Split, Brodosplit, Siemens, VIPnet, Microsoft Croatia. It is important to note that the Croatian Armed Forces expressed a special interest in cooperation, since its prospective officers are trained at the Faculty.

1.5. Financing

The study programme is financed by the Ministry of Science, Education and Sports

1.6. Comparability of the study programme with other accredited programmes in higher education institutions in the Republic of Croatia and EU countries

During the implementation of the study programme in Electrical Engineering, the Faculty is actively pursuing the process of development in higher education on global level, and especially in Europe. When developing the new curriculum, special attention was given to consolidating the curriculum and course contents with other renowned foreign higher education institutions. The educational systems in the field of electrical engineering differ a lot, both worldwide and in Europe, and there are practically no countries with identical educational systems. The former applies to almost all components of education: type and organisation of studies, fields of study, duration of studies, titles and degrees awarded at individual institutions, names of higher education institutions, etc.

The study programme proposal is consolidated with the recommendations given in the framework of the ERASMUS project THEIERE (Towards the Harmonisation of Electrical and Information Engineering Education in Europe, http://www.eaeeie.org/theiere/). Based on the analysis of the study programmes in Electrical Engineering and Information Technology at 87 European universities, a proposal was prepared for organisation of the study programme in Electrical Engineering and the ratio of each of the mentioned components. The proposal of the programme complies with the recommendations of SEFI (European Society for Engineering Education) and CESAER (Conference of European Schools for Advanced Engineering Education and Research).

The organisation of the proposed study programme is comparable with related study programmes at the following European institutions:

- Techniche Univerzität Wien/ Engineering University Vienna, Austria
- Eidgenössische Technische Hochschule (ETH)/ Swiss Federal Institute of Technology in Zürich, Switzerland

1.7. Openness of the study programme to student mobility (horizontal, vertical in the Republic of Croatia, and international)

Graduate university study programme in Electronics and Computer Engineering enables vertical and horizontal mobility of students. In terms of vertical mobility, Graduate university study programme in Electrical Engineering is open for mobility of students of related postgraduate study programmes. In terms of horizontal mobility, the graduate study programme in Electronics and Computer Engineering

is open for mobility of students of related studies at all Croatian universities, including the Faculty of Electrical Engineering and Computing at the University of Zagreb, Faculty of Engineering at the University of Rijeka and the Faculty of Electrical Engineering at the University of Osijek. Students have the opportunity to complete a part of the study programme at a similar institution in Croatia or abroad.

1.8. Compatibility of the study programme with the University mission and the strategy of the proposer, as well as with the strategy statement of the network of higher education institutions

Preparation of the study programme was done in line with the mission, vision and goals which are partly derived from the Scientific Strategy of the University of Split 2009 – 2014, document which promotes creation of internal development plans at the level of University constituents.
Graduate university study programme in Electronics and Computer Engineering conforms to the development guidelines of the Faculty, as well as mission, vision and strategic goals defined in the FESB Development Strategy for the period 2012 – 2016, and is the only programme of this type at the University of Split and the wider region.

The proposed study programme conforms to the strategic document Network of Higher Education Institutions and Study Programmes in the Republic of Croatia, which encourages launching new study programmes in STEM area, as proposed study programme is one of STEM disciplinary program areas.

1.9. Current experiences in equivalent or similar study programmes

FESB has extensive experience in delivering courses at similar programmes. Faculty of Electrical Engineering in Split was established in 1960, implementing a 2nd level study programme in electrical engineering, with programme duration of 8 semesters. After the integration with the studies in mechanical engineering and naval architecture, the Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture (FESB) was established in 1971. Since 1974 the Faculty has been a constituent part of the University of Split. Continuous work at developing the curricula resulted in establishing a number of study programmes at undergraduate and postgraduate level. At the undergraduate study programmes in Electrical Engineering the programme is implemented in the following fields of study: Power Engineering and Electronics. The first three semesters of the study programme are identical for both fields of study, and the following semesters provide specialist courses with elective disciplines of study. The disciplines of study in Power Engineering are: Electric Drives and Facilities and Power Engineering Systems, and in Electronics: Automation and Systems, Electronic Communication Systems, Applied Electronic Engineering and Computer Technology.
In 1979 vocational study programmes were established at the Faculty (former level VI study programme) which are implemented since, with a pause during years 1998- 2001.

Postgraduate study in the scientific field of electrical engineering was implemented at the Faculty, providing specialisation in the areas of telecommunications and computer information systems, electronics, power engineering and electromechanical engineering, automation and computing.

2. DESCRIPTION OF THE STUDY PROGRAMME

2.1. General information

Scientific/artistic area of the study programme	Engineering sciences
Duration of the study programme	2 years
The minimum number of ECTS required for completion of study	120
Enrolment requirements and admission procedure	Completed undergraduate study programme in Electrical Engineering and Information Technology, field of study Electronics and Computer Engineering, or completed other related undergraduate study programme with acquired at least 180 ECTS credits, with possible differential exams. For applicants who have completed other related study programmes, with preconditions defined for enrolment of certain courses, the Faculty Council may determine additional enrolment requirements.

2.2. Learning outcomes of the study programme (name 15-30 learning outcomes)

The learning outcomes of the study programme are directly related to the learning outcomes of an individual course and represent learning outcomes to be achieved by each student who completes the graduate university study programme in *Electronics and Computer Engineering*. The learning outcomes are aligned with the Croatian Qualification Framework Act and are listed as common learning outcomes for both fields of study and additional learning outcomes depending on the selected field of study, in the areas of knowledge, skills and corresponding independence and responsibility.

KNOWLEDGE

1. To apply appropriate mathematical, physical and scientific principles in solving highly complex problems in the field of Electronics and Computer Engineering.
2. To apply advanced engineering knowledge and engineering principles in presenting and solving highly complex and original problems in the field of Electronics and Computer Engineering.
3. To apply acquired knowledge in identifying, formulating and solving highly complex problems in the field of Electronics and Computer Engineering.
4. To develop innovative analytical methods and advanced modelling procedures in solving highly complex engineering problems in the field of Electronics and Computer Engineering.
5. To critically review the features of new and upcoming products, processes and methods in the field of Electronics and Computer Engineering.
6. By applying scientific principles, to design innovative experiments with the use of state-of-the-art technological solutions in the area of Electronics and Computer Engineering.
7. To select optimal engineering and economic solutions in the design and construction of the most complex systems, networks and services in the field of Electronics and Computer Engineering

8. To critically assess and provide arguments for the possibilities of applied techniques and methods and their limitations.

SKILLS

9. To apply advanced techniques of software development and software engineering in solving the most complex problems in the field of electronics and computer engineering.
10. To conduct complex experiments and measurements, to analyse and interpret collected data and measurement results and give conclusions and proposals for solutions.
11. To manage multidisciplinary and international teams
12. To prepare design documents and technical reports, using modern technologies.
13. To use literature, databases and other sources of information.
14. To give public presentations, to prepare written reports and present project results in Croatian and English.

INDEPENDENCE

15. To manage and lead development activities in the environment with unforeseen conditions.
16. To make decisions in uncertain conditions.
17. To work in the field in regular working conditions and under unforeseen conditions.

RESPONSIBILITY

18. To demonstrate awareness of the influences of engineering practice on the individual, society and environment.
19. To assume personal and team responsibility for strategic decision-making and successful performance and completion of tasks in unforeseen conditions.
20. To assume social and ethical responsibility during performance of tasks and the consequent results of those tasks.
21. To adopt and transfer new knowledge and technology.

ADDITIONAL LEARNING OUTCOMES FOR THE FIELD OF STUDY ELECTRONICS

1. To consolidate theoretical knowledge and practical skills in solving highly complex problems in the area of Electronics and Wireless Communications.
2. To propose new procedures and new solutions for modernisation in the area of Electronics and Wireless Communications
3. To develop innovative programming solutions for simulation of components and systems in the area of Electronics and Wireless Communications
4. To design advanced hardware solutions in the area of Electronics and Wireless Communications
5. To analyse complex systems in the area of electronics and wireless communications.
6. To organise and manage the investigation of highly complex systems in the area of electronics and wireless communications.
7. To design innovative solutions in the development, design, implementation and investigation of elements and devices in the area of electronics and wireless communications.

ADDITIONAL LEARNING OUTCOMES FOR THE FIELD OF STUDY COMPUTER ENGINEERING

1. To consolidate theoretical knowledge and practical skills in solving highly complex problems in the area of information systems using the methods of software engineering and artificial intelligence.

2. To propose new procedures and new solutions for modernisation of information systems using the methods of software engineering and artificial intelligence.
3. To develop innovative solutions in the field of information systems using the methods of software engineering and artificial intelligence.
4. To develop innovative solutions in the field of information systems, software engineering and artificial intelligence.
5. To analyse complex information systems using the methods of software engineering and artificial intelligence
6. To organise and manage the investigation of highly complex systems in the field of information systems using the methods of software engineering and artificial intelligence
7. To design innovative solutions in the development, design, implementation and investigation of complex information systems using the methods of software engineering and artificial intelligence.

2.3. Employment possibilities

The goal of the graduate study in Information and Communication Technology is to educate professionals for the most demanding positions in the area of information and communication technology in the industry, higher education institutions, governmental and other public institutions. After having completed the study programme, students can, due to their acquired knowledge, be employed in many enterprises related to the field of electronics and computer engineering, public and education institutions, in the service sectors etc.

There is virtually no working environment in which experts with completed graduate university degree in Electronics and Computer Engineering could not find employment and the labour market demand for this profile of experts are very high. This is especially relevant in this moment, with social and economic changes driving the development of new, small and medium technologically advanced enterprises that could serve as the new driving force for economic development. Graduates who complete the graduate university study programme in Electronics and Computer Engineering acquire the knowledge and skills necessary for work in various areas: in companies that produce electronic equipment and systems based on computer equipment, in public institutions, in companies that develop software and in other production and service industries. Following the completion of studies, the students are capable of testing, maintenance, designing, monitoring and controlling the most complex systems in the field of electronics and computer engineering. Following the completion of studies, fully educated experts are capable of solving the most complex engineering tasks and participating in scientific research. The demand for experts with these competences considerably exceeds the available number of educated experts in the region, Croatia and the world.

In addition, there is also a support provided by economic and public sector of Split-Dalmatia County, by major part of the Dalmatian region and by state administration. FESB is a signatory to a number of cooperation agreements with the aim of promoting academic and educational activities, concluded with numerous enterprises and public organisations related to the Information and Communication Technology e.g.: Ericsson Nikola Tesla, Siemens, Croatian Telecom, Hrvatska elektroprivreda (national power company, VIPnet, Microsoft Croatia and Split-Dalmatia County.

Purpose of the study programme has been confirmed by the number of students who successfully completed their studies and are employed in practically all sectors of economy and public services, especially in enterprises related to the field of information and communication technology. Demands of the labour market for this profile of experts significantly exceed current availability of experts. This is especially relevant in this moment, with social and economic changes driving the development of new, small and medium technologically advanced enterprises that could serve as the new driving force for economic development. The demand for experts with these competences considerably exceeds the available number of educated experts in the region, Croatia and the world.

2.4. Possibilities of continuing studies at a higher level

After completing the graduate university study programme in Electrical Engineering, graduates may continue their studies at the postgraduate study programme in Electrical Engineering and Information Technology or at any other related postgraduate study programme.

2.5. Name lover level studies of the proposer or other institutions that qualify for admission to the proposed study

Undergraduate university study programme in Electrical Engineering and Information Technology.

2.6. Structure of the study

The study programme is structured per semesters, lasting 4 semesters, two in each academic year. Each semester corresponds to 30 ECTS credits. There are two fields of study:

- Electronics
- Computer Engineering

In the second year of study, in addition to required courses, the students select elective courses as well. The final component of the study programme is preparing and defending the diploma thesis. The conditions for enrolling a course are listed in the course table. Lectures are delivered in groups up to 100 students, auditory exercises and seminars in groups of 30 students and laboratory exercises in groups of 10 students.

2.7. Guiding and tutoring through the study system

During the course of study programme activities, students have access to all the Faculty services. For the purpose of timely and effective communication, notifications and information are provided to students through the e-learning portal.

2.8. List of courses that the student can take in other study programmes

Students may choose courses from other study programmes only as elective courses which are not included in the standard workload of 30 ECTS credits per semester.

2.9. List of courses offered in a foreign language as well (name which language)

Course tables for individual courses list the option of teaching a course in a foreign language.

2.10. Criteria and conditions for transferring the ECTS credits

Transfer or recognition of ECTS credits between related graduate university study programmes is allowed. The criteria and conditions for transferring the ECTS credits are regulated by the Regulations on Studies and Study System at the University of Split.

2.11. Completion of study

Final requirement for completion of study	Final thesis ☐ Diploma thesis ☒	Final exam ☐ Diploma exam ☐
Requirements for final/diploma thesis or final/diploma/exam		
Procedure of evaluation of final/diploma exam and evaluation and defence of final/diploma thesis		

2.12. List of mandatory and elective courses

List of courses								
Year of study: 1.								
Semester: I.								
STATUS	CODE	COURSE	HOURS IN SEMESTER*					ECTS
			L	S	AE	LE	DE	
Mandatory	FELH01	Algorithms and data structures	30	0	0	30	0	5
	FEMJ02	Information and technology physics	30	0	0	15	0	4
	FELH02	Information theory and coding	45	0	0	15	0	6
	FELH38	Fields and waves in electronics	30	0	0	30	0	5
	FELH04	Electronic and virtual instrumentation	30	0	0	30	0	5
		Elective course 1**						
	Total		165	0	0	120	0	25
	*L = predavanja, S = seminar, AE = auditorne vježbe, LE = laboratorijske vježbe, DE = konstrukcijske vježbe							
****Izborni se predmeti mogu birati s predložene liste ili s lista obveznih i izbornih predmeta zimskih semestara sveučilišnih diplomskih studija AIS, KIT i Računarstvo. Ako se obvezni predmet upiše kao izborni, postoji mogućnost da ukupni broj ECTS bodova po semestru bude veći od 30.**								
Elective**	FELH21	Windows programming	30	0	0	30	0	5
	FELH23	Time-frequency signal analysis	30	0	0	30	0	5
	FELH24	Electromagnetic compatibility	30	0	0	30	0	5
	FELH30	Local and access networks	30	0	0	30	0	5
	FELJ17	Numerical methods in communications	30	0	0	30	0	5
	FELH39	Digital image processing and analysis	30	0	0	30	0	5
	Bira se: - **1 Elective course**							
	*L = predavanja, S = seminar, AE = auditorne vježbe, LE = laboratorijske vježbe, DE = konstrukcijske vježbe							

List of courses								
Year of study: 1.								
Semester: II.								
STATUS	CODE	COURSE	HOURS IN SEMESTER*					ECTS
			L	S	AE	LE	DE	
Mandatory	FELH05	Advanced computer architecture	30	0	0	30	0	5
	FELH06	Programming languages and compilers	45	0	0	15	0	5
	FELH07	Digital systems projecting	30	0	0	30	0	5
	FELH08	Digital signal processing systems	30	0	0	30	0	5
		Elective course 1**						
		Elective course 2**						
	Total		135	0	0	105	0	20
	*L = predavanja, S = seminar, AE = auditorne vježbe, LE = laboratorijske vježbe, DE = konstrukcijske vježbe							
****Izborni se predmeti mogu birati s predložene liste ili s lista obveznih i izbornih predmeta ljetnih semestara diplomskih studija AIS, KIT i Računarstvo. Ako se obvezni predmet upiše kao izborni, postoji mogućnost da ukupni broj ECTS bodova po semestru bude veći od 30.**								
Elective**	FELH32	Electroacoustics	30	0	0	30	0	5
	FELH34	Computer aided process control	30	0	0	30	0	5
	FELH35	Solar cells	30	0	0	30	0	5
	FELG14	Operations research	30	0	0	30	0	5
	FELJ24	Bioelectromagnetics	30	0	0	30	0	5
	FELJ09	Wireless communication networks	30	0	15	15	0	5
	FELJ30	Maritime radiocommunications	30	0	0	30	0	5
	FELJ31	Database programming	30	0	0	30	0	5
	FELJ32	3D Renedering	30	0	0	30	0	5
	FELK34	Computer games programming	30	0	0	30	0	5
	FELG33	Optoelectronic measurement methods	30	0	0	30	0	5
	Bira se: **2 Elective courses**							
	*L = predavanja, S = seminar, AE = auditorne vježbe, LE = laboratorijske vježbe, DE = konstrukcijske vježbe							

Module: **ELECTRONICS - 221**

List of courses								
Year of study: 2.								
Semester: III.								
STATUS	CODE	COURSE	HOURS IN SEMESTER*					ECTS
			L	S	AE	LE	DE	
Mandatory	FELH12	Wireless communications	30	0	0	30	0	5
	FELH13	Electronic circuits	15	0	15	30	0	5
	FELH14	Optoelectronics	30	0	0	30	0	5
		Elective course 1**						
		Elective course 2**						
		Elective course 3**						
	Total		75	0	0	105	0	15
	*L = predavanja, S = seminar, AE = auditorne vježbe, LE = laboratorijske vježbe, DE = konstrukcijske vježbe							
****Izborni se predmeti mogu birati s predložene liste ili s lista obveznih i izbornih predmeta zimskih semestara sveučilišnih diplomskih studija AIS, KIT i Računarstvo. Ako se obvezni predmet upiše kao izborni, postoji mogućnost da ukupni broj ECTS bodova po semestru bude veći od 30.**								
Elective**	FELH16	Embedded systems	30	0	0	30	0	5
	FELH20	Designing and using computer networks	30	0	0	30	0	5
	FELH37	Microelectronics	30	0	0	30	0	5
	FELJ20	Multimedia systems	30	0	0	30	0	5
	FELG17	Bioelectrical systems and equipment	30	0	0	30	0	5
	FELJ38	Radio frequency identification technology	30	0	0	30	0	5
	FELH40	Programming mobile robots and drones	30	0	0	30	0	5
	FELH42	3D Animations	30	0	0	30	0	5
	FELH41	Medical electronic devices	30	0	0	30	0	5
	FEXX06	Professional Training						5
	Bira se: - **3 Elective courses**							
	*L = predavanja, S = seminar, AE = auditorne vježbe, LE = laboratorijske vježbe, DE = konstrukcijske vježbe							

List of courses								
Year of study: 2								
Semester: IV.								
STATUS	CODE	COURSE	HOURS IN SEMESTER*					ECTS
			L	S	AE	LE	DE	
	FEXX02	Diploma thesis						30
	Total							
*L = predavanja, S = seminar, AE = auditorne vježbe, LE = laboratorijske vježbe, DE = konstrukcijske vježbe								

Module: **COMPUTER ENGINEERING - 222**

List of courses								
Year of study: 2.								
Semester: III.								
STATUS	CODE	COURSE	HOURS IN SEMESTER*					ECTS
			L	S	AE	LE	DE	
Mandatory	FELH09	Software engineering	45	0	0	15	0	5
	FELH10	Distributed information systems	30	0	0	30	0	5
	FELH11	Artificial intelligence	30	0	0	30	0	5
		Elective course 1**						
		Elective course 2**						
		Elective course 3**						
	Total		105	0	0	75	0	15
	*L = predavanja, S = seminar, AE = auditorne vježbe, LE = laboratorijske vježbe, DE = konstrukcijske vježbe							
****Izborni se predmeti mogu birati s predložene liste ili s lista obveznih i izbornih predmeta zimskih semestara sveučilišnih diplomskih studija AIS, KIT i Računarstvo. Ako se obvezni predmet upiše kao izborni, postoji mogućnost da ukupni broj ECTS bodova po semestru bude veći od 30.**								
Elective**	FELH16	Embedded systems	30	0	0	30	0	5
	FELH20	Designing and using computer networks	30	0	0	30	0	5
	FELH37	Microelectronics	30	0	0	30	0	5
	FELJ20	Multimedia systems	30	0	0	30	0	5
	FELG17	Bioelectrical systems and equipment	30	0	0	30	0	5
	FELJ38	Radio frequency identification technology	30	0	0	30	0	5
	FELH40	Programming mobile robots and drones	30	0	0	30	0	5
	FELH42	3D Animations	30	0	0	30	0	5
	FELH41	Medical electronic devices	30	0	0	30	0	5
	FEXX06	Professional Training	0	0	0	0	0	5
	Bira se: - **3 Elective courses**							
	*L = predavanja, S = seminar, AE = auditorne vježbe, LE = laboratorijske vježbe, DE = konstrukcijske vježbe							

List of courses								
Year of study: 2								
Semester: IV.								
STATUS	CODE	COURSE	HOURS IN SEMESTER*					ECTS
			L	S	AE	LE	DE	
	FEXX02	Diploma thesis						30
	Total							
*L = predavanja, S = seminar, AE = auditorne vježbe, LE = laboratorijske vježbe, DE = konstrukcijske vježbe								

2.13. Course description

FELH01	Algorithms and data structures - Zoraja (Algoritmi i strukture podataka)

FELH42	3D Animations - Zoraja (Računalne 3D animacije)

FELJ32	3D Renedering - Zoraja (Trodimenzionalne simulacije)

NAME OF THE COURSE	ADVANCED COMPUTER ARCHITECTURES						
Code	FELH05	Year of study	1				
Course teacher	Sven Gotovac, Ph.D., Full Professor	Credits (ECTS)	5				
Associate teachers	Dunja Gotovac, Teaching Assistant	Type of instruction (number of hours)	L	S	AE	LE	DE
			30			30	
Status of the course	Obligatory	Percentage of application of e-learning	0				

COURSE DESCRIPTION

Course objectives	Training students for: 1. Recognize the architecture of modern computer systems. 2. Choose the appropriate computer architecture according to the problem being solved computer architecture 3. Estimates the impact of computer architecture and its components on system performance 4. Develop, adapt and implement solutions on multi-processor and multi-core systems.		
Course enrolment requirements and entry competences required for the course	Computer Architecture		
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: 1. Understand the Architecture of Modern Computer Systems 2. Determine the impact of individual components on the performance of a computer system 3. Choose the appropriate computer architecture according to the problem being solved 4. Develop and implement solutions on selected architecture (multi-processor, multi-core, many-core.).		
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Introduction to the course, Brief description of the topics to be considered, Brief subjects from the course Digital Architecture: Programming Architecture, Pipeline, Fast Memory	2	
	Pipeline architecture	2	
	Instruction execution parallelism. Problems and Solutions.	2	
	Out of Order Execution. Branch Prediction	2	
	Cache. Various Cache Architecture	2	
	Memory Performance Optimization	2	
	ChipSet	2	
	MESI Protocol	2	
	Multi Core Processors	2	
	Many Core Processor – Xeon Phi	4	
	Graphical Processing Unit - GPU	4	
	Application Examples	4	
	List of laboratory or design exercises		LE hours
	Multi-threading programming. Performance exmples		4
	Cache impact on execution performance		4
	GPU CUDA Programming		4
	Problem implementation on Multi-Core, Many-Core and CUDA architecture. Performance comparison.		14

<table>
<tr><td>Format of instruction</td><td colspan="6">☒ lectures
☒ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☒ independent assignments
☒ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="8">The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.</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>1</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td>0</td><td>Report</td><td>1</td><td>Laboratory exercises</td><td>1</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Preparation for laboratory exercises</td><td>0,5</td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>Self-study</td><td>0,5</td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td>1</td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">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. First midterm test lasts 60 minutes and consists of 5 to 7 theoretical questions and numerical problems, second midterm is practical example and final tests consist of 6 theoretical questions and numerical problems and example solving. In the final exams students that did not pass the midterm exams take part. The midterm and final exams are carried out as written tests. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on each midterm exam or the final exam. Grade (in percentage) is formed according to the formula:
Grade(%) = 0,33 LV + 0,33 (M1 + M2)
the activities in percentage:
• LV – laboratory assessment,
• M1, M2 – test results.
The final grade will be determined after the first test term by applying a relative ECTS grading system in accordance with the Regulations on the study and study system of the University of Split. The group of students who passed the exam is divided into four groups: 15% of the best gets the grade A (excellent), 35% of the following B (very good), the next 35% rating C (good), and the last 15% rating D, E). A group of students who did not pass the exam gains FX score (additional work is required), or F (significant additional work is required). In accordance with the Rulebook for Exam, only two exam periods are organized in the exam period after the completion of classes.
According to Article 65 of the Statute of the Faculty, the student is obliged to participate in all forms of teaching and attend: lectures at least 70% of teaching hours and laboratory exercises 100% of teaching hours. If you do not meet these conditions, the student will not be able to access the exam</td><td colspan="2"></td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="5">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="5">• Hennesy & Patterson, "Computer Architecture: A Quantitative Approach", 5rd edition, Morgan Kaufmann, 2011.</td><td>2</td><td>Electronic copy On e-learning</td></tr>
<tr><td colspan="5">• Edward Kandrot and Jason Sanders, CUDA by Example: An Introduction to General-Purpose GPU, NVidi, 2010.</td><td>1</td><td>Electronic copy On e-learning</td></tr>
</table>

Optional literature (at the time of submission of study programme proposal)	• Ribarić, S.: Naprednije arhitekture mikroprocesora, Tehnička knjiga, Zagreb
Quality assurance methods that ensure the acquisition of exit competences	1. Class attendance records. 2. Evaluation of results in accordance with the above learning outcomes 3. Feedback from students via surveys 4. Self-evaluation of teachers 5. Feedback from students who have already graduated. 6. Institutional and non-institutional evaluations
Other (as the proposer wishes to add)	

NAME OF THE COURSE	ARTIFICIAL INTELLIGENCE							
Code	FELH11	Year of study	1					
Course teacher	Darko Stipaničev, Ph.D., Full Professor (60%) Ljiljana Šerić, Ph.D., Assistant Professor (40%)	Credits (ECTS)	5					
Associate teachers	Toni Jakovčević, Ph.D., Assistant Professor	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30	0	0	30	0	
Status of the course	Obligatory	Percentage of application of e-learning	80					

COURSE DESCRIPTION

Course objectives	The aim of the course is to teach students basic knowledge in the field of artificial intelligence, ways of collecting and storing knowledge, to methods and algorithms by which this knowledge is used in solving complex tasks. In addition to an introduction to the theoretical foundations of artificial intelligence and illustrate the many applications in science and economy.
Course enrolment requirements and entry competences required for the course	Basic knowledge of computers and programming. To follow the College is necessary knowledge of English.
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to successfully mastering the subject: 1. Explain the differences between biological intelligence, artificial intelligence, computational intelligence and distributed intelligence. 2. Present complex tasks and prepare them for automatic solving them. 3. Understand the difference between data, information and knowledge and systems based on knowledge. 4. Explain the procedures of knowledge elicitation and knowledge storing using different types of mathematical logic (propositional logic, predicate logic, non-standard logic). 5. Apply the structural representation of knowledge, particularly semantic networks, frames, scenarios, stereotypes, and production rules. 6. Describe and present standard methods of solving tasks of artificial intelligence, especially methods of searching the knowledge base (undirected and directed search) 7. Apply logical reasoning, probabilistic reasoning, fuzzy reasoning 8. Apply simple machine learning tasks (unsupervised and supervised). 9. Write simple programs in programming languages and tools of artificial intelligence (Prolog, LISP, AIXML, Jess). 10. Describe the application of artificial intelligence, in particular through expert systems.

	Course content	L hours	LE hours
Course content broken down in detail by weekly class schedule (syllabus)	Introduction to Artificial Intelligence - the name, history, related disciplines. Biological intelligence, the theory of multiple intelligences. The research area of artificial intelligence. The techniques of artificial intelligence and success criteria.	4	0
	Complex tasks and their preparation for solving using AI methods. Problem solving techniques using search (undirected and directed search)	4	0
	Knowledge and storage of knowledge – I part introduction, data, information, knowledge. Knowledge-based systems. Knowledge and storage of knowledge - II part mathematical	4	0

	logic (standard and non-standard logic).		
	Logical reasoning. Probabilistic reasoning (probability, conditional probability, Bays networks, hidden Markov models). Fuzzy (fuzzy) reasoning.	6	0
	Knowledge and storage of knowledge - Part III structure storage knowledge (semantic networks, stereotypes, the script, frames, production systems).	2	0
	Machine learning (unsupervised and supervised)	4	0
	Examples of applications of artificial intelligence. Expert systems. Processing and understanding speech. Computer vision.	2	8
	The programming language LISP	0	15
	The programming language Prolog and expert system shell	0	15

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	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

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	1,5	Research		Practical training	
	Experimental work		Report		Individual work	
	Essay		Seminar essay		Laboratory exercises	1,5
	Tests		Oral exam		Preparation for laboratory exercises	
	Written exam	**2**	Project		(Other)	

Grading and evaluating student work in class and at the final exam	The exam consists of a written part and if necessary additional oral exam. During the semester will be two tests. The first colloquium in 8 weeks of classes, the second at 18 weeks. A student can pass the course by these tests. In the two final exams in June and July, students who have not collected inadequate number of points through colloquia take the whole subject covered by the two tests. The condition for taking the final exam is successfully finished practical lab exercises. The exam is comprehensive and includes the theoretical part of the material and tasks with auditory exercises. The condition for positive assessment is that the student has a total of at least 50% on the exam or when it must have a minimum 25% passing the theoretical part of the material and 25% of the deposited duties. If a student has less than 25% of the points on the tasks and / or less than 25% points from the theoretical part of the material again taken the entire exam. Students who did not pass the exam after two final exams can pass the exam in autumn periods. All test questions students will be known before the exam. These rules apply equally to students who are enrolled this course for the first time and to those students who enter college for the second time. The final grade is determined as follows: percentage Rating 50% to 61% is sufficient (2) 62% to 74% good (3) 75% to 87% of very good (4) 88% 100% Excellent (5) The first colloquium will take the material to the teaching units to the seventh week

<table>
<tr><td></td><td colspan="3">inclusive, and on the other the rest of the teaching weeks. Examinations are held in terms of the anticipated calendar of classes.

Under Article 65 of the Statute of the Faculty, the student is required to participate in all forms of teaching and attend: lectures at least 70% of classes. If she or he do not meet these requirements, the student will not be able to take the exam and get a signature.</td></tr>
<tr><td rowspan="6">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>D.Stipaničev, Lj. Seric, Lectures from artificial intelligence, lecturing notes and internal textbook</td><td></td><td>e-learning portal</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">- A.Cawsey, The Essence of Artificial Intelligence, Prentice Hall, 1998.
- S.Russel, P.Norvig, Artificial Intelligence: A Modern Approach, Prentice Hall, 2nd Ed. 2002.
- AI on the Web (http://http.cs.berkeley.edu/%7Erussell/ai.html)
- American Association for Artificial Intelligence (www.aaai.org)</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">- Evaluation of results in accordance with the above learning outcomes
- Feedback from students via surveys
- Self-evaluation of teachers
- Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

NAME OF THE COURSE	BIOELECTRICAL SYSTEMS AND EQUIPMENT							
Code	FELG17	Year of study	2.					
Course teacher	Mirjana Bonković, Ph.D., Full Professor	Credits (ECTS)	5					
Associate teachers	Zoran Valić, Ph.D., Full Professor	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30	0	0	30	0	
Status of the course	Elective	Percentage of application of e-learning	0					

COURSE DESCRIPTION		
Course objectives	Training students for adoption and understanding of the basic knowledge of: - foundations of biomedical engineering as area that impinge on the various scientific disciplines such as biomechanics, biomaterials, medical imaging, rehabilitation engineering, biotechnology, tissue engineering and so on. - physiological principles underlying the formation of bioelectric signals which is necessary precondition for the functionality of medical diagnostic devices. - basic methods for bioelectric signals analysis and processing - functional components of typical diagnostic devices based on these analysis.	
Course enrolment requirements and entry competences required for the course		
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - define the reasons and the principles causing the bioelectric signals formation. - define the sensors and their functionality for measuring the bioelectrical activity. - define the functionality of some of the typical medical diagnostic devices. - define and comment procedures which should be applied to the measured bioelectric signals to make them useful in diagnosis. - apply the appropriate procedures to remove the noise and / or detect specific occurrence from the measured signal	
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours
	Biomedical engineering: historical perspective.	2
	Anatomy and physiology.	2
	Bioelectric phenomenon.	2
	Biomedical sensors.	2
	Biomedical devices.	2
	Bioelectrical signals analysis and processing.	2
	Characteristics and methods for ECG, EMG, EEG and respiratory signals processing.	6
	Analysis and processing medical images.	4
	Devices for medical diagnostics.	4
	List of laboratory or design exercises	LE hours
	Biomedical sensors.	6
	Biomedical devices. Functional components (Sensors, ADC, processing unit)	4
	Bioelectrical signals analysis and processing.	6
	Physiological modeling.	2
	Biomechanics.	2
	Analysis and processing of medical images .	6

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<tr><td>Student responsibilities</td><td colspan="8"></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 colspan="2"></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work</td><td colspan="2">0,6</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>1</td><td>Laboratory exercises</td><td colspan="2">0,8</td></tr>
<tr><td>Tests</td><td>0,2</td><td>Oral exam</td><td></td><td>Preparation for laboratory exercises</td><td colspan="2">0,2</td></tr>
<tr><td>Written exam</td><td>0,2</td><td>Project</td><td></td><td>(Other)</td><td colspan="2"></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="8">During the semester there are two midterm exams. The first midterm exam is after 7 weeks of lectures and the second one is after 13 weeks of lectures (in a form of presentation and defense of the project assignment). Each midterm test (as well as the final test) is carried out in a written format with duration of 90 minutes. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on average midterm exam ((M1 + M2)/2) or the final exam. Students are allowed to have at least 45% of total points on each midterm exams, as long as the final midterm average is at least 50% of total points.
Grade (in percentage) is formed according to the formula:

Grade(%) = 0,1L + 0,45M1 + 0,45M2

where:
• L – laboratory assessment,
• M1, M2 – midterm test results.

According to Article 65. of Faculty's Bylaw, student is required to participate in all teaching activities attending at least 70% of lectures, and 100% of laboratory exercises. If student does not meet these criteria, she or he won't be able to take part in the final exam, and will be required to enroll in the course the next year.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="5">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="5">• J.D.Enderle, S.M.Blanchard, J.D.Bronzino: Introduction to biomedical engineering, Academic Press, 1999</td><td></td><td>e-learning</td></tr>
<tr><td colspan="5">• Ante Šantić: Biomedicinska elektronika, Školska knjiga, Zagreb, 1995.</td><td></td><td>e-learning</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="8">- R. Palaniappan: Biological Signal Analysis (http://bookboon.com/en/introduction-to-biological-signal-analysis-ebook#download)</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="8">- Keeping records of student attendance.
- Annual analysis of course statistics in terms of midterm and finals exams.
- Feedback from students via surveys.
- Teacher self-evaluation.
- Feedback from graduated students (or senior students) on course content relevance.
- Periodic institutional evolution of course teachers.</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="8"></td></tr>
</table>

NAME OF THE COURSE	BIOELECTROMAGNETICS							
Code	FELJ24	Year of study	1.					
Course teacher	Antonio Šarolić, Ph.D., Full Professor	Credits (ECTS)	5					
Associate teachers	Niko Ištuk, mag. ing. el.	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30			30		
Status of the course	Elective	Percentage of application of e-learning	0					

COURSE DESCRIPTION

Course objectives	Training students for: - understanding the human electrophysiology - acquiring knowledge on therapeutic and diagnostic methods - application of specialized interdisciplinary knowledge in biomedical applications
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 the cell structure - describe the electrophysiology of excitable cells and tissues - apply the electrophysiology knowledge for understanding the brain and heart function - analyze the electric activity of heart and brain with applications in diagnostics - link the electrophysiology principles to the function of other bodily organs and to potential biomedical applications

Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Introduction and history.	2	0
	Structure of neuron and muscle cells.	2	0
	Membrane potential.	2	0
	Axon as transmission line (cable).	2	0
	Membrane activation.	2	0
	Synapses, receptors and brain.	2	0
	Heart.	2	0
	Volume source. Volume conductor.	2	0
	Electrocardiography (ECG).	2	0
	Electroencephalograhpy (EEG).	2	0
	Electrophysiology of the eye. Electrodermal reaction.	2	0
	Other diagnostic and therapeutic methods based on applied electromagnetics. Magnetic resonance imaging (MRI).	2	0
	Visit to Medical School of the University of Split. Visit to companies related to the course topics.	2	0

	List of laboratory or design exercises	LE hours
	Membrane potential.	4
	Axon as transmission line (cable).	2
	Membrane activation.	4
	Synapses, receptors and brain.	2
	Electrocardiography (ECG).	2
	Electroencephalograhpy (EEG).	2
	Electrodermal reaction.	2
	Other diagnostic and therapeutic methods based on applied electromagnetics. Magnetic resonance imaging (MRI).	2

<table>
<tr><td></td><td colspan="6">Visit to Medical School of the University of Split. Visit to companies related to the course topics.</td><td>6</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
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☐ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="7">Student is required to attend the lectures and auditory exercises in the amount of at least 70% of the schedule. Student is required to attend the laboratory exercises in the amount of 100% of the schedule and to complete all tasks associated with laboratory exercises.</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>1</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td>0,5</td><td>Report</td><td></td><td>Laboratory exercises</td><td>0,5</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>1</td><td>Individual work</td><td>1</td></tr>
<tr><td>Mid-exam</td><td>0,5</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>0,5</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="7">During the semester, two mid-exams will be held. The first mid-exam will be held in the middles of the semester, while the second will be held after the lectures and exercises are completed, schedules to be agreed with the students.
The first mid-exam is based on the first half of the course material. The second mid-exam is based on the first second half of the course material.
To pass at each mid-exam, min. 50% of points must be earned from the part of the exam containing numerical problems (material from auditory exercises) and min. 50% of points must be earned from the part of the exam containing theory (material from the lectures).
To earn the right to approach the second mid-exam, min. 30% of points must be earned from the part of the first mid-exam containing numerical problems (material from auditory exercises) and min. 30% of points must be earned from the part of the first mid-exam containing theory (material from the lectures).
If a student earns the positive grades on both mid-exams, he/she is considered to have passed the whole exam with the grade calculated as average from both mid-exams.
At the first exam term, students may choose to take the exam containing only that half of the material that they haven't passed at mid-exams.
At all other exam terms, students must take the whole exam, containing all the course material.
Approaching the exams is subject to fulfilling the requirements on student responsibilities.
The overall point percentage defining the overall grade is calculated as the average of points earned in all exam questions, corrected by the result of oral verification:
Percentage -> Grade
50% - 62,4% -> sufficient (2)
62,5% - 74,9% -> good (3)
75% - 87,4% -> very good (4)
87,5% - 100% -> excellent (5)
Final grade can be supplemented by performing practical project work involving individual and experimental work, in agreement with the teacher.
Exam terms: according to the academic year calendar</td></tr>
</table>

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	• Jaakko Malmivuo & Robert Plonsey: Bioelectromagnetism - Principles and Applications of Bioelectric and Biomagnetic Fields, Oxford University Press, New York, 1995.		
	• Handbook of biological effects of electromagnetic fields (third edition): Bioengineering and Biophysical Aspects of Electromagnetic Fields, Ed. Frank S. Barnes and Ben Greenebaum, CRC Press, 2007.		
	• Handbook of biological effects of electromagnetic fields (third edition): Biological and Medical Aspects of Electromagnetic Fields, Ed. Frank S. Barnes and Ben Greenebaum, CRC Press, 2007.		
Optional literature (at the time of submission of study programme proposal)	• Šantić, A: Biomedicinska elektronika, Školska knjiga, Zagreb, 1995. • The Biomedical Engineering Handbook (Second Edition), Ed. Joseph D. Bronzino, CRC Press, 2000.		
Quality assurance methods that ensure the acquisition of exit competences	Surveys providing student feedback		
Other (as the proposer wishes to add)			

FELH34	Computer aided process control - Betti (Primjena računala u vođenju procesa)

NAME OF THE COURSE	COMPUTER GAMES PROGRAMMING						
Code	FELK34	Year of study	1.				
Course teacher	Jadranka Marasović, Ph.D., Full Professor	Credits (ECTS)	5				
Associate teachers	Tea Marasović, Ph.D., Assistant Professor	Type of instruction (number of hours)	L	S	AE	LE	DE
			30	0	0	30	0
Status of the course	Elective	Percentage of application of e-learning	0				

COURSE DESCRIPTION

Course objectives	Enabling students to acquire basic theoretical and practical knowledge on design and development of computer video games – from concept to final implementation – by working through different game examples, with emphasis placed on their programming.
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 this course, students will be able to: - use Unity game development platform to create interactive 2D and 3D content; - explain how the physics engine works; - build a simple world using built-in primitive shapes, readily available assets and animated characters imported from 3D modelling programs; - arrange and edit basic GUI elements; - use C# programming language to set up basic game functionality; - incorporate artificial intelligence in the game; - make a simple computer video game and prepare it for publishing.

Course content broken down in detail by weekly class schedule (syllabus)

Course content	L hours	AE hours
Introduction. History of computer games.	2	0
General game development guidelines.	2	0
Getting started with Unity. Creating, editing and transforming objects. Materials and textures.	2	0
Scripting in Unity.	2	0
Designing the game's GUI: buttons, sliders, status bars and clocks.	4	0
Introduction to game physics. Rigid bodies. Collison detection and object interaction. Displaying results.	2	0
Adding sound effects and music. Working with cameras.	2	0
Particle systems. Skeletal animation basics.	2	0
Multi-player games. Tic Tac Toe.	2	0
Artificial intelligence in games. State machines.	4	0
Lighting the world. Creating the final build.	2	0

List of laboratory or design exercises	LE hours
Making a simple game: Pong.	2
Making a simple collection game.	2
Maze game: Setting up basic functionality.	2
Maze game: Animating objects in Unity.	2
Maze game: Saving and loading the game.	2
3D puzzle game: Level design. Light maps.	2
3D puzzle game: Staging props.	2
3D puzzle game: Importing animated characters. Creating movement mechanics.	4
3D puzzle game: The game manager.	2

<table>
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☐ field work</td><td colspan="6">☒ independent assignments
☐ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="12">Minimum of 70 percent lecture attendance. Completing all the required laboratory exercises.</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 colspan="2">Class attendance</td><td>1.5</td><td colspan="2">Research</td><td></td><td colspan="2">Practical training</td><td></td></tr>
<tr><td colspan="2">Experimental work</td><td></td><td colspan="2">Report</td><td></td><td colspan="2">Individual work</td><td>1</td></tr>
<tr><td colspan="2">Essay</td><td></td><td colspan="2">Seminar essay</td><td></td><td colspan="2">Laboratory exercises</td><td>1.5</td></tr>
<tr><td colspan="2">Tests</td><td>0.5</td><td colspan="2">Oral exam</td><td></td><td colspan="2">(Other)</td><td></td></tr>
<tr><td colspan="2">Written exam</td><td>0.5</td><td colspan="2">Project</td><td></td><td colspan="2">(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="12">During semester, there will be two mid-term exams – according to the class schedule – and/or a project assignment, depending on the agreement with the students. The requirement for the positive grade is the attendance and commitment at the laboratory exercises and a minimum of 40 percent correct answers at each mid-term.

The final grade is determined based on the total number of points earned, which is calculated as follows:
Grade [%] = 0.5 * M1 + 0.5*M2
Percentage Grade
50% to 61% sufficient (2)
62% to 74% good (3)
75% to 87% very good (4)
88% to 100% excellent (5)
The final exam encompasses the entire course load or selected parts of it that students' did not pass at either of mid-term exams. The correction exam encompasses the entire course load. The requirement for passing the exam is minimum of 50 percent correct answers. The exams are held according to the class schedule.</td></tr>
<tr><td rowspan="2">Required literature (available in the library and via other media)</td><td colspan="8">Title</td><td colspan="2">Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="8">• T. Marasović, J. Marasović; Authorized lectures</td><td colspan="2"></td><td>e-Learning portal</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="12">• T. Miller; “Beginning 3D Game Programming“, Sams Publishing, 2004, ISBN: 0-672-32661-2.
• K. C. Finney; “3D Game Programming All in One”, Premier Press, 2004. ISBN: 1-59200-136-X.
• S. Blackman; “Beginning 3D Game Development with Unity”, Apress, 2011, ISBN: 978-1-4302-3422-7</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="12">- Keeping records on class attendance
- Annual analysis of exam results
- Student survey on teaching performance
- Teacher self-evaluation
- Feedback information from graduates regarding course content relevancy</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="12"></td></tr>
</table>

NAME OF THE COURSE	DATABASE PROGRAMMING						
Code	FELJ31	Year of study	1.				
Course teacher	Eugen Mudnić. Ph.D., Assistant Professor	Credits (ECTS)	5				
Associate teachers		Type of instruction (number of hours)	L	S	AE	LE	DE
			30	0	0	30	
Status of the course	Elective	Percentage of application of e-learning	0				

COURSE DESCRIPTION

Course objectives	Training students for - Understanding and application of relational database programming. - Further evolving of knowledge and skills for relational databases design and use.
Course enrolment requirements and entry competences required for the course	Previously taken courses: Databases. Computer programming skills
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - Use/write database functions, batch scripts, stored procedures, triggers, views. - Understand different database data locking mechanisms. - Use transactional database mechanisms. - Implement database error recovery methods. - Administrate users in a multi-user database environment. - Connect databases with other informational systems. - Analyze database performance. - Select most suitable database implementations.

Course content broken down in detail by weekly class schedule (syllabus)

Course content	L hours	AE hours
Introduction to databases. Relational databases.	2	0
Functions and their applications in database processing.	2	0
Views: creating, structure and application, updatable views.	2	0
Multi-user access. Security and permissions.	2	0
Batch SQL instructions.	2	0
Program flow control.	2	0
Transactions: committing requests, rollback, checkpoints and database recovery.	2	0
First midterm exam		
Stored procedures.	2	0
Error handling.	2	0
Triggers.	2	0
Databases connection with other informational systems.	2	0
Overview of different relational database implementations.	2	0
Database performances analyzing and tuning.	2	0
Second midterm exam		

List of laboratory exercises	LE hours
Database development environment.	2
Functions.	2
Views.	2
Multiuser administration.	2
SQL batch instructions.	2
Program flow control.	2
Transactions.	2
Stored procedures.	2
Error handling.	2

	Triggers.	2
	Connecting with Java application.	2
	MySQL i POSTGRES databases.	2
	Database performance tuning.	2

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	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

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	1,0	Research		Practical training	
	Experimental work		Report		Individual work	1,5
	Essay		Seminar essay		Laboratory exercises	1,0
	Tests	0,2	Oral exam		Preparation for laboratory exercises	0,5
	Written exam	0,1	Project	0,7	(Other)	

Grading and evaluating student work in class and at the final exam	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 20 questions and final tests consist of 20 theoretical questions and numerical problems. In the final exams students that did not pass the midterm exams take part. The midterm and final exams are carried out as written tests. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on each midterm exam or the final exam. Grade (in percentage) is formed according to the formula: Grade(%) = 0,05 NP + 0,15 LV + 0,4 (M1 + M2) the activities in percentage: • NP - attendance at lectures, • LV – laboratory assessment, • M1, M2 – test results.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	• Baze podataka; Robert Manger; Element; 2012; ISBN: 987953197576		
	• Oracle PL/SQL Programming 5th Edition, Steven Feuerstein Bill Pribyl, 2009.	0	free available on Internet

Optional literature (at the time of submission of study programme proposal)	
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 - Feedback from graduated students
Other (as the proposer wishes to add)	

NAME OF THE COURSE	DESIGNING AND USING COMPUTER NETWORKS							
Code	FELH20	Year of study	250: 1; 220: 2					
Course teacher	Julije Ožegović; Ph.D., Full Professor	Credits (ECTS)	5					
Associate teachers	Vesna Pekić, Ph.D. Ante Kristic, Ph.D.	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30	0	0	30	0	
Status of the course	Elective	Percentage of application of e-learning	0					

COURSE DESCRIPTION

Course objectives	Training students for: - Course provides advanced knowledge of computer networks.
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: - evaluate basic parts of computer network project - design computer network project obeying investor's parameters - evaluate structural cabling of computer network - organize functionality of active and passive network equipment - plan basic network services - manage computer network - argue computer network operational problems

Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Architecture and technology of local computer networks.	2	0
	Structural cabling architecture.	2	0
	Wired and optical local networks components.	2	0
	Implementation prerequisites and installation measurements.	2	0
	Project documentation organization and development.	2	0
	Network elements tagging system.	2	0
	Work groups as network project basis.	2	0
	Virtual local networks design and management.	2	0
	Internet protocols, IP addressing.	2	0
	Internet routing.	2	0
	Virtual private networks.	2	0
	Computer networks virtualization.	2	0
	Network services and functions.	2	0
	Network management.	2	0
	Computer network security projecting.	2	0
	List of laboratory or design exercises		LE hours
	Structural cabling.		2
	Data link measurements.		4
	IP addressing and subnetworks.		4
	TCP/IP protocol stack and routing.		2
	Internet routing protocols.		4
	Access lists, NAT, DHCP.		3
	Switch management, STP.		3
	VLAN management.		2
	Wireless local networks.		2
	Complex network system implementation (final test)		4

<table>
<tr><td>Format of instruction</td><td colspan="6">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☒ independent assignments
☐ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="8">Attend all forms of teaching, pass ingress and egress tests, perform 100% laboratory exercises, pass preliminary exams or full exam (numeric and theory).</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>1</td><td>Research</td><td></td><td>Practical training</td><td>1</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Auditory exercises</td><td>0,5</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Individual learning</td><td>2,5</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="8">Continuous assessment: laboratory tests, practical tests, knowledge tests, preliminary exams. Exam: written and oral (numeric and theory) as unity.</td></tr>
<tr><td rowspan="6">Required literature (available in the library and via other media)</td><td colspan="5">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="5">1. Turk, S.: Računarske mreže, Školska knjiga, Zagreb, 1991..</td><td></td><td></td></tr>
<tr><td colspan="5">2. Rožić, N.: Informacije i komunikacije: kodiranje s primjenama, Zagreb 1992</td><td></td><td></td></tr>
<tr><td colspan="5">3. Ožegović, J., Pezelj I. Projektiranje i upravljanje računalnim mrežama, Veleučilište u Splitu, 2000.</td><td></td><td></td></tr>
<tr><td colspan="5"></td><td></td><td></td></tr>
<tr><td colspan="5"></td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="8">- Lecture notes: Ožegović, J., Projektiranje i korištenje računalnih mreža, continuously upgraded
- Upute za laboratorijske vježbe, Internet</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="8">- Lecture attending evidence
- Annual exam passing analysis
- Student feedback with teacher evaluation
- Teacher self-evaluation
- Graduated students feedback</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="8"></td></tr>
</table>

NAME OF THE COURSE	DIGITAL IMAGE PROCESSING AND ANALYSIS						
Code	FELH39	Year of study	1				
Course teacher	Damir Krstinić, Ph.D., Associate Professor Darko Stipaničev, Ph.D., Full Professor	Credits (ECTS)	5				
Associate teachers	Maja Braović, Ph.D.	Type of instruction (number of hours)	L	S	AE	LE	DE
			30			30	
Status of the course	Elective	Percentage of application of e-learning	30%				

COURSE DESCRIPTION

Course objectives	Training students for: • Understanding the biological and machine vision • Understanding acquisition, encoding and storage of digital image • Understanding and using of mathematicam model of digital image • Application of aritmetic, gemoetric and logical operations to manipulate and improve digital images • Understanding statistical parameters of digital images and extracting features useful for image interpretation • Application of mathematical operations for processing image sequences		
Course enrolment requirements and entry competences required for the course	Knowledge of mathematics		
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: • Describe the principles of biological and machine vision • be aware of standards for retrieving, storage and transfer of digital images • understand the mathematical representation of digital image • understand and apply techniques for digital image analysis based on statistical features and image histogram • apply image processing techniques based on local features • describe and apply morphological operations on binary image • understand and apply method for object extracting based on image segmentation • understand methods for feature extraction • understand techniques for processing image sequences		
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Introduction to digital image processing and applications	2	
	Biological and machine vision, basic concepts of the theory of vision	2	
	CCD camera and conversion of an analogue to electrical signal. Standards: RGB, Y-C (SuperVHS), composite video signal (NTSC, PAL). System components for aquisition and digitalization of digital images	2	
	The theory of digital images. Elements of digital images. Types of digital images. Color images in RGB and HSI color space. The mathematical representation of digital image. Storage of digital image. Histograms	2	
	Processing of digital images: optimization, reconstruction and transformation	2	
	Unary operations and LUT. Geometric operations	2	
	Binary and multi-modal operations, arithmetic and logical operations on digital images.	2	

	Preliminary exam	2	
	Convolution and filtering	2	
	Analysis of digital images: image feature extraction. Extracting objects, Image segmentation	2	
	Mathematical morphology, processing binary images	2	
	Form analysis, counting, sorting, identification, classification	2	
	Color and luminescent analysis	2	
	Preliminary exam	2	

List of laboratory or design exercises	LE hours
Image processing and analysis software	2
Using Matlab for image processing	2
Histograms, RGB and HSI color space	2
Color space transformation	2
Unary operations and LUT	2
Geometrical operations on images	2
Binary operations on images	2
Preliminary exam	2
Convolution and filtering	2
Segmentation	2
Mathematical morphology	2
Shape analysis	2
Counting and sorting	2
Shape identification, analysis of brighthes and color	2
Preliminary exam	2

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	1	Research		Practical training	1
	Experimental work		Report		(Other)	
	Essay	1	Seminar essay		(Other)	
	Tests	2	Oral exam		(Other)	
	Written exam		Project		(Other)	

Grading and evaluating student work in class and at the final exam	The final grade is determined based on: • assesment of laboratory exercices • assesment of written seminar essay and its oral presentation • grade achieved in two peliminary exams, or grade achieved in final exam, if positive grade was not achieved in one or both preliminary exams

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	• Stipaničev, Darko; krstinić, Damir, Uvod u digitalnu obradu i analizu slike, materijali s predavanja, FESB 2011.		
	• A. K. Jain, Fundamentals of Digital Image Processing, ISBN: 0-13-336165-9, Prentice Hall Int., London, 1989.		
	• B. Jahne, Digital Image Processing, ISBN: 978-3-662-11565-7, Springer-Verlag, Berlin, 1991.		
	• L.J. Galbiati, Machine Vision and Digital Image processing Fundamentals, PrenticeHall, London 1990.		
Optional literature (at the time of submission of study programme proposal)	• Digital Image Analysis abnd processing, http://www.ph.ac.uk/~wjh/teaching/dia • CVIPtools http://www.ee.siue.edu/CVIPtools/ • Course pages on internal e-learnign portal		
Quality assurance methods that ensure the acquisition of exit competences	• Evaluation of resutls in accordance with the above learning outcomes • Feedback from student via surveys • Self-evaluation of teachers • Institutional and non-institutional evaluations		
Other (as the proposer wishes to add)			

NAME OF THE COURSE	DIGITAL SIGNAL PROCESSING SYSTEMS							
Code	FELH08	Year of study	1					
Course teacher	Julije Ožegović, Ph.D., Full Professor	Credits (ECTS)	5					
Associate teachers	Vesna Pekić, Ph.D. Ante Kristic, Ph.D.	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30	0	0	30	0	
Status of the course	Obligatory	Percentage of application of e-learning	0					

COURSE DESCRIPTION

Course objectives	Training students for: - Course provides advanced knowledge of digital signal processing system's architecture and deployment.
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: - choose information capacity, sampling, quantification and coding - design LTI systems and their structure - evaluate LTI impulse response - evaluate frequency and time domain algorithms - design FIR and IIR filters - organize functionality if DSP systems

Course content broken down in detail by weekly class schedule (syllabus)

Course content	L hours	AE hours
Digital signal processing systems	2	0
Time domain analysis. Digital convolution.	2	0
Frequency domain analysis. Discrete Fourier series.	2	0
Aperiodic digital sequence transform.	2	0
Z transform.	2	0
Non-recursive filter synthesis.	2	0
Recursive filter synthesis.	2	0
Discrete Fourier transform.	2	0
Fast Fourier transform (FFT).	2	0
FFT applications.	2	0
A/D i D/A conversion.	2	0
Fixed and floating-point arithmetic.	2	0
DSP system specific hardware.	2	0
DSP system interfacing.	2	0
DSP system software design.	2	0
List of laboratory or design exercises		LE hours
DSP architecture (Blackfin).		3
Arithmetic operations.		3
Cyclical data fields.		3
DSP software execution framework.		3
Digital convolution.		3
DSP software with hardware interrupts.		3
DMA applications.		3
Synchronous serial data transfer.		3
Time domain filtering.		3
Asynchronous serial data transfer		3

<table>
<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
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<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Auditory exercises</td><td>0,5</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Individual learning</td><td>2,5</td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
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<tr><td colspan="3">4. Lynn, P.A.; Fuerst, W.: Introductory Digital Signal Processing with Computer Applications, John Wiley & Sons, revised edition 1996.</td><td></td><td>Internet</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">- Lecture notes: Ožegović, J., Sustavi za digitalnu obradu signala, continuously upgraded
- A. Kristić: Upute za laboratorijske vježbe, Internet</td></tr>
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- Student feedback with teacher evaluation
- Teacher self-evaluation
- Graduated students feedback</td></tr>
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</table>

NAME OF THE COURSE	DIGITAL SYSTEMS PROJECTING							
Code	FELH07	Year of study	1					
Course teacher	Julije Ožegović, Ph.D., Full Professor	Credits (ECTS)	5					
Associate teachers	Vesna Pekić, Ph.D., Ante Kristic, Ph.D.	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30	0	0	30	0	
Status of the course	Obligatory	Percentage of application of e-learning	0					

COURSE DESCRIPTION

Course objectives	Training students for: - Course provides advanced knowledge of digital system projecting using hardware definition languages, block synthesis methods and structural synthesis using complex programmable logic structures.
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: - design digital systems using program definition of hardware - organize HDL modeling and synchronization - create a system using HDL syntax and functions libraries - evaluate results of simulation measurements - justify application of CPLD and FPGA architectures

Course content broken down in detail by weekly class schedule (syllabus)

Course content	L hours	AE hours
Approach to program specification of hardware. Verilog.	2	0
Verilog basic syntax.	2	0
Logic gate level modelling.	2	0
Fields of logic gates.	2	0
Bistables at the logic gate level.	2	0
Delay, power and types of nets.	2	0
Data flow level modelling.	2	0
Behavioral level modelling.	2	0
Behavioral level modelling techniques.	2	0
Control structures on behavioral level.	2	0
Functions and tasks. User defined elements.	2	0
Transistor level modeling.	2	0
Development system management.	2	0
Advanced digital structures.	2	0
CPLD and FPGA programmable structures architecture.	2	0

List of laboratory or design exercises	LE hours
Programmable logic development environment.	4
Verilog language syntax applications.	4
Signal power, fields of logic gates.	4
Data flow level modelling.	4
Behavioral level modeling.	4
Functions and tasks. User defined elements.	4
Advanced digital structures. Finite automata.	4

Format of instruction	☒ lectures	☒ independent assignments

<table>
<tr><td></td><td colspan="3">☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">☐ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
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<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Auditory exercises</td><td>0,5</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Individual learning</td><td>2,5</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>
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<tr><td colspan="3">5. T. R. Padmanabhan, B. Bala Tripura Sundari: "Design Through Verilog HDL", The IEEE Press - Willey Interscience, 2004.</td><td></td><td>Internet</td></tr>
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<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">- Lecture notes: Ožegović, J., Projektiranje digitalnih sustava, continuously upgraded
- A. Kristić: Upute za laboratorijske vježbe, Internet</td></tr>
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<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

FELH10	Distributed information systems - Zoraja (Distribuirani informacijski sustavi)

NAME OF THE COURSE	ELECTROACOUSTICS						
Code	FELH32	Year of study	1.				
Course teacher	Ivo Mateljan, Ph.D., Full Professor	Credits (ECTS)	5				
Associate teachers		Type of instruction (number of hours)	L	S	AE	LE	DE
			30			30	
Status of the course	Elective	Percentage of application of e-learning					

COURSE DESCRIPTION

Course objectives	Training students for: - Understandind basic law of acoustics , - Understanding principles of electroacoustic transducers, - Understanding basic of psychoacoustics - Rooom acoustics evaluation		
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: 1. Define equations for propagation of sound 2. Define characteristics of sound emiters and receivers 3. Define characteristisc od electroacoustic transducers 4. Define basic psychoacoustical quantities and units: loudness, SPL, fon and son 5. Define basic characteristics of loudspeakers and microphones 6. Make project of sound system in open and closed space.		
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L or S hours	AE hours
	Acoustic wave equation and wave phenomena	2	0
	Sound emitters in open space	2	0
	Sound field in closed space – reverberation	2	0
	Hearing system	2	0
	Psychoacoustics	2	0
	Measurement od acoustical signals	2	0
	Transducers	2	0
	Electrodynamic driver and Thiel Small parameters	2	0
	Loudspeaker boxes	2	0
	Microphones types	2	0
	Design of microphones	2	0
	PA systems	2	0
	Architectural acoustics	2	0
	List of laboratory or design exercises		LE hours
	Spectral analysis of acoustical signals		2
	Hearing characteristics – SPL and loudness		2
	Loudspeaker frequemcy response		2
	Detection of resonances		2
	Room acoustics measurements		2
	Design od loudspeaker boxes and crossovers		2

<table>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
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☐ field work</td><td colspan="3">☒ independent assignments
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<tr><td>Student responsibilities</td><td colspan="6"></td></tr>
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<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work</td><td>2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>0.5</td><td>Lab. Exercise</td><td>0.5</td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>Lab. Exercise test</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">There are seminar work and final exams. There are learning check out on every laboratory exercise. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on each seminar work or the final exam. Grade (in percentage) is formed according to the formula:
Grade(%) = 0,1 SR + 0,1 LV + 0,8 UI
the activities in percentage:
• SR – seminar,
• LV – laboratory assessment,
• UI – final exam.</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">Ivo Mateljan: Elektroakustika– skripta, FESB, 2008</td><td></td><td>Internet</td></tr>
<tr><td colspan="3">Ivo Mateljan: ARTA software - manual,
ARTALABS, FESB, 2008.</td><td></td><td>Internet</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>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6"></td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Evaluation of results in accordance with the above learning outcomes
- Feedback from students via surveys
- Self-evaluation of teachers
- Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

NAME OF THE COURSE	ELECTROMAGNETIC COMPATIBILITY						
Code	FELH24	Year of study	1.				
Course teacher	Dragan Poljak, Ph.D., Full Professor Antonio Šarolić, Ph.D., Full Professor	Credits (ECTS)	5				
Associate teachers	Niko Ištuk, mag. ing. el.	Type of instruction (number of hours)	L	S	AE	LE	DE
			30			30	
Status of the course	Elective	Percentage of application of e-learning	0				

COURSE DESCRIPTION

Course objectives	Training students for: - understanding the electromagnetic phenomena in circuits, devices and systems - application of acquired knowledge to prevent electromagnetic interference from circuits, devices and systems - application of acquired knowledge to improve immunity of circuits, devices and systems to electromagnetic disturbances
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: - analyze electronic components and circuits from the aspect of electromagnetic compatibility - calculate electromagnetic field around parasitic antenna structures, as well as disturbance voltages induced in such structures - analyze the conducted emissions and susceptibility of electrical devices - design filters for rejection of disturbances - analyze shielding and grounding of electrical devices and circuits - test the electromagnetic compatibility by measurements in accordance with standards and regulations - analyze electromagnetic compatibility of devices and systems using models with concentrated parameters, distributed parameters and transmission lines - analyze wire antennas with the application in electromagnetic compatibility

	Course content	L hours	AE hours
Course content broken down in detail by weekly class schedule (syllabus)	Introduction to electromagnetic compatibility.	2	0
	Electronic components and their equivalent circuits.	2	0
	Radiated emissions and susceptibility.	2	0
	Conducted emissions and susceptibility	2	0
	Filtering.	2	0
	Shielding.	2	0
	Grounding.	2	0
	Measurements in electromagnetic compatibility.	2	0
	Electromagnetic compatibility requirements, standards and regulations. Electromagnetic compatibility in radiocommunication systems.	2	0
	Historical overview of EMC modelling. Low-frequency models with concentrated parameters.	2	0
	High-frequency models with distributed parameters.	2	0
	Analysis of wire antennas in EMC applications.	2	0
	Transmission line models.	2	0

	List of laboratory or design exercises	LE hours
	Introduction to electromagnetic compatibility.	2

	Electronic components and their equivalent circuits.	2
	Radiated emissions and susceptibility.	2
	Conducted emissions and susceptibility	2
	Filtering.	2
	Shielding.	2
	Grounding.	2
	Measurements in electromagnetic compatibility.	2
	Electromagnetic compatibility requirements, standards and regulations. Electromagnetic compatibility in radiocommunication systems.	2
	Historical overview of EMC modelling. Low-frequency models with concentrated parameters.	2
	High-frequency models with distributed parameters.	2
	Analysis of wire antennas in EMC applications.	2
	Transmission line models.	2

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	Student is required to attend the lectures and auditory exercises in the amount of at least 70% of the schedule. Student is required to attend the laboratory exercises in the amount of 100% of the schedule and to complete all tasks associated with laboratory exercises.	

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	0,5
	Experimental work	0,5	Report		Laboratory exercises	0,5
	Essay		Seminar essay	1	Individual work	1
	Mid-exam		Oral exam		(Other)	
	Written exam	0,5	Project		(Other)	

Grading and evaluating student work in class and at the final exam	Written exam, seminar essay presentation

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	• Clayton R. Paul: Introduction to Electromagnetic Compatibility, Wiley, 2006.		
	• Dragan Poljak: "Advanced modeling in computational electromagnetic compatibility", Wiley Interscience, 2007.		

Optional literature (at the time of submission of study programme proposal)	• Poljak, D.: Electromagnetic Modelling of Wire Antenna Structures, WIT Press, Southampton-Boston, 2002. • Handbook of Electromagnetic Compatibility, ed. R. Perez, Academic Press, 1995. • Tesche, F.M.: Ianoz, M.V., Karslsson, T.: EMC Analysis Methods and Computational Models, John Wiley & Sons, 1997.
Quality assurance methods that ensure the acquisition of exit competences	Surveys providing student feedback
Other (as the proposer wishes to add)	

NAME OF THE COURSE	ELECTRONIC AND VIRTUAL INSTRUMENTATION							
Code	FELH04	Year of study	1.					
Course teacher	Ivo Mateljan, Ph.D., Full Professor	Credits (ECTS)	5					
Associate teachers		Type of instruction (number of hours)	L	S	AE	LE	DE	
			30			30		
Status of the course	Obligatory	Percentage of application of e-learning	0					

COURSE DESCRIPTION

Course objectives	Training students for: - understanding and application of basic principles for electronic measurement, - programming for virtual instrumentation, - measurement with stochastic and deterministic signals - application of basic measurement sensors		
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: - define fundamentat electronic instrumentation characteristics - define electronic circuit for measurement sensors application - define techniques used to measure stochastic and deterministic signals - apply digital algorithms for mean value, rms value, FFT, autocorrelation, crosscorrelation and spectrum estimation. - measure spectrum and system frequency response - make program for virtual instrumentation, with modules: oscilloscope, voltmeter and Fourier Analyzer		
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Metrology	2	
	Statistical analysis of measurements	2	
	Uncertainity of measurements	2	
	Analog signals and systems	2	
	Discrete signals and systems	2	
	Random signals, spectral and correlation analysis	2	
	Analysis of system impulse and frequency response	2	
	Basic electronic circuits for the instrumentation	2	
	Signal generators	2	
	AD and DA converters	2	
	Standars interfaces	2	
	Virtual instrumentation	2	
	Distributed measurement systems	2	
	List of laboratory or design exercises		LE hours
	Spectral analysis and distortion of signals		2
	PC souncard quality measurements		2
	Deterministic and random signals		2
	Frequency response measurement		2
	Impulse response measurements		2
	SFT and Wavelet signal analysis		2
	Bandpass and heterodyned spectral analysis		2
	Use of Matlab in measurements		2

<table>
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☒ exercises
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<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>2.5</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>Individual work</td><td>1</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>0.5</td><td>Laboratory work</td><td>0.5</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>0.5</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">There are two seminar works and final exams. First seminar is theoretical with student presentation and second is program of virtual instrumentation. There are learning check out on every laboratory exercise. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on each seminar work or the final exam. Grade (in percentage) is formed according to the formula:
Grade(%) = 0,1 SR + 0,1 LV + 0,8 UI
the activities in percentage:
• SR – seminar,
• LV – laboratory assessment,
• UI – final exam.</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>Availability via other media</td></tr>
<tr><td colspan="3">• Ivo Mateljan: Electronic and Virtual Instrumentation, script, FESB,</td><td></td><td>Internet</td></tr>
<tr><td colspan="3">• Ivo Mateljan: Laboratory Exercise in Electronic and Virtual Instrumentation, script, FESB, 2007.</td><td></td><td>Internet</td></tr>
<tr><td colspan="3">• Ivo Mateljan: ARTA software - Manual, ARTALABS, 2004-2017</td><td></td><td>Internet</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6"></td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Evaluation of results in accordance with the above learning outcomes
- Feedback from students via surveys
- Self-evaluation of teachers
- Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

NAME OF THE COURSE	ELECTRONIC CIRCUITS						
Code	FELH13	Year of study	2.				
Course teacher	Ivan Marinović, Ph.D., Full Professor	Credits (ECTS)	5				
Associate teachers	Duje Čoko, Ph.D., Assistant Professor	Type of instruction (number of hours)	L	S	AE	LE	DE
			15		15	30	
Status of the course	Obligatory: 221 Elective: 210	Percentage of application of e-learning					

COURSE DESCRIPTION

Course objectives	Training students for: - synthesis of electronic circuits - analysis of complex electronic circuits - projecting of simple electronic device		
Course enrolment requirements and entry competences required for the course	Finished coarse *Electronic circuits*		
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - design electronic circuits - construct a prototype of the projected circuit - make measurements of electronic parameters applying oscilloscopes and analyzers - understand principles of operation of more complex circuits		
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Synthesis of electronic circuits	2	2
	Cutoff frequencies as parameters for synthesis	1	1
	Design of feedback amplifiers	1	1
	Operational amplifiers, slew-rate, LM741	3	3
	C-class, D-class and E-class power amplifiers	2	2
	Energy converters, rectifiers and stabilizers of voltage, LM723	3	3
	Switching regulators	1	1
	Timers, NE555	1	1
	Oscillators	1	1
	List of laboratory or design exercises		LE hours
	Electronic project: construction of given electronic circuit (design, simulation, PCB design and construction, soldering of components, measurements on the device, final report)		30
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	The presence on lectures and exercises in the amount of at least 70% of the times scheduled. Performed all required laboratory exercises.		

<table>
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<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Exercises</td><td>1</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Individual work</td><td>2</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 course will be graded according to outcomes of the project and oral exam. The absolute grading is applied.</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 colspan="2">Availability via other media</td></tr>
<tr><td colspan="3">P. Biljanović: Elektronički sklopovi, Školska knjiga, Zagreb</td><td>5</td><td colspan="2"></td></tr>
<tr><td colspan="3">U. Tietze, C. Schenk, Advanced electronics circuits</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"></td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Evidence of students attendance
- Annual analysis of grades achieved
- Teachers self-evaluation
- Students feedback via questionnaires and surveys</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

NAME OF THE COURSE	EMBEDDED SYSTEMS						
Code	FELH16	Year of study	2				
Course teacher	Sven Gotovac, Ph.D., Full Professor	Credits (ECTS)	5				
Associate teachers	Dunja Gotovac, Teaching Assistant	Type of instruction (number of hours)	L	S	AE	LE	DE
			30			30	
Status of the course	Elective	Percentage of application of e-learning	0				

COURSE DESCRIPTION

Course objectives	Training students to: 1. Analyze and design embedded computing systems. 2. Create related software support. 3. Select and customize system support according to the system requirements 4. Select and match the circuits and software solution (hardware-software co-design) 5. Analyze complexity and system performance.
Course enrolment requirements and entry competences required for the course	
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: 1. Design embedded computer system. 2. Design and build related software support. 3. Select and match the needs of system software support. 4. Analyze and evaluate overall system performance.

Course content broken down in detail by weekly class schedule (syllabus)

Course content	L hours	AE hours
Introduction, Importance and scope of application of embedded computing systems.	2	
Design methods of embedded computing systems	2	
Tools for design of embedded computing systems.	2	
Embedded systems hardware and their interconnections.	2	
Microprocessor, microcontroller	2	
Digital signal processors	2	
Different peripherals and their interconnection	2	
The interface problem is considered at the level of computer architecture, logic circuits, time diagrams, and protocols.	2	
Connecting analog and digital systems.	2	
Sensors and actuators	2	
Software support for embedded computing systems.	2	
Operating Systems of Embedded Systems.	2	
Operating systems for real-time operation.	2	
Hardware-software codesign. Examples.	4	

List of laboratory or design exercises	LE hours
ARM and AVR microprocessors/microcontrollers.	6
Assembler programming	4
EMBEST IDE board, Raspberry PI board, Arduino board	4
Application for one of the boards	4
Project	12

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☒ laboratory
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<tr><td>Student responsibilities</td><td colspan="8">The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.</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>1</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>Laboratory exercises</td><td>1</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Preparation for laboratory exercises</td><td>0,5</td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>Self-study</td><td>0,5</td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td>2</td><td></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="8">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. First midterm test lasts 60 minutes and consists of 5 to 7 theoretical questions and numerical problems, second midterm is practical example and final tests consist of 6 theoretical questions and numerical problems and example solving. In the final exams students that did not pass the midterm exams take part. The midterm and final exams are carried out as written tests. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on each midterm exam or the final exam. Grade (in percentage) is formed according to the formula:
Grade(%) = 0,33 LV + 0,33 (M1 + M2)
the activities in percentage:
• LV – laboratory assessment,
• M1, M2 – test results.
The final grade will be determined after the first test term by applying a relative ECTS grading system in accordance with the Regulations on the study and study system of the University of Split. The group of students who passed the exam is divided into four groups: 15% of the best gets the grade A (excellent), 35% of the following B (very good), the next 35% rating C (good), and the last 15% rating D, E). A group of students who did not pass the exam gains FX score (additional work is required), or F (significant additional work is required). In accordance with the Rulebook for Exam, only two exam periods are organized in the exam period after the completion of classes.
According to Article 65 of the Statute of the Faculty, the student is obliged to participate in all forms of teaching and attend: lectures at least 70% of teaching hours and laboratory exercises 100% of teaching hours. If you do not meet these conditions, the student will not be able to access the exam</td></tr>
<tr><td>Required literature (available in the library and via other media)</td><td colspan="5">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="5">1. Wayne Wolf, Computers as Components Principles of Embedded Computing Systems Design, Morgan Kaufmann 2008.</td><td>1</td><td>Electronic copy On e-learning</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="8">1. 1. Frank Vahid, Tony D. Givargis, Embedded System design: A Unified Hardware/Software Introduction, John Wiley 2001, ISBN 0-471-38678-2
2. Qing Li, Caroline Yao, "Real-Time Concepts for Embedded Systems", Published by CMP Books, 2003. ISBN: 1-57820-124-1</td></tr>
</table>

Quality assurance methods that ensure the acquisition of exit competences	1. Class attendance records. 2. Evaluation of results in accordance with the above learning outcomes 3. Feedback from students via surveys 4. Self-evaluation of teachers 5. Feedback from students who have already graduated. 6. Institutional and non-institutional evaluations
Other (as the proposer wishes to add)	

NAME OF THE COURSE	FIELDS AND WAVES IN ELECTRONICS							
Code	FELH38	Year of study	1					
Course teacher	Dragan Poljak, Ph.D., Full Professor	Credits (ECTS)	5					
Associate teachers	Anna Šušnjara, Teaching Assistant	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30	0	0	30		
Status of the course	Obligatory	Percentage of application of e-learning	0					

COURSE DESCRIPTION

Course objectives	Training students for: - Understanding and apply fundamental principles and laws of electromagnetic field theory, - Formulating and solve simple static, quasistatic an ddynamic fields, - Applying of analytical and numerical methods to solve problems in electromagnetic wave propagation and radiation - Solve simple problems in electromagnetic compatibility and analysis of simple antenna systems		
Course enrolment requirements and entry competences required for the course	- Mathematics 2 and 3, Physics 1 and 2		
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - Define fundamental phenomena, quantities and laws of electromagnetic wave propagation, - Apply fundamental laws of electromagnetic theory to calculate basic parameters of electromagnetic fields - Apply methods and techniques to solve problems of electromagnetic wave propagation and radiation of thin wire antennas - Mathematically formulate simple cases of electromagnetic wave and radiation from thin wire structures. - Analyze simple transmission lines, grounding systems and antennas - Compute quantities of simpler transmission lines, grounding electrodes and antennas. - Develop simple codes and use commercial software packages for solving problems in propagation, electromagnetic compatibility and radiation.		
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Introduction. Maxwell's equations in differential form. Maxwell's equations in integral form. Maxwell's equations for moving media. Wave equations.	2	0
	Continuity equation. Ohm's law. Poyinting theorem. Electric properties of material: isotropy, linearity, homogenity.	2	0
	Continuity conditions. Electromagnetic potentials. Wave equations for potentials. Particular solutions for potentials.	2	0
	Maxwell's equations for particular cases. Media classification and application of approximations depending on frequency range. Field representation by complex phasors.	2	0
	Maxwells equations, wave equations, potentials and Poynting vector for time-harmonic fields.	2	0
	Electrostatic field. Green's theorems.General solution of Laplace and Poisson equations.	2	0
	Magnetostatic field. Vector analogue of Green's theorem. Biot-Savart law.	2	0
	Stationary current field.	2	0

	Solution method of stationary problems. Method of separation of variables. Finite Difference Method.	2	0
	Quasistationary magnetic field. Eddy currents. Self and mutual inductance.	2	0
	Transmission lines.	2	0
	Electromagnetic waves. Solution of wave equations. Plane wave in free space. Reflection and diffraction of plane wave. Propagation of plane wave in finitely conducting media.	2	0
	Electromagnetic radiation. Hertz dipole. Introduction to linear antenna theory. Basic notions of electromagnetic compatibility and bioelectromagnetism.	2	0
	List of laboratory or design exercises		LE hours
	Field and potential inside a capacitor. (plate, cylindrical and spherical capacitor)		3
	Volume charge distribution – Poisson equation.		3
	Field and potential of point charge.		3
	Magnetic field of infinite conductor and shielded cable.		3
	EM wave propagation in dielectric media and lossy media.		3
	EM wave normal incidence to perfect ground and interface between two dielectric media.		3
	EM wave oblique incidence to perfect ground and interface between two dielectric media		3
	Total and zero reflection.		3
	EM oblique incidence to lossy media.		3
	Radiated electromagnetic field from short dipole.		3

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	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

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	2	Research		Practical training	
	Experimental work		Report		(Other)	2,2
	Essay		Seminar essay		(Other)	0,2
	Tests	0,2	Oral exam		(Other)	0,2
	Written exam	0,2	Project		(Other)	

Grading and evaluating student work in class and at the final exam	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 (120 min in duration) consists of 3 questions (each containing theoretical part and short numerical problem) and 2 longer numerical problems. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on each midterm. Grade (in percentage) is formed according to the formula: Grade(%) = 0,5 (M1 + M2) where M1 and M2 are the midterm test results, and is determined through following percentage score: Percentage score: Grade: From 50% to 62% sufficient (2) From 63% to 75% good (3) From 76% to 88% very good (4)

<table>
<tr><td></td><td colspan="3">From 89% to 100% excellent (5)

Students who do not pass midterm exams are obliged to pass final test (150 min in duration) in winter/fall examination period. Final test consists of 4 questions (each containing theoretical part and short numerical problem) and 2 longer numerical problems. The requirement for passing grade is 50 % points. Final grade is formed according to the described procedure.The midterm and final exams are carried out as written tests.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>• D.Poljak, Teorija elektromagnetskih polja s primjenama u inženjerstvu, Šk. knjiga Zagreb, 2014.</td><td></td><td></td></tr>
<tr><td>• D.Poljak, V.Dorić, S.Antonijević,: Modeliranje žičanih antena primjenom računala . Zagreb, Kigen d.o.o., 2009.</td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">1. D. Poljak, Advanced Modeling in Computational Electromagnetic compatibility, Wiley Interscience, New York 2007.
2. Z. Haznadar, Ž. Štih: Elektromagnetizam, Školska knjiga, Zagreb 1997.
3. S. Ratnajeevan, H. Hoole, P. Ratnamahilan, P. Hoole: A Modern Short Course in Engineering Electromagnetics, Oxford University Press, 1996.
4. S.M.Wentworth: Fundamentals of Electromagnetics with Engineering Applications, Wiley, 2005.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">- Evaluation of results in accordance with the above learning outcomes
- Feedback from students via surveys
- Self-evaluation of teachers
- Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

NAME OF THE COURSE	INFORMATION AND TECHNOLOGY PHYSICS							
Code	FEMJ02	Year of study	1.					
Course teacher	Nikola Godinović, Ph.D., Associate Professor	Credits (ECTS)	4					
Associate teachers	Dunja Polić, Darko Zarić, Toni Vrdoljak	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30	0		15	0	
Status of the course	Obligatory	Percentage of application of e-learning	0					

COURSE DESCRIPTION

Course objectives	Understanding the basic laws and concepts of quantum physics and their application in modern engineering techniques, technology and information. The acquired knowledge serves as a basis for the adoption of further expertise through specialized courses, as well as preparing for the adoption of professional knowledge throughout his career.
Course enrolment requirements and entry competences required for the course	
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Developing ability of abstract thinking and understanding the concepts of quantum physics on which modern technologies are based Understanding of the electric and magnetic properties of the materials starting from their atomis structure Understanding the fenomenology of superconductors. Basic understanding of nuclear physics and their aplication for energy generation as well as basic understanding of radioactivity and dosimetry. Become familiar with modern diagnostic methods and treatments in medicne: nuclear magnetic resonance (NMR), positron emission tomography (PET), Hadron therapy, ...

Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Special theory of relativity	2	
	General theory of relativity	2	
	Particle properties of waves	2	
	Wave properties of particle	2	
	Introduction to wave mechanics - Schrodinger equation	2	
	Application of Schrodinger equation	2	
	Schrodinger equation for hydrogen atom	2	
	Electrical properties of material	2	
	Semiconductors	2	
	Magnetic properties of material	2	
	Phenomenology of superconductor	2	
	Atomic nuclei	2	
	Application of nuclear physics	2	

	List of laboratory or design exercises	LE hours
	Measuring Planck's constant	1
	Measuring the temperature dependence of semiconductor resistance (measuring band gap in silicon)	2
	Hall effect	2
	Measuring the properties of semiconductor photodetectors	1
	Demonstration of superconductivity – Meissner effect	1
	Demonstration of uncertainty principle	1
	Measuring the attenuation of gamma radiation	2
	Measuring the properties of solar cell	1

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	The presence on lectures in the amount of at least 70 % of the times scheduled.	

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	1,0	Research		Practical training	
	Experimental work		Report		Individual work	2,6
	Essay		Seminar essay		(Other)	
	Tests	0,2	Oral exam		(Other)	
	Written exam	0,2	Project		(Other)	

Grading and evaluating student work in class and at the final exam	There are two midterm exams, two final exams and one make-up exam. The first midterm exam is after 7 weeks of lectures and the second one is after the next 6 weeks. Each midterm test lasts for 90 minutes and consists of the following 4 questions: The requirement for passing grade at the midterm exams is to have at least 50% from each of 4 questions. Students that do not pass one of the midterm exams can retake it during the final exams. Final exams lasts 135 minutes each and consist out of the following 6 questions: The requirement for passing grade at the final exam is to have at 50% from each of 6 questions. Final grade is determined using the relative grading system based on the arithmetic mean of the per cents of each of the additional questions. Students that have passed both midterm exams or final exams are grouped in four categories: 15% of the students with the highest arithmetic means are assigned grade A (excellent), 35% of the students with the next best arithmetic means are assigned grade B (very good), 35% of the students with the next to next best arithmetic means are assigned grade C (good), and 15% of the students with the lowest passing arithmetic means are assigned grade D (satisfactory). Students who fail to pass the course through midterms and/or final exams have one make-up exam at the beginning of fall. This exam features the same format as the final exam. Exam schedule is predetermined through the academic calendar.

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	• Knapp, V.; Colić, P.: Uvod u električna i magnetska svojstva materijala, Školska knjiga, Zagreb, 1997		
	• I. Supek, M. Furić: Počela fizike, Školska knjiga, Zagreb, 1994.		
	• A. Beiser: Concepts of Modern Physics, sixth edition, McGraw-Hill 2003		
Optional literature (at the time of submission of study programme proposal)	• E.V. Wichmann: Kvantna Fizika, udžbenik fizike Sveučilišta u Berkeley, svezak 4., Tehnička knjiga, Zagreb, 1988. • D. Halliday, R. Resnick, J. Walker: Fundamentals of Physics 10th edition, John Wiley & Sons, Inc., 2013. • Vladimir Šips, Uvod u fiziku čvrstog stanja, Školska knjiga 2000.		
Quality assurance methods that ensure the acquisition of exit competences	- Student evaluation surveys Teacher self-evaluation - Institutional and non-institutional evaluations		
Other (as the proposer wishes to add)			

NAME OF THE COURSE	INFORMATION THEORY AND CODING							
Code	FELH02	Year of study	1.					
Course teacher	Petar Šolić, Ph.D., Assistant Professor	Credits (ECTS)	6					
Associate teachers		Type of instruction (number of hours)	L	S	AE	LE	DE	
			45	0	0	15	0	
Status of the course	Obligatory	Percentage of application of e-learning	0					

COURSE DESCRIPTION

Course objectives	Training students for: - Understanding and applying the elementary principles in the field of information theory, coding and cryptography - Acquire and deepen the knowledge in the field of information theory, coding and cryptography
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: 1. Design efficient information source models by using acquired data from real information source 2. Develop simple Markov chains 3. Analyze simple information sources 4. Explain the role of cryptography in communication systems 5. Analyze crypted communication systems properties through simulations 6. Calculate capacity according the standard channel model 7. Choose appropriate decision concepts in communication systems by taking into account properties of communication channel and information source.

Course content broken down in detail by weekly class schedule (syllabus)

Course content	L hours
Information source models, ergodic information source, memory-based sources	3
Markov chain, Markov model, hidden Markov model, artificial languages	3
Information measure, self-information, entropy	3
Joint sources, joint information, mutual infromation, Venn diagrams	3
Cryptography	3
Detection of errors and error correction	3
Redundant coding, block codes	3
Dual codes, Cyclic codes	3
Convolutional codes, turbo codes	3
Noise channel, binary symetric channel	3
Erasure channel, channel capacity, coding in noisy channels	3
Deterministic and random signals and systems	3
MAP and ML decisions	3

List of laboratory exercises	LE hours
Markov information source	2
Entropy	2
Secret key cryptography	2
Public key cryptography	2
Block codes: Hamming code	2
Convolutional coedes	2

<table>
<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>Studentresponsibilities</td><td colspan="6">The presence on lectures in the amount of at least 70% of the times scheduled.
Performed all required laboratory exercises.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for eachactivity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1,3</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>Individual work</td><td>3,5</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Laboratory exercises</td><td>0,5</td></tr>
<tr><td>Tests</td><td>0,1</td><td>Oral exam</td><td></td><td>Preparation for laboratory exercises</td><td>0,5</td></tr>
<tr><td>Written exam</td><td>0,1</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">During the semester there are two mid-term exams and the final exam. Mid-term and final exams consist of questions and tasks. In the final exams students that did not pass the midterm exams take part.
The midterm and final exams are carried out as written tests. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on each midterm exam or the final exam. Grade (in percentage) is formed according to the formula:
Grade (%) = 0,75 * (0.5 * M1 + 0,5 * M2) + 0,25 * L;
M1, M2 - points at the mid-term expressed as a percentage, and L - points from the laboratory (with completed all lab. Exercises) expressed as a percentage.
The final evaluation is determined as follows:
percentage Rating
50% to 61% is sufficient (2)
62% to 74% good (3)
75% to 87% of very good (4)
88% 100% Excellent (5)</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">• N. Rožić: Informacije i komunikacije, script</td><td></td><td>e-learning</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">• Rožić, N.: Informacije i komunikacije: kodiranje s primjenama, Zagreb, 1992.
• Sinković, V.: Informacija, simbolika i semantika, Školska knjiga, Zagreb, 1997.
• Cover, T. : ElementsofInformationTheory, J. Wiley&Sons., 1991.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Evaluation of results in accordance with the above learning outcomes
- Feedback from students via surveys
- Self-evaluation of teachers
- Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

NAME OF THE COURSE	LOCAL AND ACCESS NETWORKS							
Code	FELH30	Year of study	1.					
Course teacher	Josip Lörincz, Ph.D., Assistant Professor	Credits (ECTS)	5					
Associate teachers	Dinko Begušić, Ph.D., Full Professor	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30	0	0	30		
Status of the course	Elective: 220 Obligatory: 242	Percentage of application of e-learning	10%					

COURSE DESCRIPTION

Course objectives	Training students for: - knowledge and understanding of the fundamental concepts of local and access networks, - knowledge of the characteristics of the medium for the transmission of information in local and access network (metal wires, optical fibre and wireless transmission), - capability to configure local and access networks and network devices, - qualification for participation in the design and maintenance of local and access networks, - permanent acquisition of knowledge in the field of new technologies used in local access networks.
Course enrolment requirements and entry competences required for the course	Knowledge of basic concepts and technology in the area of data information transfer and communication protocols. Knowledge of basic computer skills. Knowledge of English language.
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - define basic terms and concepts of local and access networks, - evaluate and implement protocols, systems and techniques for transmission of information in local and access networks based on different transmission medias including metal wires, optical fibre and wireless transmission, - configure local and access networks and network devices, - participate in the design and maintenance of local and access networks, - permanently acquire knowledge about new technologies in the area of local access networks.

Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Introduction. Standards.	2	
	The division of the LAN network according to different criteria.	2	
	Local area networks of type Ethernet.	2	
	Local area networks of type: Token ring, Token bus, FDDI, DQDB	2	
	Gigabit Ethernet, switched LAN	2	
	Networks: ATM, ATM LAN	2	
	Virtual Private Networks-VPN	2	
	Wireless Communication Systems-general, cellular (mobile) systems	2	
	Wireless LAN (WLAN) networks	2	
	Broadband access networks-general	2	
	xDSL technology: HDSL, ADSL, VDSL	2	
	Fiber optical networks: FTTx technology	2	
	HFC technology, WiMAX technology	2	

	List of laboratory or design exercises	LE hours
	Exercise 1.: Introduction - basics Riverbed Modeler simulator	2
	Exercise 2.: Local Area Network - The role of Switch in LAN Ethernet network	2
	Exercise 3.: Local Area Network - a network design (planning network with different users, terminals and services)	2
	Exercise 4.: ATM (cell switching technology based on connection oriented connections)	2
	Exercise 5.: RIP protocol (Routing protocol based on an link algorithm state)	2
	Exercise 6.: TCP Transmission Control Protocol (Trusted protocol based on pre-established links)	2
	Exercise 7.: The methods of sorting (queuing, waiting to transmit or discard packets)	2
	Exercise 8.: The wireless local area network (media access control for mobile station)	2
	Exercise 9.: Mobile wireless networks (wireless cellular networks with mobile devices)	2
	Exercise 10.: OSPF routing protocol based on an link-state algorithm	2
	Exercise 11.: Border Gateway Protocol (BGP) - (Routing data traffic between different administrative domains)	2
	Compensation exercises	2

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	The conditions for overall positive assessment are: • positive assessment of laboratory exercises (above 50 %) • minimum presence during 70% of overall class teaching time in a semester, • presence on laboratory exercises during 100% of overall laboratory exercise time in a semester, • minimum 50% points at each mid-term or final exam (or correctional or commission exam).	

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	1,0	Research		Practical training	
	Experimental work		Report		Independent work	2,2
	Essay		Seminar essay		Laboratory exercises	1,0
	Tests		Oral exam		Preparation for Laboratory exercises	0,5
	Written exam	0,3	Project		(Other)	

Grading and evaluating student work in class and at the final exam	During the semester there will be two mid-term exams (tests). The 1st mid-term exam will be after 8 weeks of classes, and the 2nd after 15 weeks of classes. On the 1st and 2nd of the final exams, students take exam of those parts of the curricula which they did not pass on some of the mid-term exams. On the 3rd and 4th of the final (correctional) exam, students take exam of complete course curricula. Rating (%) = 0.1PL + 0,2LA + 0.35 (M1 + M2) PL – presence on the lectures (expressed in percentage), LA- grades from laboratory assessment (expressed in percentage), M1, M2- the 1st and 2nd mid-term exam grades or final exam grades (expressed in percentage),

<table>
<tr><td></td><td colspan="3">The final grade is determined as follows:
percentage Rating
50% to 61% is sufficient (2)
62% to 74% good (3)
75% to 87% of very good (4)
88% 100% Excellent (5)

Independently on results obtained during the 1st or 2nd mid-term exams, on the 3rd and 4th final (correctional) exams students take exam of entire curricula content. In the case of organization of commission exam, students also take exam of entire curricula content. Requirements related to the admission on final and correctional (commission) exam is a positive assessment of laboratory exercises.

Examinations:
1st Final exam
2nd Final exam
3rd Final (correctional) exam
4th Final (correctional) exam
5th Final (commission) exam (organized only based on decision of Faculty council in specific academic year)</td></tr>
<tr><td rowspan="6">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>• Milutin Kapov, Josip Lorincz, "Local and Access Networks", FESB-Split, 2015, (2009), internal script</td><td></td><td>e-learning portal</td></tr>
<tr><td>• Josip Lorincz, “Instructions for performing laboratory exercises in local and access networks”, FESB Split, internal script, 2015.</td><td></td><td>e-learning portal</td></tr>
<tr><td>• Alen Bažant and others: "The basic architecture of the network", ELEMENT, Zagreb, 2004.</td><td>5</td><td></td></tr>
<tr><td>• M. Vrdoljak and others: "New Communication Technologies", FESB Split, HT TKC Split, softcore library Split in 1999.</td><td>5</td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">• M. Jose ., M. Caballero and others, "SDH / SONET, ATM, xDSL and Synchronization Networks", Artech House, Boston, London, 2003.
• Alex Gillespie: "Broadband Access Technology Interfaces and Management, Artech House, Boston, London, 2000.
• Annabel Z. Dodd, "Telecommunications", Algorithm, Zagreb 2002.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">- Evaluation of results in accordance with the above learning outcomes
- Feedback from students via surveys
- Self-evaluation of teachers
- Institutional and non-institutional evaluations
- Feedback from graduated students about the relevance of the course content</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3">/</td></tr>
</table>

NAME OF THE COURSE	MARITIME RADIOCOMMUNICATIONS							
Code	FELJ30	Year of study	1.					
Course teacher	Antonio Šarolić, Ph.D., Full Professor	Credits (ECTS)	5					
Associate teachers	Niko Ištuk, mag. ing. el.	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30			30		
Status of the course	Elective	Percentage of application of e-learning	0					

COURSE DESCRIPTION

Course objectives	Training students for: - understanding the specificities of maritime radiocommunications - acquiring knowledge on maritime radiocommunication systems
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 the specificities of maritime radiocommunications - apply the knowledge of radiocommunications to maritime applications - identify the maritime radiocommunication devices and systems in use - use the maritime radiocommunication systems - connect the maritime radiocommunication systems into a GMDSS system

Course content broken down in detail by weekly class schedule (syllabus)

Course content	L hours	AE hours
Introduction to maritime radiocommunications.	2	0
Basics of maritime telecommunications.	2	0
Basics of maritime radiocommunications.	4	0
Terrestrial radio links.	2	0
Satellite radio links.	2	0
Terrestrial radiocommunication systems.	2	0
Satellite radiocommunication systems.	2	0
GMDSS system.	2	0
Shipboard navigational radar.	2	0
GPS.	2	0
Visit to systems in use (field trip).	4	0

List of laboratory or design exercises	LE hours
Introduction to maritime radiocommunications.	2
Basics of maritime telecommunications.	2
Basics of maritime radiocommunications.	4
Terrestrial radio links.	2
Satellite radio links.	2
Terrestrial radiocommunication systems.	2
Satellite radiocommunication systems.	2
GMDSS system.	2
Shipboard navigational radar.	2
GPS.	2
Visit to systems in use (field trip).	4

<table>
<tr><td>Format of instruction</td><td colspan="6">☒ lectures
☒ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☒ field work</td><td colspan="2">☐ independent assignments
☐ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="8">Student is required to attend the lectures and auditory exercises in the amount of at least 70% of the schedule. Student is required to attend the laboratory exercises in the amount of 100% of the schedule and to complete all tasks associated with laboratory exercises.</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>1</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td>0,5</td><td>Report</td><td></td><td>Laboratory exercises</td><td>0,5</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>1</td><td>Individual work</td><td>1</td></tr>
<tr><td>Mid-exam</td><td>0,5</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>0,5</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="8">During the semester, two mid-exams will be held. The first mid-exam will be held in the middles of the semester, while the second will be held after the lectures and exercises are completed, schedules to be agreed with the students.
The first mid-exam is based on the first half of the course material. The second mid-exam is based on the first second half of the course material.
To pass at each mid-exam, min. 50% of points must be earned from the part of the exam containing numerical problems (material from auditory exercises) and min. 50% of points must be earned from the part of the exam containing theory (material from the lectures).
To earn the right to approach the second mid-exam, min. 30% of points must be earned from the part of the first mid-exam containing numerical problems (material from auditory exercises) and min. 30% of points must be earned from the part of the first mid-exam containing theory (material from the lectures).
If a student earns the positive grades on both mid-exams, he/she is considered to have passed the whole exam with the grade calculated as average from both mid-exams.
At the first exam term, students may choose to take the exam containing only that half of the material that they haven't passed at mid-exams.
At all other exam terms, students must take the whole exam, containing all the course material.
Approaching the exams is subject to fulfilling the requirements on student responsibilities.
The overall point percentage defining the overall grade is calculated as the average of points earned in all exam questions, corrected by the result of oral verification:
Percentage -> Grade
50% - 62,4% -> sufficient (2)
62,5% - 74,9% -> good (3)
75% - 87,4% -> very good (4)
87,5% - 100% -> excellent (5)
Final grade can be supplemented by performing practical project work involving individual and experimental work, in agreement with the teacher.
Exam terms: according to the academic year calendar.</td></tr>
</table>

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	• Kim, J.C., Muehldorf, E.I., Naval Shipboard Communication Systems, Prentice Hall, 1995.		
	• Lees, G.D., Williamson, W.G., Handbook for Marine Communications, Lloyds of London Press, London, 1999.		
	• Law, Preston E. Jr, Shipboard Antennas, Artech House, Boston, 1986.		
Optional literature (at the time of submission of study programme proposal)	- Zentner, E,. Antene i radiosustavi, Graphis, Zagreb, 2001. - Law, Preston E. Jr, Shipboard Electromagnetics, Artech House, Boston, 1987. - Šarolić, A., Elektromagnetska kompatibilnost brodskih RF uređaja, (magistarska disertacija), FER, 2000.		
Quality assurance methods that ensure the acquisition of exit competences	Surveys providing student feedback		
Other (as the proposer wishes to add)			

NAME OF THE COURSE	MEDICAL ELECTRONIC DEVICES							
Code	FELH41	Year of study	2.					
Course teacher	Antonio Šarolić, Ph.D., Full Professor Ivan Marinović, Ph.D., Full Professor	Credits (ECTS)	5					
Associate teachers	Niko Ištuk, mag. ing. el.	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30			30		
Status of the course	Elective	Percentage of application of e-learning	0					

COURSE DESCRIPTION

Course objectives	- learning the types, realizations and application areas of electronic/communication/information technology in medical domain - knowledge on therapeutic, diagnostic and control medical electronic devices - understanding the specifics of functional and safety requirements for medical electronic devices - understanding and application of success criteria for medical device innovation and development
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: - employ their knowledge on electronic/communication/information technology for analysis and development of medical devices - use the knowledge of human physiology, especially electrophysiology, for analysis and development of medical devices - analyze the components of medical electronic devices and their interaction with human body medical electronic devices - conceive the electronic circuits for application in a medical device - characterize a medical electronic device from the aspect of safety - critically assess the success of innovation and development of a medical device

Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Basics of human electrophysiology and electrophysiology	2	0
	Measurement medical electronic devices	2	0
	Diagnostic medical electronic devices	2	0
	Therapeutic medical electronic devices	2	0
	Electronic circuits and components in medical devices	6	0
	Circuits and devices for electric and magnetic stimulation at low frequencies	2	0
	Circuits and devices for thermal procedures at high frequencies	2	0
	Electrical safety aspects and electromagnetic compatibility aspects of medical electronic devices	2	0
	Control and auxiliary medical electronic devices. E-Health. Theranostic medical electronic devices – unifying the therapeutics and diagnostics in innovative medical devices and methods	2	0
	Translational resaerch and development of medical devices from lab to clinics (from the workbench to the bedside). Assessment of clinical and economic efficacy of medical technology (Health Technology Assessment - HTA)	2	0
	Clinical studies: principles and implementation of clinical trials of medical devices	2	0

	List of laboratory or design exercises	LE hours
	Basics of human electrophysiology	2
	Amplifier circuits	4
	Electrostimulator circuits	4
	Noise and disturbance suppression in electronic devices	2
	Electromagnetic compatibility testing	2
	Electrical safety testing	2
	Measurements of dielctric properties of tissues	2
	Measurement, diagnostic and therapeutic medical electronic devices – field trip (visit to medical establishments)	8

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	Student is required to attend the lectures and auditory exercises in the amount of at least 70% of the schedule.	

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	0,5	Report		Laboratory exercises	0,5
	Essay		Seminar essay	1	Individual work	1
	Mid-exam	0,5	Oral exam		(Other)	
	Written exam	0,5	Project		(Other)	

Grading and evaluating student work in class and at the final exam	Lectures are given in collaboration of prof. Šarolić (2/3 of lecture hours) and prof. Marinović (1/3 of lecture hours). Exam: presentation and defense of the seminar essay

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Ante Šantić: Biomedicinska elektronika, Školska knjiga, Zagreb, 1995.		
	Jaakko Malmivuo & Robert Plonsey: Bioelectromagnetism - Principles and Applications of Bioelectric and Biomagnetic Fields, Oxford University Press, New York, 1995.		

Optional literature (at the time of submission of study programme proposal)	- Handbook of biological effects of electromagnetic fields (third edition): Bioengineering and Biophysical Aspects of Electromagnetic Fields, Ed. Frank S. Barnes and Ben Greenebaum, CRC Press, 2007. - Handbook of biological effects of electromagnetic fields (third edition): Biological and Medical Aspects of Electromagnetic Fields, Ed. Frank S. Barnes and Ben Greenebaum, CRC Press, 2007. - The Biomedical Engineering Handbook (Second Edition), Ed. Joseph D. Bronzino, CRC Press, 2000.
Quality assurance methods that ensure the acquisition of exit competences	Surveys providing student feedback
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="6">MICROELECTRONICS</td></tr>
<tr><td>Code</td><td>FELH37</td><td>Year of study</td><td colspan="5">2</td></tr>
<tr><td>Course teacher</td><td>Tihomir Betti, Ph.D., Assistant Professor</td><td>Credits (ECTS)</td><td colspan="5">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Ivan Marasović, Ph.D., Assistant Professor</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td></td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>Elective</td><td>Percentage of application of e-learning</td><td colspan="5"></td></tr>
<tr><td colspan="7">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="6">Training students for:
- Understanding basic microelectronic devices, their design and operating principles.
- Understanding integrated circuits process engineering.
- Understanding the fundamental principles of quantum physics important for operation of nanoelectronic devices.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">None.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">Students will be able to:
- Describe the main processes of integrated circuits production.
- Describe the production and structure of main devices in silicon bipolar monolithic integrated circuits.
- Explain the processes for insulating components in silicon bipolar monolithic integrated circuits.
- Classify monolithic MOS circuits by type and describe their structure.
- Explain the integration principle of bipolar and MOS devices fabricated on the same substrate.
- Apply the fundamental laws of integrated circuit fabrication processes and calculate the basic parameters of devices in monolithic integrated circuits.
- Design a simple monolithic circuit.
- Explain the limitations in current process technology of semiconductor devices.
- Explain the fundamental principles of nanoelectronics and define the basic nanostructures.</td></tr>
<tr><td rowspan="8">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Course content</td><td>L hours</td></tr>
<tr><td colspan="5">Introduction. Historical development of semiconductor processing technology. Moore’s law.</td><td>2</td></tr>
<tr><td colspan="5">The planar process on silicon: diffusion, epitaxy, oxidation, photolithography, metallization.</td><td>2</td></tr>
<tr><td colspan="5">Devices of monolithic integrated circuits. Integrated components insulation by reverse-biased pn-junctions. Monolithic BJT. Sheet resistance. Monolithic pn-diodes. Schottky barrier diodes and transistors.</td><td>2</td></tr>
<tr><td colspan="5">MOSFET: technology, I-V characteristics, application in digital monolithic circuits. Insulation of MOS components in monolithic integrated circuits.</td><td>2</td></tr>
<tr><td colspan="5">MOS threshold voltage analysis. Inversion layer. Estimating the threshold voltage of p- and n-channel MOS structures. The properties of semiconductor-oxide junction.</td><td>2</td></tr>
<tr><td colspan="5">Design of monolithic integrated circuits. The principle of superintegration. Basic design rules.</td><td>2</td></tr>
<tr><td colspan="5">Linear integrated circuits. Current conveyor. Common emitter amplifier. Negative feedback in linear monolithic circuits. Differential and operational amplifier.</td><td>2</td></tr>
</table>

	Basic digital integrated circuits. Emitter-coupled logic: analysis and practical implementation.	2
	TTL logic circuits: operating principle and main properties.	2
	MOS logic circuits. MOS invertor. CMOS logic circuits. Limitations in MOS process technology.	2
	Introduction to nanoelectronics.	2
	Fundamentals of quantum mechanics: free and confined electrons. Definition of basic nanostructures: quantum well, quantum wire, quantum dot.	2
	Quantum tunnelling. Tunnel junction. Applications. Single-electron transistor.	2
	List of laboratory or design exercises	LE hours
	Processes for semiconductor device fabrication.	3
	Diffusion of dopants in silicon.	6
	Threshold voltage of MOS structures.	3
	Design of monolithic integrated circuits.	12
	Modeling single electron transistor.	6

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	At least 70% of lectures attendance. Completed all laboratory assignments and the presentation of the project.	

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		Individual work	2
	Essay		Seminar essay		Laboratory exercises	1
	Tests	0.15	Oral exam		(Other)	
	Written exam	0.1	Project	0.75	(Other)	

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

There are two midterm exams and final exams. The requirement for passing the course is to score at least 40% at each midterm, complete all laboratory work and successfully present the project. The final grade (in percentage) is formed using following formula:

$$\text{Grade}(\%)=0.3(M1+M2)+0.4P,$$

where:

- M1, M2 – grade from midterm exams given in percentage,
- P – grade from projects given in percentage.

Students not passing the midterm exams take part in the final exams. For passing the final exam, students must score at least 50% as well as have a positive assesment of the laboratory exercises. The grade on final exams is determined by the formula:

$$\text{Grade}(\%) = 0.65F+0.35P,$$

where:

- P – grade from projects given in percentage.

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	• I. Zulim, T. Betti: Mikroelektronika, predavanja (prezentacije)		E-learning portal
	• P. Biljanović: Mikroelektronika, Školska knjiga, Zagreb		
	• A.S. Sedra, K.C. Smith: Microelectronic Circuits, Oxford University Press		
	• G.W. Hanson: Fundamentals of Nanoelectronics, Prentice Hall		
Optional literature (at the time of submission of study programme proposal)	- P. Biljanović: Poluvodički elektronički elementi, Školska knjiga, Zagreb - J. Millman, A. Grabel: Microelectronics, McGraw-Hill - R.T. Howe, C.G. Sodini: Microelectronics – An Integrated Approach, Prentice-Hall		
Quality assurance methods that ensure the acquisition of exit competences	- Record of number of students attending the classes - Evaluation of results in accordance with expected learning outcomes - Feedback from students via student surveys - Teachers self-evaluation - Institutional and non-institutional evaluations		
Other (as the proposer wishes to add)			

NAME OF THE COURSE	MULTIMEDIA SYSTEMS						
Code	FELJ20	Year of study	2.				
Course teacher	Mladen Russo, Ph.D., Assistant Professor	Credits (ECTS)	5				
Associate teachers	Jelena Čulić, mag. ing. Martina Bašić, mag. ing.	Type of instruction (number of hours)	L	S	AE	LE	DE
			30	0	0	30	0
Status of the course	Elective	Percentage of application of e-learning	0				

COURSE DESCRIPTION

Course objectives	Training students for: - understanding of multimedia systems and virtual reality - knowledge of the properties and methods for generating speech, audio, image and video signals (including 3D images and video) - understanding of the most important algorithms for compressing speech, audio, image and video signals		
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 the basic principles of human speech, hearing and vision - explain the basic principles of psychoacoustics and their application in compression of audio signals - demonstrate the frequency masking effect - define the most important algorithms for compression of speech, audio, image and video signals - demonstrate the basic mechanisms of JPEG compression		
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Introduction. History of multimedia systems. Basic terms. Overview of multimedia software tools. Design of multimedia applications.	2	0
	Audio signal. How humans hear and speak. Speech modelling.	2	0
	Generic compression techniques for audio signals. Audio specific algorithms (mp3).	2	0
	Speech specific algorithms (LPC, CELP, RELP, MPE, RPE) and applications in mobile telephony. Review of standards for encoding speech and audio signals.	2	0
	Color in images and video signal. The perception of color (how people perceive electromagnetic radiation). Theory of mixing colors.	2	0
	Color models for image signal (RGB, CMY, CMYK). Color models for video signal (YUV, YIQ, YCbCr). Software-oriented color models (HSB, HLS, HSV). Gamma correction. Image signal (resolution, depth, memory requirements). Image formats (gif, tiff, jfif, ps, bmp).	2	0
	Basics of video and television. Analog television and video. Digital television and video. Video formats and memory requirements.	2	0
	Image compression. JPEG modes.	2	0
	Video compression: H.261. H.263.	2	0
	Video compression: MPEG-1. MPEG -2.	2	0

	Video compression: MPEG-4.	2	0
	Video compression: H.264.	2	0
	Fundamentals of virtual reality. History. Stereoscopic (3D) vision. Software and hardware for virtual reality.	2	0
			LE hours
	Sound recording. Searching of voiced and unvoiced speech. Pitch period.		2
	Speech specific algorithms (LPC)		2
	Frequency masking		2
	3D sound		2
	Image compression (JPEG)		2
	Image compression (JPEG)		2
	Image compression (JPEG)		2
	MPEG – influence of I, P, B frames on video quality		2
	Multimedia systems on mobile devices (Android programming)		2
	Multimedia systems on mobile devices (Android programming)		2
	Multimedia systems on mobile devices (Android programming)		2
	3D images		2
	CAVE system		2

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	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

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		Individual work	1,7
	Essay		Seminar essay		(Other)	
	Tests	0,2	Oral exam		(Other)	
	Written exam	0,1	Project		(Other)	

Grading and evaluating student work in class and at the final exam	During a semester there are two midterms and final exam. Final exam and midterms are held according to the calendar of classes. At the final exam students take the test from the complete course if they do not have a positive grade on the midterms or take the midterm that they did not pass. At the make-up and commission exam students take the test from the complete course. The requirement for passing grade is 50% points on each midterm exam or the final exam. Grade (in percentage) is formed according to the formula: Grade(%) = 0,5*M1+0,5*M2; M1, M2 – midterm test results. The final grade is determined as follows: Percentage Grade 50% to 61% sufficient (2) 62% to 74% good (3) 75% to 87% very good (4) 88% to 100% excellent (5)

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	• H. Dujmić: Multimedijski sustavi, internal script	1	e-learning portal
Optional literature (at the time of submission of study programme proposal)	• Steinmetz, Nahrstedt: "Multimedia Fundamentals: Media Coding and Content Processing", Prentice Hall, 2002 • Rao, Bojkovic, Milovanovic: "Multimedia Communication Systems: Techniques, Standards and Networks", Prentice Hall, 2002		
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	NUMERICAL METHODS IN COMMUNICATIONS						
Code	FELJ17	Year of study	1				
Course teacher	Dragan Poljak, Ph.D., Full Professor Vicko Dorić, Ph.D., Associate Professor	Credits (ECTS)	5				
Associate teachers	Anna Šušnjara, Teaching Assistant	Type of instruction (number of hours)	L	S	AE	LE	DE
			30	0	0	30	
Status of the course	Elective	Percentage of application of e-learning	0				

COURSE DESCRIPTION

Course objectives	Training students for: - Understanding and apply fundamental principles of engineering numerical modeling, - Formulating and solve simple problems in electrical engineering by means of modern numerical methods, - Permanent adopting and fostering the knowledge in the area of numjerical modeling, - Applyingof numerical methods to solve problems in electronics and communications involving elektromagnetic waves and electromagnetic radiation		
Course enrolment requirements and entry competences required for the course	- Mathematics 2 and 3, Physics 1 and 2		
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - Define fundamental principles of engineering modeling, - Apply numerical methods to determine transient response of electric circuits - Apply numerical methods to solve one-dimensional static engineering problems - Apply numerical methods to solve two-dimensional static engineering problems - Compute frequeny response of transmission lines by means of Finite Difference Method (FDM) and Finite Element Method (FEM) - Compute frequeny response of wire antennas by means of Boundary Element Method (BEM) - Develop simple codes and use commercial software packages based on numerical methods for solving problems in electronics and communications		
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Introduction to numerical modeling. Source and field concepts., Differential and integral approach to solve problems in science and etechnology.	2	
	Classification of numerical methods. Analysis in the ferquency and time domain. Domain discretisation methods.Boundary discretisation methods.	2	
	Overview of numerical methods; Finite Difference Method (FDM).Finite Element Method (FEM). Boundary Element Method (BEM).	2	
	Introduction to Finite Difference Method (FDM).	2	
	Finite Difference Method (FDM): One-dimensional static problems.	2	
	Finite Difference Method (FDM): Two-dimensional static problems.	2	
	Finite Difference Time Domain (FDTD) method: one-dimensional problems.	2	

	Introduction to Finite Element method (FEM)	2	
	Finite Element Method: One-dimensional static problems.	2	
	Finite Element Method: Two-dimensional static problems.	2	
	Finite Element Method in the time domain: One-dimensional problems.	2	
	Introduction to Boundary Element Method (BEM).	2	
	Application of numerical methods to transmission lines, waveguides, electric circuits, antennas, human exposure to electromagnetic radiation.	2	
	List of laboratory or design exercises		LE hours
	Numerical integration – trapesoidal rule		2
	Numerical integration- Simpson and Gauss quadrature		2
	Adaptive integration		2
	Collocation method		2
	Least Square Method		2
	Finite Difference Method		2
	Finite Element Method		3

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	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

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	2	Research		Practical training	
	Experimental work		Report		(Other)	2,2
	Essay		Seminar essay		(Other)	0,2
	Tests	0,2	Oral exam		(Other)	0,2
	Written exam	0,2	Project		(Other)	

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

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 (120 min in duration) consists of 3 questions (each containing theoretical part and short numerical problem) and 2 longer numerical problems. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on each midterm. Grade (in percentage) is formed according to the formula:

$$\text{Grade}(\%) = 0{,}5\ (M1 + M2)$$

where M1 and M2 are the midterm test results, and is determined through following percentage score:

Percentage score:	Grade:
From 50% to 62%	sufficient (2)
From 63% to 75%	good (3)
From 76% to 88%	very good (4)
From 89% to 100%	excellent (5)

Students who do not pass midterm exams are obliged to pass final test (150 min in duration) in winter/fall examination period. Final test consists of 4 questions (each containing theoretical part and short numerical problem) and 2 longer numerical problems. The requirement for passing grade is 50 % points. Final grade is formed according to the described procedure.The midterm and final exams are carried out as written tests.

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	• D.Poljak, *Teorija elektromagnetskih polja s primjenama u inženjerstvu*, Šk. knjiga Zagreb, 2014.		
	• D.Poljak i dr., Numeričke metode u elektrotehnici – interna skripta, FESB-Split 2006.		
	• D.Poljak, V.Dorić, S.Antonijević,: Modeliranje žičanih antena primjenom računala . Zagreb, Kigen d.o.o., 2009.		
Optional literature (at the time of submission of study programme proposal)	• D. Poljak, *Advanced Modeling in Computational Electromagnetic compatibility*, Wiley Interscience, New York 2007. • Jović, V.: Uvod u inženjersko numeričko modeliranje, Aquarius Engineering, Split, 1993.		
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	OPERATIONS RESEARCH							
Code	FELG14	Year of study	1.					
Course teacher	Jadranka Marasović, Ph.D., Full Professor	Credits (ECTS)	5					
Associate teachers	Martina Bašić, mag.img.	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30	0	0	30	0	
Status of the course	Elective	Percentage of application of e-learning	0					

COURSE DESCRIPTION			
Course objectives	Training students for: To enable students using examples to understand the importance of optimimal solutions for engineering practice and research. By gaining knowledge through basic concepts of optimization, the necessary theoretical knowledge about different approaches can be achieved, about mathematical and heuristic methods, about the fastest and organized search for optimal solutions, too. To enable students to acquire practical knowledge, user-oriented, on the need for software solutions and precision interface in order to work independently to obtain optimal solutions. Examples from everyday life are used.		
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: 1. iimplement models of different systems, quantitative (math) and qualitative (graphs, tables, text) models, 2. apply mathematical conversion to the original models and to understand the purpose of these conversions in the application of known methods of optimization, if the solutions and methods for the original model do not exist, 3. describe the difference between defined mathematical optimization methods and search methods and describe the impossibility of finding a universal method of solving, 4. pick and sort out the proper method of optimization based on model, 5. apply the results optimum analysis on the appropriate practices, 6. calculate the strategic optimum, 7. solve independently complex tasks of optimizing where it is necessary to combine several methods.		
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Introduction: Systems approach and purpose and power of modeling (in the analysis and understanding of systems acting and in the problems with the synthesis of the "living" systems). The model is an approximation of the system. Modeling is an iterative process during which resolves a compromise between complex models and quality of approximation.	2	0
	Quantitative models and diffferences of the systems characteristics: deterministic, stochastic, static, dynamic, continuous, discrete, linear and nonlinear. The selection of input and output variables and their impact on the complexity of the model. Physical, economic and other laws as a basis for building models. Qualitative models.	2	0
	The impact of constraints on the behavior of the system and how to add them to the original model - space of solutions. Objective function as an indicator of optimality.	2	0

	Optimal is not perfect - depends on objective function,on constraints and on methods of solving. Multidisciplinary approach as the main feature of all tasks optimization.		
	Operations research, history and way of thinking with the tasks of optimization. Mathematical conversions and mathematical operations - basic ideas used through the orientation in space of solutions and seeking optimum.	2	0
	Linear static models. The standardization of models. Problems with unbounded spaces solutions (infinite limits).	2	0
	Simplex algorithm - one of 10 the best algorithms of the 20th century. Examples of solving. The meaning of optimality criteria and feasibility criteria.	2	0
	Qualitative models - poorly structured models. Heuristics. Search. Branching (Branch and Bound method).	2	0
	Transport problem. Methods seeking basic possible solutions and methods of seeking improved solution to the optimum - the basics of search.	2	0
	Transport problems with ambiguous warehouses (transshipment problem)	2	0
	0-1 Programming. Backpack problem (loading / unloading). Travelling salesperson.	2	0
	Game theory and optimal strategic decisions-making.	2	0
	Nonlinear Programming: mathematical procedures that can create problems to resolve and seek optimum. It is essential to create characteristic search, which can become complicated, but can unexpectedly diverge. Basic information are what, why and how to keep it under control.	2	0
	Graph theory. Modeling events and activities. Optimization tasks modeled using graph theory (CPM method - Critical Path Method). Software solutions such tasks.	2	0
	List of laboratory or design exercises		LE hours
	Postoptimal analysis, the reasons for its implementation to the optimal results from the practice.		2
	Sensitivity analysis of optimal solutions depending on the change of the coefficients of the objective function. Examples.		2
	Sensitivity analysis of optimal solutions depending on the change of the coefficient from the right side of constraints. Examples.		2
	Preparing for use of already created software solutions with examples of linear programming, data for software: input and output		2
	Integer programming: the need and ways to search for such solutions in linear programming. Examples.		2
	A simple example of solving linear programming tasks - solving using already created software on a digital computer and "hand-made mathematical solutions".		2
	Testing problems of parameters sensitivity, solving tasks using already created software on a digital computer and "hand-made mathematical solutions".		2
	Solving simple example of dual Simplex, using digital computer and graphics solutions.		2
	The application of the dual simplex in practice with the example of optimal cutting shape, minimization of material thrown. The use of linear programming tasks in automation systems.		2
	Solving examples of optimal transport of goods between several towns in Croatia - the basic transport problem.		2
	Solving examples of optimal transport of goods between several cities in Croatia - ambiguous warehouses.		2
	Illustration "the power of models" in the example of problem-solving		2

<table>
<tr><td></td><td colspan="6">scheduling (students - classrooms). The problem layout, basically 0-1 programming can be mathematically translated into a form of transport problems and dealt with using "its" program.</td><td></td></tr>
<tr><td></td><td colspan="6">Problem solving traveling salesman, optimal touring several cities in Croatia.</td><td>2</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
☒ seminar essay (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Minimum of 70 percent lecture attendance. Completing all the required laboratory exercises.</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>1.5</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>Individual work</td><td>0.5</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>1</td><td>Laboratory exercises</td><td>1</td></tr>
<tr><td>Tests</td><td>0.5</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>0.5</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">During the semester there will be two mid-term exams (tests). The first mid-term will be held during class (according to the calendar), and the other colloquium after the end of classes. Individual colloquium will be considered passed if it achieved 40% correct answers, or total points achieved that give a positive evaluation must be at least 50% correct.

It is necessary during the semester to resolve homework and seminars to be recognized (enrolled) score achieved by tests and exams.

The final grade is determined based on the total number of points earned, which is calculated as follows (Including laboratory exercises points, M3)

Grade [%] = 0.45 * M1 + 0.45*M2 + 0,1*M3

Percentage Grade
50% to 61% sufficient (2)
62% to 74% good (3)
75% to 87% very good (4)
88% to 100% excellent (5)

The final exam encompasses the entire course load or selected parts of it that students' did not pass at either of mid-term exams. The correction exam encompasses the entire course load. The requirement for passing the exam is minimum of 50 percent correct answers. The exams are held according to the class schedule.</td></tr>
</table>

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	• J.Marasović: “Introduction in Operations Research“ (in Croatian: Uvod u operacijska istraživanja, Authorized lectures, FESB, 2000.		e-learning portal
Optional literature (at the time of submission of study programme proposal)	- T.B. Boffey: “Graph Theory in Operations Research”, McMillan Press, Hong Kong, 1982. - R. Bronson, G. Naadimuthu: “Operations Research”, Schaum’s Outline of Operations Research, McGraw Hill, 1998. - H.A. Taha: “Operations Research: An Introduction”, Prentice Hall, 1997		
Quality assurance methods that ensure the acquisition of exit competences	- Keeping records on class attendance - Annual analysis of exam results - Student survey on teaching performance - Teacher self-evaluation - Feedback information from graduates regarding course content relevancy		
Other (as the proposer wishes to add)			

NAME OF THE COURSE	OPTOELECTRONIC MEASUREMENT METHODS							
Code	FELG33	Year of study	1					
Course teacher	Ivo Stančić, Ph.D., Assistant Professor	Credits (ECTS)	5					
Associate teachers		Type of instruction (number of hours)	L	S	AE	LE	DE	
			30			30		
Status of the course	Elective	Percentage of application of e-learning	0					

COURSE DESCRIPTION

Course objectives	Training students for: - Understand the basic principles of camera and optical lens elements - Operate with linear, IR / night and heat cameras - Apply camera to control industrial process or use it as a sensor - Operate and analyze data from laser range finders and LIDAR		
Course enrolment requirements and entry competences required for the course			
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: – Have detail knowledge of camera and camera optical elements – Apply algorithms for 3D reconstruction of motion – Apply algorithm for surface reconstruction – Analyze data from laser range finders and create map of area		
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Introduction to optoelectronics	2	
	Machine visiona and computer vision	2	
	Mathematical description of cameras and geometry of a space	4	
	Lense optical system and distorsions	2	
	Color system and photosensitive chips	2	
	Inudstrial cameras, linear cameras, motion capture systems	2	
	IR cameras and applications	2	
	Stereovision systems	2	
	3D scanners	2	
	Laser range finders and LIDAR	2	
	Night vision cameras and image intensifiers	2	
	Future of optoelectronics	2	
	Introduction to optoelectronics	2	
	List of laboratory or design exercises		LE hours
	Introduction to Matlab: image loading, capture and editing		2
	Introduction to Matlab: video loading, capture and editing		2
	Camera calibration and distortion removal		2
	Movement reconstruction from single camera in single plane		2
	Movement reconstruction with stereovision system in space		2
	Laser and IR rangefinders		2
	3D scanners and surface reconstruction		2
	Lidar and applications in robotics		2
	Cameras in visible and IR spectrum. Presentation of night optics		2
	IR thermal camera and temperature calculation		2

<table>
<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="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>1</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>Impended research</td><td>1,7</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>1</td><td>Laboratory exercises</td><td>1</td></tr>
<tr><td>Tests</td><td>0,2</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>0,1</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">During the semester there are two midterm exams according to teaching calendar or project assignments will be handed out depending on student preferences.

The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on average midterm exam ((M1 + M2)/2) or the final exam. Students are allowed to have at least 45% of total points on each midterm exams, as long as the final midterm average is at least 50% of total points.

Midterm consists of both theoretical questions and numerical problems. The midterms consist of 4 questions while final exam test consists of 6 questions divided into two groups.

In determining the final grade (in percentages) each midterm contributes with 30% (or project assignment with 60%), while laboratory exercises contribute with 40%.

Final grade (based on percentages) is formed as follows:
Percentage Grade
50% do 62% sufficient (2)
63% do 74% good (3)
75% do 86% very good (4)
87% do 100% excellent (5)

In case student does not complete midterms or project exams he/she needs to take the final exam in which case it contributes with 60% toward final grade, and laboratory exercises again with 40%.</td></tr>
</table>

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	• Hartley, R., Zisserman, A.: 'Multiple view geometry in computer vision' (Cambridge University Press, 2003)		
	• Shapiro, G., Stockman, G.C.: 'Computer vision' (Prentice-Hall, 2001)		
Optional literature (at the time of submission of study programme proposal)			
Quality assurance methods that ensure the acquisition of exit competences	- Keeping records of student attendance. - Annual analysis of course statistics in terms of midterm and finals exams. - Feedback from students via surveys. - Teacher self-evaluation. - Feedback from graduated students (or senior students) on course content relevance.		
Other (as the proposer wishes to add)	/		

NAME OF THE COURSE	OPTOELECTRONICS						
Code	FELH14	Year of study	2				
Course teacher	Tihomir Betti, Ph.D., Assistant Professor	Credits (ECTS)	5				
Associate teachers		Type of instruction (number of hours)	L	S	AE	LE	DE
			30			30	
Status of the course	Obligatory	Percentage of application of e-learning					

COURSE DESCRIPTION

Course objectives	Training students for: - Understanding physical principles of operation of the most important optoelectronic devices. - Application of optoelectronic devices in circuits for light sourcing and/or detection.	
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: - Explain the physics underlying the operation of optoelectronic devices. - Calculate the basic physical parameters important for operation of optoelectronic devices. - Analyze semiconductor material properties and consider their applicability to optoelectronic devices. - Explain the techniques for semiconductor bandgap engineering. - Compare optical and electrical properties of light-emitting diodes and lasers. - Compare photodetectors by their basic properties (quantum efficiency, responsivity, impulse response, dark current).	
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours
	Introduction to optoelectronics.	2
	Band theory of solids. Density of states. Occupation probability and Fermi energy level.	2
	PN junction, metal-semiconductor (Schottky) junction and ohmic contact.	2
	Semiconductor materials for optoelectronics. Techniques for bandgap engineering.	2
	Semiconductor heterostructures and quantum wells.	2
	Photon absorption and emission. Spontaneous and stimulated emission. Rates of emission and absorption.	2
	Light amplification by stimulated emission. The semiconductor amplifier. Absorption spectrum of semiconductors. Gain and absorption spectrum of quantum well structures.	2
	Electroluminescence. Light-emitting diode.	2
	Semiconductor laser.	2
	Other types of lasers: solid-state lasers, gas lasers, dye lasers, chemical lasers.	2
	General properties of photodetectors. Quantum efficiency and responsivity of the semiconductor.	2
	Photoconductors. Photodiodes. Avalanche photodiodes. Phototransistors.	2
	Solar cells.	2

	List of laboratory or design exercises	LE hours
	Light-emitting diodes.	6
	Photoconductor.	6
	Photodiode.	6
	Phototransistor. Optocoupler.	6
	Solar cell.	6

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	At least 70% of lectures attendance. Completed all laboratory assignments and the presentation of the seminar essay.	

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		Individual work	2
	Essay		Seminar essay	0.75	Laboratory exercises	1
	Tests	0.15	Oral exam		(Other)	
	Written exam	0.1	Project		(Other)	

Grading and evaluating student work in class and at the final exam	There are two midterm exams (the first after 7 weeks of classes, the second after the following 6 weeks of classes) and final exams. Students that do not pass both midterm exams take part in the final exam. Midterm and final exams are written and last for 90 minutes. The requirement for passing the course is to complete all laboratory work, as well as successfully present seminar essay. The final grade (in percentage) is formed using following formula: Grade(%)=0.3(M1+M2)+0.4S, where: • M1, M2 – grade from midterm exams given in percentage, • S – grade from seminar essay given in percentage.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	• T. Betti: Optoelektronika – autorizirana predavanja (prezentacije), FESB		E-learning portal
	• S.M. Sze, K.K. Ng: Physics of Semiconductor Devices, Wiley, 2006.		
	• S.O. Kasap: Optoelectronics and Photonics, Pearson, 2013.		
	• P. Bhattacharya: Semiconductor Optoelectronic Devices, Prentice Hall, 1997.		

Optional literature (at the time of submission of study programme proposal)	- B.E.A. Saleh, M.C. Teich: Fundamentals of Photonics, 2nd edition, Wiley, 2007. - J. Singh: Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill, 1995. - S. L. Chang, Physics of Optoelectronic Devices, Wiley, 1995.
Quality assurance methods that ensure the acquisition of exit competences	- Record of number of students attending the classes - Evaluation of results in accordance with expected learning outcomes - Feedback from students via student surveys - Teachers self-evaluation - Institutional and non-institutional evaluations
Other (as the proposer wishes to add)	

NAME OF THE COURSE	PROFESSIONAL TRAINING						
Code	FEXX06	Year of study	2				
Course teacher	Head of the professional training from the Faculty	Credits (ECTS)	5				
Associate teachers	Head of the professional training from the private institution	Type of instruction (number of hours)	L	S	AE	LE	DE
Status of the course	Elective	Percentage of application of e-learning					

COURSE DESCRIPTION

Course objectives	Training students for: - consolidating theoretical knowledge and practical skills in solving highly complex engineering problems - acquaintance with the organization, work and business of the receiving institution, - solving practical problems, - inclusion in the labour market, - writing technical reports
Course enrolment requirements and entry competences required for the course	Acquired 120 ECTS credits
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - consolidate theoretical knowledge and practical skills in solving problems - use literature, databases and other sources of information - select appropriate methods and procedures for solving practical problems - apply technical knowledge and skills to effectively solve engineering problems - prepare a written report on the work results
Course content broken down in detail by weekly class schedule (syllabus)	Professional training is the independent work of the student performed in the receiving institution in accordance with the plan and programme agreed between the head of the professional training from the receiving institution and the head of professional training from the Faculty.
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	Independent work

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	4
	Experimental work		Report		Independent work	
	Essay		Seminar essay		Report writing	1
	Tests		Oral exam		(Other)	
	Written exam		Project		(Other)	

<table>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="3">Professional training is not evaluated. Students are obliged to complete professional training in accordance with the Regulation on professional training and to write a Professional training report. Professional training report is validated by the head of professional training from the receiving institution and the head of professional training from the Faculty.</td></tr>
<tr><td rowspan="2">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3"></td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">- Questionnaire on professional training
- Self-evaluation of the head of professional training
- Student survey of the whole study programme</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

NAME OF THE COURSE	PROGRAMMING LANGUAGES AND COMPILERS						
Code	FELH06	Year of study	1.				
Course teacher	Ivo Mateljan, Ph.D., Full Professor Marjan Sikora, Ph.D., Assistant Professor	Credits (ECTS)	5				
Associate teachers	Marjan Sikora, Ph.D., Assistant Professor	Type of instruction (number of hours)	L	S	AE	LE	DE
			45	0	0	15	
Status of the course	Obligatory	Percentage of application of e-learning	0				

COURSE DESCRIPTION

Course objectives	Training students for: - Understanding of imperative, OOP, functional and logic programing languages - Understanding of lexical analysis and LL(1) and LR(1) parsing - Use of compiler generators programs: ELL, LEX and YACC
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: - Understand programming in assembler, imperative, OOP, functional and logic programing languages - Define language grammar with BNF and EBNF - Make recursive descent parser - Make parser using ELL parser generator - Make lexical analyser using program LEX - Make LR(1) parser using program YACC - Define program structures for compilers: symbol tables and AST - Define attributed grammar and semantic actions - Make simple interpreter - Define assembler code for source code translation

Course content broken down in detail by weekly class schedule (syllabus)	Course content	L or S hours	AE hours
	History and elements of programming languages	3	
	Lexical, syntatic and semantic analysis	3	
	Recursive descent parser	3	
	Embedding semantic analysis	3	
	Lexical analysis and DFA	3	
	Generators of LL and LR table driven parsers	3	
	Attributed grammar	3	
	Structures for semantic analysis	3	
	Assembler and run-time structures	3	
	Introduction to code generation	3	
	Functional languages – Scheme	3	
	Logical language – Prolog	3	
	Script languages	3	
	List of laboratory or design exercises		LE hours
	Intepreter of mathematical expressions		2
	Using LEX		2
	Using YAC		2
	Interpreter design using LEX and YACC		2
	Writing assembler program		2

	Code generation for C—language	2
	Writing Scheme program	2
	Writing Prolog program	2

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	2	Research		Practical training	
	Experimental work		Report		Individual work	2
	Essay		Seminar essay		Progr. Exercise	0.5
	Tests		Oral exam		Exercise test	0.1
	Written exam	**0.1**	Project	0.3		

Grading and evaluating student work in class and at the final exam	There are seminar work and final exams. There are learning check out on every laboratory exercise. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on each seminar work or the final exam. Grade (in percentage) is formed according to the formula: Grade(%) = 0,1 SR + 0,1 LV + 0,8 UI the activities in percentage: • SR – seminar, • LV – laboratory assessment, • UI – final exam.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	• Ivo Mateljan: Prevoditelji i interpreteri, skripta, FESB, 2004		Internet
	• LEX – manual, UNIX		Internet
	• YACC – manual, UNIX		Internet

Optional literature (at the time of submission of study programme proposal)	• Aho, Sethi, Ullman: Compilers - Principles, Techniques and Tools, Adison Wesley, 1986. • Appel: Modern Compiler Implementation in C, Cambridge University Press, 1997
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)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="6">PROGRAMMING MOBILE ROBOTS AND DRONES</td></tr>
<tr><td>Code</td><td>FELH40</td><td>Year of study</td><td colspan="4">2.</td></tr>
<tr><td>Course teacher</td><td>Mirjana Bonković, Ph.D., Full Professor
Josip Musić, Ph.D., Assistant Professor</td><td>Credits (ECTS)</td><td colspan="4">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Miroslav Dujmović, BSc (external collaborator)</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td>0</td><td>0</td><td>30</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Elective</td><td>Percentage of application of e-learning</td><td colspan="4">0</td></tr>
<tr><td colspan="7">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="6">Training students for:
- understanding basic working principles and limitations of individual robot components (actuators, sensors and control units).
- understanding and applying number of different techniques for solving problems in the robotics domain such as control and navigation, as well as programming robot/drone to perform desired task.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">Students will be able to:
- describe basic mobile robot and drone components.
- describe properties of widely used sensors in mobile robotics.
- explain different modes of mobile robot control.
- develop PID controller for mobile robot control.
- design algorithms for data fusion based on Kalman filter.
- formulate algorithm for path planning, obstacle avoidance and simple navigation.
- demonstrate application of computer vision in mobile robot control (visual servoing).
- apply acquired knowledge in higher level programming languages (e.g. Visual C#, Python, Java).
- evaluate efficiency of path planning and navigation algorithms.</td></tr>
<tr><td rowspan="10">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Course content</td><td>L hours</td></tr>
<tr><td colspan="5">Introduction: mobile robot (drone) components.</td><td>2</td></tr>
<tr><td colspan="5">Microcontrollers. Arduino IDE for robot control.</td><td>2</td></tr>
<tr><td colspan="5">Sensors: sensor characteristics, uncertainty representation, sensor types: incremental encoders, position and orientation sensors, inertial sensors, vision sensors.</td><td>4</td></tr>
<tr><td colspan="5">Mobile robot kinematics. Drive. Mobile robot control modes: on-off control, PID controller, speed and position controller.</td><td>4</td></tr>
<tr><td colspan="5">Robot localization: Kalman, particle and information filter.</td><td>4</td></tr>
<tr><td colspan="5">Navigation: planning and control.</td><td>2</td></tr>
<tr><td colspan="5">Control with navigation error as input.</td><td>2</td></tr>
<tr><td colspan="5">Visual servoing.</td><td>2</td></tr>
<tr><td colspan="5">Selected practical examples of control of mobile robots and drones.</td><td>4</td></tr>
</table>

	List of laboratory or design exercises	LE hours
	Arduino development environment.	2
	Digital I/O – ultrasonic sensor.	3
	Motor control. Connection motors and sensors.	3
	Line following.	2
	Obstacle avoidance.	4
	Working on project assignments.	16

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	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

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	1,5	Research		Practical training	
	Experimental work		Report		Individual work	2
	Essay		Seminar essay		Laboratory exercises	1
	Tests	0,2	Oral exam		Preparation for laboratory exercises	0,1
	Written exam	0,2	Project		(Other)	

Grading and evaluating student work in class and at the final exam	During the semester there are two midterm exams. The first midterm exam is after 7 weeks of lectures and the second one is after 13 weeks of lectures (in a form of presentation and defense of the project assignment). Each midterm test (as well as the final test) is carried out in a written format with duration of 90 minutes. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on average midterm exam ((M1 + M2)/2) or the final exam. Students are allowed to have at least 45% of total points on each midterm exams, as long as the final midterm average is at least 50% of total points. Grade (in percentage) is formed according to the formula: Grade(%) = 0,1L + 0,25M1 + 0,65M2 where: • L – laboratory assessment, • M1, M2 – midterm test results. According to Article 65. of Faculty's Bylaw, student is required to participate in all teaching activities attending at least 70% of lectures, and 100% of laboratory exercises. If student does not meet these criteria, she or he won't be able to take part in the final exam, and will be required to enroll in the course the next year.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	• T Siegwart, R., Nourbakhsh, I. R., Scaramuzza D., Autonomous Mobile Robots, MIT Press, 2011.		teacher/Internet
	• Thomas Braunl, Embedded Robotics: mobile robot design and applications with embedded systems, Springer, 2006.		teacher/Internet

	• S. Thrun, W. Burgard, D. Fox, Probabilistic Robotics, MIT Press, 2006.		teacher/Internet
	• Saeed B. Niku: Introduction to Robotics: Analysis, Systems, Applications, Prentice Hall, 2001.		teacher
	• M. Bonković, J. Musić, I Stančić: "Mikroregulatori i ugradbeni mrežni sustavi u Arduino razvojnom okruženju", faculty book, FESB		e-learning portal
	• J. Musić, M. Bonković: Authorised lecture notes, FESB		e-learning portal
Optional literature (at the time of submission of study programme proposal)	1. Tadej Bajd: Osnove robotike, Fakulteta za elektrotehniko, Univerza v Ljubljani, 2000. 2. Kovačić, Laci, Bogdan, Osnove robotike, Fakultet elektrotehnike i računarstva, Zagreb, 1999.		
Quality assurance methods that ensure the acquisition of exit competences	- Keeping records of student attendance. - Annual analysis of course statistics in terms of midterm and finals exams. - Feedback from students via surveys. - Teacher self-evaluation. - Feedback from graduated students (or senior students) on course content relevance. - Periodic institutional evolution of course teachers.		
Other (as the proposer wishes to add)	/		

NAME OF THE COURSE	RADIO FREQUENCY IDENTIFICATION TECHNOLOGY						
Code	FELJ38	Year of study	2.				
Course teacher	Joško Radić, Ph.D., Associate Professor Petar Šolić, Ph.D., Assistant Professor	Credits (ECTS)	5				
Associate teachers		Type of instruction (number of hours)	L	S	AE	LE	DE
			30	0	0	30	0
Status of the course	Elective	Percentage of application of e-learning	0				

COURSE DESCRIPTION

Course objectives	Training students for: - Acquire elemental knowledge in the field of RFID technologies - Introduction with RFID systems with multiple readers - Understanding mobility and energy efficiency in RFID systems - Implement simple RFID system - Applying appropriate technology for identification and localization		
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: 1. Describe architecture and types of RFID systems 2. Explain protocols used in RFID systems 3. Explain reasons of introducing RFID systems with multiple readers 4. Choose appropriate RFID system regarding to its application 5. Choose appropriate RFID system regarding to its demands on the application 6. Project simple solution to control the access by using RFID system		
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	LE hours
	RFID system architecture	3	2
	Types of RFID systems	2	2
	Networking protocols in communication of one reader and multiple tags, decision trees and ALOHA	4	4
	CDMA and CSMA systems	2	2
	Mobility and energy efficiency of RFID systems	2	2
	Systems with large number of readers and tags	3	3
	Problems in RFID systems implementation	2	2
	Enviroments appropriate for the usage of RFID systems	2	2
	RFID systems applications, access control and identification	2	2
	Competitive technologies for identification and localization, bar-codes, wireless sensor networs	2	2
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	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.		

<table>
<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>0,8</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>Individual work</td><td>3</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Laboratory exercises</td><td>0,5</td></tr>
<tr><td>Tests</td><td>0,1</td><td>Oral exam</td><td></td><td>Preparation for laboratory exercises</td><td>0,5</td></tr>
<tr><td>Written exam</td><td>0,1</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">During the semester there are two mid-term exams and the final exam. Mid-term and final exams consist of questions and tasks. In the final exams students that did not pass the midterm exams take part.
The midterm and final exams are carried out as written tests. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on each midterm exam or the final exam. Grade (in percentage) is formed according to the formula:
Grade (%) = 0,75 * (0.5 * M1 + 0,5 * M2) + 0,25 * L;
M1, M2 - points at the mid-term expressed as a percentage, and L - points from the laboratory (with completed all lab. Exercises) expressed as a percentage.
The final evaluation is determined as follows:
percentage Rating
50% to 61% is sufficient (2)
62% to 74% good (3)
75% to 87% of very good (4)
88% 100% Excellent (5)</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">• Nastavni materijali za kolegij Tehnologija radiofrekvencije identifikacije</td><td></td><td>e-learning</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">• M. Bolic, D. Simplot-Ryl, I. Stojmenovic, RFID Systems: Research trends and challenges, edited book, Wiley Series in Wireless Communications and Mobile Computing, 2010.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Evaluation of results in accordance with the above learning outcomes
- Feedback from students via surveys
- Self-evaluation of teachers
- Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

FELH09	Software engineering - Zoraja (Programsko inženjerstvo)

NAME OF THE COURSE	SOLAR CELLS						
Code	FELH35	Year of study	1				
Course teacher	Tihomir Betti, Ph.D., Assistant Professor Ivan Marasović, Ph.D., Assistant Professor	Credits (ECTS)	5				
Associate teachers		Type of instruction (number of hours)	L	S	AE	LE	DE
			30			30	
Status of the course	Elective	Percentage of application of e-learning					

COURSE DESCRIPTION

Course objectives	Training students for: - Understanding fundamental operating principles of solar cells. - Modeling solar cells using equivalent electrical circuits. - Calculating solar radiation on the plane of arbitrary tilt and orientation. - Understanding different PV technologies and comparison between them. - Designing simple stand-alone and grid-connected PV systems. - Calculating the electricity production of a photovoltaic system.	
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: - Calculate the components of solar radiation on the plane of arbitrary tilt and orientation. - Explain the physical operating principles of a solar cell. - Compare different solar cell technologies. - Design simple grid-connected and stand-alone photovoltaic system. - Calculate the electricity production of a photovoltaic system.	
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours
	Introduction. Solar radiation: irradiance and irradiation. Basic solar geometry parameters.	2
	Solar radiation components. Measurement of solar radiation. Calculating the beam, diffuse and reflected solar radiation.	2
	Physical principles of solar cell operation. Current-voltage characteristic and basic solar cell parameters. Series and shunt resistance.	2
	Solar cell models. Dependence of solar cell parameters on irradiance and temperature.	2
	Amorphous silicon solar cells.	2
	Crystalline silicon solar cells.	2
	High-efficiency III-V multijunction solar cells. Other semiconductor materials for solar cells.	2
	Organic solar cells.	2
	Third generation solar cells: concepts and perspective. Nanostructure-based solar cells.	2
	Photovoltaic systems: stand-alone and grid-connected. Photovoltaic system components: inverters, charge regulators, batteries, mounting structures, cables.	2
	Design of grid-connected and stand-alone photovoltaic system. Shading and mismatch losses. Hot spot heating.	2
	Estimation of electricity production of a photovoltaic system.	2
	PV cell, module and system testing. Environmental impact of a photovoltaic system. Photovoltaics in the smart grid.	2

<table>
<tr><td></td><td colspan="6">List of laboratory or design exercises</td><td>LE hours</td></tr>
<tr><td></td><td colspan="6">Solar radiation. Measurement of solar radiation.</td><td>3</td></tr>
<tr><td></td><td colspan="6">Calculating global horizontal radiation from sunshine duration</td><td>3</td></tr>
<tr><td></td><td colspan="6">Estimation of solar radiation on surface of arbitrary tilt and orientation.</td><td>6</td></tr>
<tr><td></td><td colspan="6">Shade measurement and solar site assessment.</td><td>3</td></tr>
<tr><td></td><td colspan="6">Design of grid-connected photovoltaic system.</td><td>6</td></tr>
<tr><td></td><td colspan="6">Estimating electricity production of a photovoltaic system.</td><td>3</td></tr>
<tr><td></td><td colspan="6">Visiting photovoltaic system on the roof of the faculty building.</td><td>3</td></tr>
<tr><td></td><td colspan="6">Testing photovoltaic modules and systems. Photovoltaic system in the smart energy systems (smart home and smart grid).</td><td>3</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="4">☒ independent assignments
☒ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="7">At least 70% of lectures attendance. Completed all laboratory assignments and the presentation of two projects.</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>1</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>Individual work</td><td>2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Laboratory exercises</td><td>1</td></tr>
<tr><td>Tests</td><td>0.15</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>0.1</td><td>Project</td><td>0.75</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">Students work in groups of two on two projects: the first project involves calculation of global solar radiation from sunshine duration, the evaluation of the model used and calculation of solar energy on slope of arbitrary tilt and orientation. The first project is presented during the first midterm exam (after 7 weeks of classes). The second project is design of a photovoltaic system and students must complete it and present the results during the second midterm exam (after the following 6 weeks of classes). Apart from presentation of student projects, there will be two midterm quizzes. The requirement for passing the course is to score at least 40% at each quiz, complete all laboratory work and successfully present the projects.. The final grade (in percentage) is formed using following formula:
Grade(%)=0.3(M1+M2)+0.4P,
where:
• M1, M2 – grade from midterm exams given in percentage,
• P – grade from projects given in percentage.
Students not passing the midterm exams take part in the final exams. For passing the final exam, students must score at least 50% as well as have a positive assesment of the laboratory exercises. The grade on final exams is determined by the formula:
Grade(%) = 0.65F+0.35P,
where:
• P – grade from projects given in percentage.</td></tr>
</table>

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	T. Betti, I. Marasović: Sunčane ćelije – autorizirana predavanja (prezentacije), FESB		E-learning portal
	P. Kulišić, J. Vuletin, I. Zulim: Sunčane ćelije, Školska knjiga, Zagreb, 1994.		
	Planning and Installing Photovoltaic Systems, 2nd edition, Earthscan, 2010.		
Optional literature (at the time of submission of study programme proposal)	- T. Markvart, L. Castañer: Practical Handbook of Photovoltaics: Fundamentals and Applications, Elsevier, 2003. - M.A. Green: Solar cells: operating principles, technology, and system applications, Prentice-Hall, 1982. - A. Luque, S. Hegedus: Handbook of Photovoltaic Science and Engineering, Wiley, 2003. - S.M. Sze, K.K. Ng: Physics of Semiconductor Devices, Wiley, 2006. - M.A. Green: Third Generation Photovoltaics, Springer, 2006.		
Quality assurance methods that ensure the acquisition of exit competences	- Record of number of students attending the classes - Evaluation of results in accordance with expected learning outcomes - Feedback from students via student surveys - Teachers self-evaluation - Institutional and non-institutional evaluations		
Other (as the proposer wishes to add)			

NAME OF THE COURSE	TIME-FREQUENCY SIGNAL ANALYSIS						
Code	FELH23	Year of study	1				
Course teacher	Tihomir Betti, Ph.D., Assistant Professor Ivan Marasović, Ph.D., Assistant Professor	Credits (ECTS)	5				
Associate teachers		Type of instruction (number of hours)	L	S	AE	LE	DE
			30			30	
Status of the course	Elective	Percentage of application of e-learning					

COURSE DESCRIPTION

Course objectives	Training students for: - Understanding, recognition and classifying digital signal processing problems. - Using frequency and time-frequency for signal analysis. - Understanding and using wavelet transformations for signal analysis.
Course enrolment requirements and entry competences required for the course	Completed course Digital instrumentation 1.
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - Describe digital signal acquisition methods, - Design appropriate digital filter, - Explain reconstruction signal techniques, - Use time-frequency transformations for signal analysis, - Use wavelet transformation in non-stationary signal analysis - Develop and implement algorithm for digital signal processing in MATLAB

Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours
	Introduction. Time and frequency signal representation.	2
	Digital signal acquisition techniques.	2
	Time and amplitude signal quantization.	2
	Aliasing and anti-aliasing filter.	2
	Signal reconstruction.	2
	Mathematical representation of discrete signals.	2
	Frequency transformations for signal analysis.	2
	Algorithms and windows for spectral analysis.	2
	Correlation and spectral analysis.	2
	Time-frequency transformations for signal analysis.	2
	Wavelet transformation for non-stationary signal analysis.	2
	CWT and DWT algorithms for signal decomposition.	2
	Adaptive wavelet analysis.	2
	List of laboratory or design exercises	LE hours
	Introduction in MATLAB. Time and frequency signal representation.	3
	Time and amplitude signal quantization in MATLAB.	3
	Signal reconstruction and aliasing.	3
	Frequency transformations for signal analysis.	3
	Algorithms and windows for spectral analysis.	3
	Correlation and spectral analysis.	3
	Time-frequency transformations for signal analysis.	3
	Wavelet transformation for non-stationary signal analysis.	3
	CWT and DWT algorithms for signal decomposition.	3
	Adaptive wavelet analysis in MATLAB.	3

<table>
<tr><td>Format of instruction</td><td colspan="6">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☒ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="8">Students should attend at least 70% of the lectures. Students must complete all laboratory exercises.</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>1</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>Individual work</td><td>2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Laboratory exercises</td><td>1</td></tr>
<tr><td>Tests</td><td>0.15</td><td>Oral exam</td><td></td><td>Preparation for laboratory exercises</td><td></td></tr>
<tr><td>Written exam</td><td>0.1</td><td>Project</td><td>0,75</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="8">There are two midterm exams and a final exam. The first midterm exam is scheduled after 7 weeks of classes and the second one after the following 6 weeks. Each midterm exam is written and consists of theoretical questions. Each midterm exam lasts 90 minutes. To pass an exam, the student should score at least 50% and also have a positive assesment of the laboratory exercises.
The final grade (in percentage) is determined according to the formula:
Grade(%) = 0.3(T1+T2)+0.4P
where:
• T1, T2 – grade from theoretical questions in midterms given in percentage,
• P – grade from final project given in percentage.
Students not passing the midterm exams take part in the final exam. It consists of theoretical questions problems and lasts 165 minutes. For passing the final exam, students must score at least 50%, as well as have a positive assesment of the laboratory exercise. The grade on final exams is determined by the formula:
Grade(%) = 0.6(T)+0.4(P),
where:
• T – grade from theoretical questions given in percentage,
• P – grade from final project given in percentage.</td></tr>
<tr><td rowspan="6">Required literature (available in the library and via other media)</td><td colspan="5">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="5">• S. Beroš: Digitalna instrumentacija 2, autorizirana predavanja, FESB</td><td></td><td>e-learning portal</td></tr>
<tr><td colspan="5">• J.M. Candy: Signal Processing – The Modern Approach, McGraw-Hill</td><td></td><td></td></tr>
<tr><td colspan="5">• I. Daubechies: Ten lectures on wavelets, Society for Industrial and Applied Mathematics, Philadelphia</td><td></td><td></td></tr>
<tr><td colspan="5"></td><td></td><td></td></tr>
<tr><td colspan="5"></td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="8">- A.V. Oppenheim, R.W. Schafer: Discrete-time Signal Processing, Prentice-Hall
- D. Brook, R.J. Wynne: Signal Processing, Edward Arnold, London
- L.B. Jackson: Digital Filters and Signal Processing, Kluwer Academic Press, Boston
- M.V. Wicherhauser: Adapted Wavelet Analysis from Theory to Software, IEEE Press</td></tr>
</table>

Quality assurance methods that ensure the acquisition of exit competences	- Record of number of students attending the classes - Evaluation of results in accordance with expected learning outcomes - Feedback from students via student surveys - Teachers self-evaluation - Institutional and non-institutional evaluations
Other (as the proposer wishes to add)	

NAME OF THE COURSE	WINDOWS PROGRAMMING						
Code	FELH21	Year of study	1				
Course teacher	Maja Štula, Ph.D., Full Professor	Credits (ECTS)	5				
Associate teachers		Type of instruction (number of hours)	L	S	AE	LE	DE
			30			30	
Status of the course	Elective	Percentage of application of e-learning	10%				

COURSE DESCRIPTION

Course objectives	Training students for: - Understanding functioning of Microsoft Windows operating systems and communication between application and OS - Acquiring basic knowledge necessary for development of applications based on .NET 2.x and .NET 3.x frameworks - Acquiring knowledge on desktop applications with graphical interface
Course enrolment requirements and entry competences required for the course	Object oriented programming Data structures Algorithms
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - Use .NET environment - Understand MS windows application functioning - Design and develop simple graphical user interface for desktop application - Choose appropriate user controls for required application functions - Choose suitable .NET framework to fulfil user application requirements

Course content broken down in detail by weekly class schedule (syllabus)

Course content	L hours	AE hours
Microsoft Windows operating system, GUI history, dynamic linking, native API	2	-
NET framework 2.x, 3.x, 4.x structure, .NET basic elements and properties	2	-
Application entry point, message loop, working with messages	3	-
Creating windows, windows types, hierarchy, .NET 2.x and 3.x windows	3	-
XAML language	3	-
Controls, windows, application resources	3	-
MDI application, tab design, navigation design	2	-
Working with data, data binding	3	-
WPF triggers and animations	2	-
GDI+ and WPF graphics subsystem	3	-
Windows 8 OS, windows Store application	4	-
List of laboratory or design exercises		LE hours
Different data types in .NET applications, NET 2.x and .NET 3.x applications with basic GUI with basic window		4
Developing UI in XAML		6
User controls		8
MVVM (Model-View-ViewModel) pattern introduction		6
LINQ, Extension methods, Anonymous types		6

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)

<table>
<tr><td>Student responsibilities</td><td colspan="6">The presence on lectures in the amount of at least 70 % of the times scheduled. Performed and uploaded on e-learning portal all required laboratory exercises.</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>2,5</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>1,5</td><td>(Other)</td><td></td></tr>
<tr><td>Tests</td><td>0,2</td><td>Oral exam</td><td>0,6</td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>0,2</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">There are two midterms and final exams duration of 90 minutes. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. In the final exams students that did not pass the midterm exams take part. The requirement for passing grade is 50 % points on each midterm exam or the final exam. Grade (in percentage) is formed according to the formula:
Grade(%) = (M1 + M2)/2
the activities in percentage:
• M1, M2 – test results.</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">M. Štula: Programiranje korisničkih sučelja na Windows platformama, 2010, University textbook, FESB</td><td>1</td><td></td></tr>
<tr><td colspan="3">M. Štula, Authorized lecture materials</td><td></td><td>e-learning portal</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>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">- C# 3.0 Unleashed With the .NET Framework 3.5, Joseph Mayo
- Foundations of WPF: An Introduction to Windows Presentation Foundation, Laurence Moroney, Apress</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Students’ surveys for teacher evaluation
- Students attendance track
- Annual statistic on passed exam</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

NAME OF THE COURSE	WIRELESS COMMUNICATION NETWORKS						
Code	FELJ09	Year of study	1.				
Course teacher	Dinko Begušić, Ph.D., Full Professor	Credits (ECTS)	5				
Associate teachers	Maja Stella. Ph.D., Assistant Professor Marina Rajič, Mag. Ing. Josip Žilić, Magl. Ing. Ante Dagelić, Mag. Ing.	Type of instruction (number of hours)	L	S	AE	LE	DE
			30	0	15	15	0
Status of the course	Elective: 220, 250 Obligatory: 241, 242	Percentage of application of e-learning					

COURSE DESCRIPTION

Course objectives	Training students for: - understanding and application of basic concepts and technologies of wireless communication systems, - collaboration in design, development and maintenance of wireless communication networks, - collaborate in design, development and maintenance of optical communication systems and networks, - permanent adoption and deepening of the knowledge in the area of wirelessl communication systems and networks.
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: - identify, select and apply wireless communication systems and networks, - collaborate in design, implementation and maintenance of mobile networks (NMT, GSM, GPRS, EDGE, UMTS, HSDPA, LTE), - collaborate in design, implementation and maintenance of wireless access networks (WIMAN), - collaborate in design, implementation and maintenance of wireless local area networks (WLAN, IEEE 802.11x), - collaborate in design, implementation and maintenance of wireless personal area networks (WPAN, Bluetooth), - collaborate in design, implementation and maintenance of ad-hoc networks, - collaborate in design, implementation and maintenance of sattelite commnication networks (LEO, MEO, GEO), - collaborate in development of services based on wireless communication networks, - permanently adopti and deepening of the knowledge in the area of wireless communication systems and networks.

Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Basic characteristics of wireless communication channels (feding, multipath propagation, Doppler effect).	2	1
	Digital signal processing and diversity combining in wireless commnications.	2	1
	Multiple access techniques and multiplexing (FDMA, TDMA, CDMA, OFDMA).	2	1
	Cellular systems. Interference. Coverage.	2	1
	Mobile networks evolution. First generation networks.	2	1
	Second generation networks.	2	1
	GSM system. Network architecture, physical channels.	2	1

	Implementation and application of discrete time systems.	2	1
	GSM system: logical channels, layered model. 3 Mobile networks 2G+; GPRS, EDGE.	2	1
	Mobile networks 3G+ (UMTS, HSPA).	2	1
	Mobile networks 4G. (LTE, LTE-A). Mobile networks 5G.	2	1
	Wireless access networks. (WMAN); IEEE 802.16. Wireless local networks (WLAN); IEEE 802.11x. Wireless personal area networks (WPAN); Bluetooth., IEEE 802.15	2	1
	Satellite commnication networks (LEO, MEO, GEO). Services in wireless communication networks. Mobile computing and mobile internet.	2	1
	List of laboratory or design exercises		LE hours
	Configuration of IEEE 802.11x based networks.		2
	Throughput measurement in IEEE 802.11x based networks,		2
	Configura and throughput measurement in Bluetooth systems.		2
	Signalling in GSM networks.		2
	Signalling in UMST networks.		2
	Signalling in LTE networks.		2
	Synchronization in mobile networks.		2

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	D..Begušić: Wireless and mobile communication networks, handouts Optional literature (at the time of submission of study programme proposal) □ IEEE Communications Magazine. □ Documents of standardization institutions ITU, ETSI, IEEE and others. □ Scientific papers in the area of wireless and mobile communication networ	

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	1,0	Research	-	Practical training	-
	Experimental work	-	Report	-	Individual work	2,2
	Essay	-	Seminar essay	0,5	Laboratory exercises	0,5
	Tests	0,2	Oral exam	-	Preparation for laboratory exercises	0,5
	Written exam	0,1	Project	-	(Other)	

Grading and evaluating student work in class and at the final exam	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 and final test consists of 10 theoretical questions and numerical problems. The duration of each test is 2 school hour. In the final exams students that did not pass the midterm exams take part. The midterm and final exams are carried out as written tests. The requirement for passing grade is the positive assessment of laboratory exercises, the seminar exercise and 50 % points on each midterm exam or the final exam. The continuous knowledge assessment grade (in percentage) is formed according to the formula: Grade(%) = 0,05 NP + 0,15 LV + 0,4 (M1 + M2) the activities in percentage: • NP - attendance at lectures, • LV – laboratory assessment, • M1, M2 – test results.

<table>
<tr><td></td><td colspan="3">The final grade is based on the grade of the continuous knowledge assesment grade and the oral part of the final exam. The students whose grade may be formed without the need for the oral part of the final exam may not be obliged to attend tthe oral part of the exam.
There are two terms for the final exam and one additional term for the make up exam.
The requirement for attendance of the final exam or the make up exam is the passing grade for all laboratory excercises and submitted seminar excercis work. At the final exam the student writes the test from the area of the miterm exam(s) which has/have not been succesfully passed before. At the make up exam the student writes the test from the complete course.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>D.Begušić: Wireless communication networks, handouts, FESB, 2016.</td><td></td><td>e-learning portal</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">- P.M.Shankar: Introduction to Wireless Systems, John Wiley & sons, USA, 2002 -
- EEE Communications Magazine.
- Documents of standardization institutions ITU, ETSI, IEEE and others.
- Scientific papers in the area of wireless and mobile communication networks.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">- Evaluation of results in accordance with the above learning outcomes
- Feedback from students via surveys
- Self-evaluation of teachers
- Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

NAME OF THE COURSE	WIRELESS COMMUNICATIONS							
Code	FELH12	Year of study	2.					
Course teacher	Antonio Šarolić, Ph.D., Full Professor	Credits (ECTS)	5					
Associate teachers	Niko Ištuk, mag. ing. el.	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30			30		
Status of the course	Obligatory	Percentage of application of e-learning	0					

COURSE DESCRIPTION

Course objectives	Training students for: - understanding the principles of radio signal propagation - understanding the principles of wireless signal transmission - understanding all the components of transmitters and receivers - understanding the important present and emerging wireless communication systems		
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: - utilize antenna parameters as the basis for antenna application in ICT - elaborately assess the applicability of a certain antenna for specific purpose - characterize the frequency bands from the aspect of specific radio system features and needs - calculate the budget of a wireless link between the transmitter and the receiver - analyze the characteristics of modulation procedures - analyze and compare the characteristics of different radiocommunication systems		
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Introduction and history of wireless communications. Radiation phenomena. Antennas – parameters and elementary radiation sources.	2	0
	Antennas – overview of types and frequency.	2	0
	Antenna systems.	2	0
	Radio spectrum.	2	0
	Radio signal propagation. Terrestrial and satellite links.	2	0
	Analog modulation procedures.	2	0
	Digital modulation procedures.	2	0
	Radiocommunication system configuration.	2	0
	Theoretical basis of radiocommunication systems. Radio channel. Broadcasting network operation principles.	2	0
	Mobile telephony network operation principles.	2	0
	Overview of presently operating and emerging systems: GSM, UMTS, LTE.	2	0
	Overview of presently operating and emerging systems: Wi-Fi, WIMAX, Bluetooth.	2	0
	Overview of presently operating and emerging systems: RFID, DVB, UWB, GPS, TETRA.	2	0

	List of laboratory or design exercises	LE hours
	Antennas – parameters and elementary radiation sources.	2

	Antennas – overview of types and frequency.	2
	Antenna systems.	2
	Radio spectrum.	2
	Radio signal propagation. Terrestrial and satellite links.	2
	Analog modulation procedures.	2
	Digital modulation procedures.	2
	Radiocommunication system configuration.	2
	Theoretical basis of radiocommunication systems. Radio channel.	2
	Mobile telephony network	2
	Presently operating and emerging systems: GSM, UMTS, LTE.	2
	Presently operating and emerging systems: Wi-Fi, Bluetooth.	2
	Presently operating and emerging systems: RFID, DVB.	2

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	Student is required to attend the lectures and auditory exercises in the amount of at least 70% of the schedule. Student is required to attend the laboratory exercises in the amount of 100% of the schedule and to complete all tasks associated with laboratory exercises.	

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	1,5	Research		Practical training	0,5
	Experimental work	0,5	Report		Laboratory exercises	0,5
	Essay		Seminar essay		Individual work	0,5
	Mid-exam	0,5	Oral exam		(Other)	
	Written exam	0,5	Project	0,5	(Other)	

Grading and evaluating student work in class and at the final exam	During the semester, two mid-exams will be held. The first mid-exam will be held in the middles of the semester, while the second will be held after the lectures and exercises are completed, schedules to be agreed with the students. The first mid-exam is based on the first half of the course material. The second mid-exam is based on the first second half of the course material. To pass at each mid-exam, min. 50% of points must be earned from the part of the exam containing numerical problems (material from auditory exercises) and min. 50% of points must be earned from the part of the exam containing theory (material from the lectures). To earn the right to approach the second mid-exam, min. 30% of points must be earned from the part of the first mid-exam containing numerical problems (material from auditory exercises) and min. 30% of points must be earned from the part of the first mid-exam containing theory (material from the lectures). If a student earns the positive grades on both mid-exams, he/she is considered to have passed the whole exam with the grade calculated as average from both mid-exams. At the first exam term, students may choose to take the exam containing only that half of the material that they haven't passed at mid-exams. At all other exam terms, students must take the whole exam, containing all the course material. Approaching the exams is subject to fulfilling the requirements on student responsibilities. The overall point percentage defining the overall grade is calculated as the average of points earned in all exam questions, corrected by the result of oral verification:

<table>
<tr><td></td><td colspan="3">Percentage -> Grade
50% - 62,4% -> sufficient (2)
62,5% - 74,9% -> good (3)
75% - 87,4% -> very good (4)
87,5% - 100% -> excellent (5)
Final grade can be supplemented by performing practical project work involving individual and experimental work, in agreement with the teacher.
Exam terms: according to the academic year calendar</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>• E. Zentner: Antene i radiosustavi, Graphis, Zagreb 2001.</td><td></td><td></td></tr>
<tr><td>• David Tse and Pramod Viswanath: Fundamentals of Wireless Communication, Cambridge University Press, 2005.</td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">- Ramjee Prasad: Technology Trends in Wireless Communications, Artech House, 2003.
- Handbook of antennas in wireless communications, CRC Press, 2002.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">Surveys providing student feedback</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

NAME OF THE COURSE	DIPLOMA THESIS						
Code	FEXX02	Year of study	2				
Course teacher		Credits (ECTS)	30				
Associate teachers		Type of instruction (number of hours)	L	S	AE	LE	DE
Status of the course	Mandatory	Percentage of application of e-learning					

COURSE DESCRIPTION

Course objectives	Training students for: - consolidating theoretical knowledge and practical skills in solving highly complex engineering problems, - being independent in solving problems under the given conditions, - applying scientific-research and ethical principles, - writing and presenting the project results.
Course enrolment requirements and entry competences required for the course	Acquired 60 ECTS credits
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - To consolidate theoretical knowledge and practical skills in solving highly complex engineering problems - To use literature, databases and other sources of information - To select appropriate methods and procedures for solving the most complex engineering problems - To apply scientific and technical knowledge and skills to effectively solve engineering problems - To apply scientific research methodology and ethical principles in the science - To give oral public presentation, to prepare written report and present project results
Course content broken down in detail by weekly class schedule (syllabus)	Diploma thesis is the independent work of the student produced according to the task and instructions given by the supervisor, and according to the scientific research methodology and ethical principles.
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	Independent work

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		Individual work	30
	Essay		Seminar essay		(Other)	
	Tests		Oral exam		(Other)	
	Written exam		Project		(Other)	

<table>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="3">Producing of the diploma thesis is evaluated by the supervisor based on the student's achievements during the process of preparing the diploma thesis. Commission for defence of the diploma thesis gives an assessment, representing an average grade for the preparation and defence of the thesis.</td></tr>
<tr><td rowspan="2">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>1. Etički kodeks Fakulteta elektrotehnike, strojarstva i brodogradnje u Splitu
2. Zelenika, Ratko: Metodologija i tehnologija izrade znanstvenog i stručnog djela, Pisana djela na stručnim i sveučilišnim studijima, knjiga peta, Ekonomski fakultet u Rijeci, Rijeka, 2011.
3. Žugaj, Miroslav; Dumičić, Ksenija; Dušak, Vesna: Temelji znanstvenoistraživačkog rada, Metodologija i metodika, Fakultet organizacije iinformatike, Varaždin, 2006.

Literature depends on the given problem. The literature list may be given by the supervisor or the student should find the appropriate literature to help solve the problem.</td><td></td><td>Web site of the Faculty</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3"></td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">- Self-evaluation of teachers
- Student survey of the whole study programme</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

3. STUDY PERFORMANCE CONDITIONS

3.1. Places of the study performance

Buildings of the constituent part (name existing, under construction and planned buildings)	
Identification of building	
Location of building	
Year of completion	
Total square area in m^2	
Identification of building	
Location of building	
Year of completion	
Total square area in m^2	

3.2. List of teachers and associate teachers

CODE	Course	Teachers and associate teachers
	List the courses in alphabetical order	
FELH42	3D Animations	Ivan Zoraja, Ph.D., Associate Professor Marko Žarković, Teaching Assistant
FELJ32	3D Renedering	Ivan Zoraja, Ph.D., Associate Professor Marko Žarković, Teaching Assistant
FELH05	Advanced computer architecture	Sven Gotovac, Ph.D., Full Professor Dunja Gotovac, Teaching Assistant
FELH01	Algorithms and data structures	Ivan Zoraja, Ph.D., Associate Professor Marko Žarković, Teaching Assistant
FELH11	Artificial intelligence	Darko Stipaničev, Ph.D., Full Professor Ljiljana Šerić, Ph.D., Assistant Professor Toni Jakovčević, Ph.D., Assistant Professor
FELG17	Bioelectrical systems and equipment	Mirjana Bonković, Ph.D., Full Professor Zoran Valić, Ph.D., Full Professor
FELJ24	Bioelectromagnetics	Antonio Šarolić, Ph.D., Full Professor Niko Ištuk, Teaching Assistant
FELH34	Computer aided process control	Tihomir Betti, Ph.D., Assistant Professor
FELK34	Computer games programming	Jadranka Marasović, Ph.D., Full Professor Tea Marasović, Ph.D., Assistant Professor
FELJ31	Database programming	Eugen Mudnić, Ph.D., Assistant Professor
FELH20	Designing and using computer networks	Julije Ožegović, Ph.D., Full Professor Ante Kristić, Ph.D.
FELH39	Digital image processing and analysis	Damir Krstinić, Ph.D., Associate Professor Darko Stipaničev, Ph.D., Full Professor Maja Braović, Ph.D.
FELH08	Digital signal processing systems	Julije Ožegović, Ph.D., Full Professor Ante Kristić, Ph.D. Vesna Pekić, Ph.D.
FELH07	Digital systems projecting	Julije Ožegović, Ph.D., Full Professor Vesna Pekić, Ph.D. Ante Kristić, Ph.D.
FELH10	Distributed information systems	Ivan Zoraja, Ph.D., Associate Professor Marko Žarković, Teaching Assistant

FELH32	Electroacoustics	Ivo Mateljan, Ph.D., Full Professor
FELH24	Electromagnetic compatibility	Dragan Poljak, Ph.D., Full Professor Antonio Šarolić, Ph.D., Full Professor Niko Ištuk, Teaching Assistant
FELH04	Electronic and virtual instrumentation	Ivo Mateljan, Ph.D., Full Professor
FELH13	Electronic circuits	Ivan Marinović, Ph.D., Full Professor Duje Čoko, Ph.D., Assistant Professor
FELH16	Embedded systems	Sven Gotovac, Ph.D., Full Professor Dunja Gotovac, Teachig Assistant
FELH38	Fields and waves in electronics	Dragan Poljak, Ph.D., Full Professor Anna Šušnjara, Teaching assistant
FEMJ02	Information and technology physics	Nikola Godinović, Ph.D., Associate Professor Dunja Polić, Darko Zarić, Toni Vrdoljak
FELH02	Information theory and coding	Petar Šolić, Ph.D., Assistant Professor
FELH30	Local and access networks	Josip Lörincz, Ph.D., Assistant Professor Dinko Begušić, Ph.D., Full Professor
FELJ30	Maritime radiocommunications	Antonio Šarolić, Ph.D., Full Professor Niko Ištuk, Teaching Assistant
FELH41	Medical electronic devices	Antonio Šarolić, Ph.D., Full Professor Ivan Marinović, Ph.D., Full professor Niko Ištuk, Teaching Assistant
FELH37	Microelectronics	Tihomir Betti, Ph.D., Assistant Professor Ivan Marasović, Ph.D., Assistant Professor
FELJ20	Multimedia systems	Mladen Russo, Ph.D., Assistant Professor Jelena Čulić, Teaching Assistant Martina Bašić, Teaching Assistant
FELJ17	Numerical methods in communications	Dragan Poljak, Ph.D., Full Professor Vicko Dorić, Ph.D., Associate Professor Anna Šušnjara, Teaching Assistant
FELG14	Operations research	Jadranka Marasović, Ph.D., Full Professor Martina Bašić, Teaching Assistant
FELG33	Optoelectronic measurement methods	Ivo Stančić, Ph.D., Assistant Professor
FELH14	Optoelectronics	Tihomir Betti, Ph.D., Assistant Professor
FEXX06	Professional Training	
FELH06	Programming languages and compilers	Ivo Mateljan, Ph.D., Full Professor Marjan Sikora, Ph.D., Assistant Professor
FELH40	Programming mobile robots and drones	Mirjana Bonković, Ph.D., Full Professor Josip Musić, Ph.D., Assistant Professor Miroslav Dujmović, Teaching Assistant
FELJ38	Radio frequency identification technology	Joško Radić, Ph.D., Associate Professor Petar Šolić, Ph.D., Assistant Professor
FELH09	Software engineering	Ivan Zoraja, Ph.D., Associate Professor Marko Žarković, Teaching Assistant
FELH35	Solar cells	Tihomir Betti, Ph.D., Assistant Professor Ivan Marasović, Ph.D., Assistant Professor
FELH23	Time-frequency signal analysis	Tihomir Betti, Ph.D., Assistant Professor Ivan Marasović, Ph.D., Assistant Professor
FELH21	Windows programming	Maja Štula, Ph.D., Full Professor
FELJ09	Wireless communication networks	Dinko Begušić, Ph.D., Full Professor Maja Stella. Ph.D., Assistant Professor Marina Rajič, Teaching Assistant Josip Žilić, Teaching Assistant Ante Dagelić, Teaching Assistant
FELH12	Wireless communications	Antonio Šarolić, Ph.D., Full Professor Niko Ištuk, Teaching Assistant
FEXX02	Diploma Thesis	

3.3. Curriculum vitae of the course teacher

First and last name and title of teacher	**Dinko Begušić, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Wireless communication networks
GENERAL INFORMATION ON COURSE TEACHER	
Address	Trondheimska 4d, Split
Telephone number	021305637
E-mail address	begusic@fesb.hr
Personal web page	www.fesb.hr/~begusic
Year of birth	1960.
Scientist ID	129685
Research or art rank, and date of last rank appointment	Scientific advisor, scientific field of electrical engineering Scientific advisor, scientific field of computing
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full professor, permanent position (date of election Spetember 11, 2008)
Area and field of election into research or art rank	Scientific area of technical sciences, scientific field of electrical engineering Scientific area of technical sciences, scientific field of computing
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	University of Split, Faculty of electrical engineering, mechanical engineering and naval architecture
Date of employment	1985.
Name of position (professor, researcher, associate teacher, etc.)	Full professor, permanent position
Field of research	Information and communication technology, Telecommunications and informatics, Information processing, Networking technologies, Digital signal processing
Function	Chair of communication technologies and signal processing
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	University of Zagreb, Faculty of electrical engineering and computing
Place	Zagreb
Date	1992.
INFORMATION ON ADDITIONAL TRAINING	
Year	1990.
Place	Bruxelles, Belgija
Institution	Universite Libre de Bruxelles
Field of training	Telecommunications and informatics, Digital signal processing
Year	1992.
Place	London
Institution	King's College London
Field of training	Telecommunications and informatics, Digital signal processing
Year	1998.
Place	Dallas, SAD
Institution	University of Texas at Dallas
Field of training	Telecommunications and informatics, Digital signal

	processing
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
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)	Wireless communication networks, Optical communication systems, Transmission systems, Software engineering in telecommunications (master study of electrical engineering)
Authorship of university/faculty textbooks in the field of the course	• D.Begušić: " Wireless communication networks ", handouts, 2016. • D.Begušić: "Optical communication systems ", handouts, 2016. • D.Begušić: " Programsko inženjerstvo u telekomunikacijama", nastavni tekst, 2016. • N.Rožić, D.Begušić, M.Vrdoljak, W.Afrić:"New communication technologies ", ISBN 953-6114-20-8, FESB Split - HT-TKC Split, pp. 416, Split, 1999.
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	• T.Perković, M.Čagalj, T.Mastelić,N.Saxena, D.Begušić: "Secure Initialization of Multiple Constrained Wireless Devices for an Unaided User", IEEE Transactions on Mobile Computing (1536-1233) 11 (2012), 2; pp.337-351 • M. Stella, M. Russo, D. Begušić: "RF Localization in Indoor Environment", Radioengineering, Special issue on advanced RF measurements (ISSN 1210-2512), Vol 21, No. 2, 2012, pp. 557-567 • Josip Lorincz, Antonio Capone, Dinko Begušić, "Optimized Network Management for Energy Savings of Wireless Access Networks", Computer Networks Journal (ISSN: 1389-1286), svezak 55, broj 3, February 2011, str.: 626-648 • D.Begušić, N.Rožić, H.Dujmić: "Development of the communication/information infrastructure at the academic institution", Computer Communications, Elsevier, ISSN 0140-3664, No.26, pp. 472-476, 2003. • M.Vojnovic, N.Rozic, D.Begusic, J.Ursic, H.Dujmic: "Multimedia Dictionary Network Application: Design and Implementation", IEEE Communications Magazine, ISSN 0163-6804, Vol.38 No.2, pp.130-137, February 2000..
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	• T.Kilić, I.Puljak, D.Begušić: "*Studying electrical engineering and information technology at the University of Split, Croatia*", International Journal of Electrical Engineering Education, Manchester University Press, ISSN 0020-7209, Vol. 44, No. 2; pp.175-183, Manchester, UK, 2007. • D.Begušić, B.Bilić, T.Kilić, I.Puljak:"*Bolonjski proces na Fakultetu elektrotehnike, strojarstva i brodogradnje u Splitu*", Zbornik sažetaka Obrazovanje inženjera Bolonjski proces 3 godine kasnije, Hrvatska akademija tehničkih znanosti, pp.38-39, Zagreb, 2007.
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	• Advanced networking technologies and systems, project FESB • Advanced heterogeneous networking technologies, project MZOS • Collaborative internationalization of software engineering

	in Croatia j, project TEMPUS • Research in the area fo telecommunications, joint project FESB - Ericsson Nikola Tesla • International conference on Software, Telecommunications and Computer Networks SoftCOM • Journal of Communications Software and Systems
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	Member of Croatian academy of engineering, Department of Information systems
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	**Tihomir Betti, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Computer aided process control Microelectronics Optoelectronics Solar cells Time-frequency signal analysis
GENERAL INFORMATION ON COURSE TEACHER	
Address	Kaštelanska 2, HR-21000, Split
Telephone number	091 4305 889
E-mail address	betti@fesb.hr
Personal web page	
Year of birth	1977
Scientist ID	248722
Research or art rank, and date of last rank appointment	Assistant research fellow, 22.11.2012.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant professor, 18.09.2013.
Area and field of election into research or art rank	Technical sciences, electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	08.06.2001.
Name of position (professor, researcher, associate teacher, etc.)	Assistant professor
Field of research	Electronics, Nanoelectronics, Photovoltaics
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	04.12.2009.
INFORMATION ON ADDITIONAL TRAINING	
Year	2013. (7 weeks)
Place	Freiburg, Germany
Institution	Fraunhofer ISE
Field of training	Photovoltaics
Year	2011. (3 weeks)
Place	Ljubljana, Slovenia
Institution	Institute „Jožef Stefan“
Field of training	Hybrid polymer solar cells
Year	2007-2009. (several visits, 4 weeks in total)
Place	Munich, Germany
Institution	Walter Schottky Institute
Field of training	Application of semiconductor nanostructures in third generation photovoltaics

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)	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)	Programmable logic controllers, Graduate study of Control Engineering and Automation, Optoelectronics, Graduate study of Electronic and Computer Engineering Solar cells, Graduate study of Electronic and Computer Engineering and Control Engineering and Automation
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. I. Marasović, Ž. Milanović, T. Betti, "Resistance Fluctuations in GaAs Nanowire Grids", Journal of Nanomaterials, (2014), 428390 2. I. Marasović, T. Garma, T. Betti, "Modelling a nanowire grid for light-sensing applications", Journal of Physics D: Applied Physics 45 (2012)
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	
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	**Mirjana Bonković, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Bioelectrical systems and equipment Programming mobile robots and drones
GENERAL INFORMATION ON COURSE TEACHER	
Address	R. Boškovića 32, 21 000 Split, HR
Telephone number	+385 91 4 305 641
E-mail address	mirjana.bonkovic@fesb.hr
Personal web page	
Year of birth	
Scientist ID	190481
Research or art rank, and date of last rank appointment	
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full professor, 2016.
Area and field of election into research or art rank	Technical Sciences, Field Electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	01/7/1991
Name of position (professor, researcher, associate teacher, etc.)	Full professor, 2016.
Field of research	3D modelling, robotics, computer vision, optimization
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	10/3/2000.
INFORMATION ON ADDITIONAL TRAINING	
Year	1995
Place	Oxford, UK
Institution	Robotics Research Group
Field of training	Robot production lines optimization
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)	Computers and Programming, Undergraduate study program Programming, Undergraduate professional study program
Authorship of university/faculty textbooks in the field of the course	Zbirka riješenih zadataka iz programiranja u Cu, upute za laboratorijske vježbe, Interna skripta, FESB Split Mikroregulatori i ugradbeni mrežni sustavi, Interna skripta,

	FESB Split, 2014
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Kuzmanić Skelin, Ana; Grujić, Tamara; Bonković, Mirjana, Visual Peoplemeter: A Vision-based Television Audience Measurement System. // Advances in Electrical and Computer Engineering. 14 (2014) , 4; 73-80 2. Mazić Igor, Bonković Mirjana, Džaja Barbara. Two-Level Coarse-to-Fine Classification Algorithm for Asthma Wheezing Recognition in Children's Respiratory Sounds. //Biomedical Signal Processing and Control. 5 (2015) ; 105-118 (članak, znanstveni). 3. Džaja, Barbara; Bonković, Mirjana; Malešević, Ljubomir. Solving a two-colour problem by applying probabilistic approach to a full-colour multi- frame image super-resolution. // Signal processing. Image communication. 28 (2013) , 5; 509-521 (članak, znanstveni). 4. Čić, Maja; Šoda, Joško; Bonković, Mirjana. Automatic classification of infant sleep based on instantaneous frequencies in a single-channel EEG signal. // Computers in biology and medicine. 43 (2013) , 12; 2110-2117 (članak, znanstveni). 5. Musić, Josip; Bonković, Mirjana; Cecić, Mojmil. Comparison of uncalibrated model-free visual servoing methods for small amplitude movement: a simulation study. //International journal of advanced robotic systems. 11 (2014) , 108; 1-16 (članak, znanstveni).
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)	Provjera inovativnog koncepta, Alarm astmatičnog napada, projekt HAMAG-BICRO, agencija za malo gospodarstvo, inovacije i investicije., 2014. /2015. "Virtual CulTourist - Razvoj korisničkog sučelja za virtualno predstavljanje kulturne baštine kroz integraciju inovativnih 3D tehnologija", 2016-2017. Programa tehnološkog razvoja, istraživanja i primjene inovacija (2014.-2017.), SDŽ "Napredne metode 3D virtualizacije – na putu prema virtualnom turizmu i digitalizaciji splitske kulturne baštine", 2015-2016. Programa tehnološkog razvoja, istraživanja i primjene inovacija (2014.-2017.), SDŽ
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)	

First and last name and title of teacher	**Vicko Dorić, Ph.D., Associate Professor**
The course he/she teaches in the proposed study programme	Numerical methods in communications

GENERAL INFORMATION ON COURSE TEACHER	
Address	Matoševa 1, Split
Telephone number	021305694
E-mail address	vdoric@fesb.hr
Personal web page	https://nastava.fesb.hr/nastava/nastavnici/detalji/vdoric
Year of birth	1974.
Scientist ID	248744
Research or art rank, and date of last rank appointment	higher scientific collaborator, February 2013.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Associate Professor, September 2016.
Area and field of election into research or art rank	Technical sciences, Electrical Engineering, Radio communications
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	20.01.2001.
Name of position (professor, researcher, associate teacher, etc.)	Associate Professor
Field of research	Technical sciences
Function	ERASMUS coordinator
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Phd
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	02.02.2009.
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 +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)	
Authorship of university/faculty textbooks in the field of the course	1. Poljak, D., Dorić, V., Antonijević S.: Modeliranje žičanih antena primjenom računala, Kigen, Zagreb, 2009. D.Poljak N.Kovač, V. Dorić, Numeričke metode u elektrotehnici – interna skripta, FESB-Split 2006.
Professional, scholarly and artistic articles published in the last five years in the field of the course (5	1. D.Čavka, D. Poljak, V. Dorić, R. Goić, Transient analysis of grounding systems for wind turbines, Renewable energy, 43, 2012

works at most)	2. D. Poljak, R. Lucić, V. Dorić, S. Antonijević, Frequency domain boundary element versus time domain finite element model for the transient analysis of horizontal grounding electrode, Engineering analysis with boundary elements, 35, 3, 2011 3. D. Poljak, V. Dorić, D. Čavka, On the use of isoparametric elements for BEM modeling of arbitrarily shaped thin wires in electromagnetic compatibility applications, Boundary Elements and other Mesh Reduction Methods XXXIV, 2012. 4. D. Čavka, D. Poljak, V. Dorić, S. Antonijević, Some Computational Aspects of Using Current and Voltage Sources in Electromagnetic Models of Lightning Return Strokes, ICLP 2012, CONFERENCE PROCEEDINGS, 2012. V. Dorić, D. Poljak, K. El Kamichi Drissi, Human Exposure to Outdoor PLC System, PIERS 2011 Marrakesh Progress In Electromagnetics Research Symposium, 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)	EUROfusion – Code Development for Integrated Modelling 2014.- Electromagnetic Interference (EMI) Study of Power Line Communications (PLC) Services 2011.-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)	

First and last name and title of teacher	**Nikola Godinović, Ph.D., Associate Professor**
The course he/she teaches in the proposed study programme	Information and Technology Physics
GENERAL INFORMATION ON COURSE TEACHER	
Address	Omiška 20, 21000 Split
Telephone number	0915195314
E-mail address	nikola.godinovic@fesb.hr
Personal web page	
Year of birth	1959
Scientist ID	129696
Research or art rank, and date of last rank appointment	
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Associate Professor, 11.3.2016.
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 Electrical Engineering, Mechanical Engineering and Naval Architecture* R. Boškovića 32 21000 Split Croatia
Date of employment	1.1.1985.
Name of position (professor, researcher, associate teacher, etc.)	professor
Field of research	Physics
Function	Head of the Department of Mathematichs and Physics
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	University of Zagreb
Place	Croatia, Zagreb
Date	30.11.2003.
INFORMATION ON ADDITIONAL TRAINING	
Year	1995. – 2017. god.
Place	Geneva
Institution	CERN
Field of training	Experimenatal Elementary Particle 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)	Italian 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)	Nuclear physcis, Experimtnal Methods of Moderan Physics, graduate program, University of Split, Fcaulty of Scince.

Authorship of university/faculty textbooks in the field of the course	Faculty text book*:* *Instructions for laboratory exercises in Physics 1* *Instructions for laboratory exercises in Physics 1*
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. *Teraelectronvolt pulsed emission from the Crab Pulsar detected by MAGIC,* MAGIC Collaboration, Ansoldi, S.; et al., . (Authors: MAGIC collaboration), Astronomy and Astrophysics 585, Article Number: A133 (2016) IF: 4.479. 2. *The major upgrade of the MAGIC telescopes, Part I: The hardware improvements and the commissioning of the system*, (Authors: MAGIC Collaboration,) Astroparticle Physics 72, pages: 61-75 (2016) IF: 3.584. 3. *The major upgrade of the MAGIC telescopes, Part II: A performance study using observations of the Crab Nebula*, (Authors: MAGIC Collaboration), Astroparticle Physics 72, pages: 76-94 (2016) IF: 3.584. 4. *Measurement of the properties of a Higgs boson in the four-lepton final state*, By: Chatrchyan, S.; Khachatryan, V.; Sirunyan, A. M.; et al., Group Author(s): CMS Collaboration, Physical Review D 89, Issue: 9, Article Number: 092007 (2014) IF: 4.506 5. *Study of the Mass and Spin-Parity of the Higgs Boson Candidate via Its Decays to Z Boson Pairs*, S. Chatrchyan et al. (CMS Collaboration), Physical Review Letters 110, 081803 – Published 21 February 2013; Erratum Phys. Rev. Lett. 110, 189901 (2013). IF: 7.512.
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	None
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	***HRZZ Research Projects* (IP-11-2013)**, Croatian Sicnece Foundation zaklada za znanost (1.10.2014. god. – 30.9.2018. god.). ***HRZZ Research Projects* (Very high energy gamma ray astronomy with the MAGIC telescopes)**, Croatian Sic nece Foundation zaklada za znanost (1.7.2012. god. – 31.12.2016.).
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	Slobodna Dalmacija ”Science 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)	

First and last name and title of teacher	**Sven Gotovac, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Advanced computer architecture Embedded systems
GENERAL INFORMATION ON COURSE TEACHER	
Address	Đorđićeva 5, 21000 Split
Telephone number	+385 21 305850
E-mail address	sven.gotovac@fesb.hr
Personal web page	www.fesb.hr
Year of birth	1960
Scientist ID	108173
Research or art rank, and date of last rank appointment	Scientific Adviser/2004.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Senior Full Professor/2009.
Area and field of election into research or art rank	Technical Sciences, Field Electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	December, 1983
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Computer architecture, Implementation of Computer Vison Algorithms on Advanced Computer Architecture.
Function	Head of Chair of Computer Architecture and Operating Systems, Dean of Faculty
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Tehnical University Berlin, Germany
Place	Berlin, Germany
Date	24.5.1994.
INFORMATION ON ADDITIONAL TRAINING	
Year	From 2004.
Place	CERN, Genève, Switzerland
Institution	Genève, Switzerland
Field of training	Distributed Computer Architecture
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 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	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)	Digital circuits Impulse electronics

Authorship of university/faculty textbooks in the field of the course	1. Elektronički sklopovi, P.Slapničar, S. Gotovac, FESB, Split 2000. 2. Osnovni elektronicki poluvodički elementi, I. Zulim, S. Gotovac., FESB, Split 1998.
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Vicković, Tomislav. Razvoj i realizacija digitalnog uređaja za mjerenje jakosti treperenja napona/znanstveni magistarski rad. Split : Fakultet elektrotehnike, strojarstva i brodogradnje, 08.11. 2010, 161 str. Voditelj: Gotovac, Sven. 2. Vicković, Linda; Mudnić, Eugen; Gotovac, Sven. Parity information placement in the disk array model. //COMPEL: The International Journal for Computation and Mathematics in Electrical and Electronic Engineering. 28 (2009) , 6; 1428-1441
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. ALICE experiment CERN, Modelling of the distributed computing system for storage and retrieval of mass data for high energy physics. – HPC Systems. International scientific project since 2004. 2. Computing system of the University of Mostar.
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	Special award for the development of the University of Mostar Award for Scientific Achievements from 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)	4.7/5

First and last name and title of teacher	**Damir Krstinić, Ph.D., Associate Professor**
The course he/she teaches in the proposed study programme	Digital image processing and analysis
GENERAL INFORMATION ON COURSE TEACHER	
Address	Slobode 43, Split 21000
Telephone number	+385 (0) 21 305 895
E-mail address	damir.krstinic@fesb.hr
Personal web page	http://www.fesb.hr/~dkrst
Year of birth	1975
Scientist ID	248812
Research or art rank, and date of last rank appointment	senior research associate, 2011.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Associate professor, 25. 01. 2017.
Area and field of election into research or art rank	Computer science, Information systems
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	FESB, University of Split
Date of employment	01. 02. 2000.
Name of position (professor, researcher, associate teacher, etc.)	Associate professor
Field of research	Computer science
Function	Associate professor
INFORMATION ON EDUCATION – Highest degree earned	
Degree	dr. sc.
Institution	FESB, University of Split
Place	Split
Date	2008.
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 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian 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)	
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. Krstinić, Damir; Kuzmanić Skelin, Ana; Milatić, Ivan, Laser Spot Tracking Based on Modified Circular Hough Transform and Motion Pattern Analysis, Sensors, Vol. 14, no. 11, 2014., pp. 20112-20133 2. Jakovčević, Toni; Stipaničev, Darko; Krstinić, Damir, "Visual spatial-context based wildfire smoke sensor", Machine vision and applications (ISSN 1387-8092), Vol. 24(2013), No. 4, pp. 707-719, 2013. 3. Šerić, Ljiljana; Krstinić, Damir; Braović, Maja; Milatić, Ivan; Mirčevski, Aljoša; Stipaničev, Darko, "Holonic Multi Agent System for Data Fusion in Vehicle Classification", in Proc. Of 10th KES International Conference, KES-AMSTA 2016.; pp-151-161; Puerto de la Cruz, Tenerife, Spain, June 15. - 17. 2016. 4. Stipaničev, Darko; Šerić, Ljiljana; Krstinić, Damir; Bugarić, Marin, "Wildfire video observers network with phyisical an d virtual sensors", 10th EARSel Forest Special Interest Group Workshop – Sensors, Multi-Sensor Integration, Large Volumes: New Oportunities and Chalenges in Forest Fire Research, Limassol, Cyprus, November 2. - 5. 2015. 5. Štula, Maja; Krstinić, Damir; Šerić, Ljiljana, "Intelligent forest fire monitoring system", Information System Frontiers (ISSN 1387-3326), Vol. 14(2012), No. 3; pp- 725-739, 2012.
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	
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)	Digital image processing and analysis: • 2015/2016 – overall average 4.7 • 2014/2016 – overall average 4.6 • 2013/2014 – overall average 4.6 • 2012/2013 – overall average 4.7 • 2011/2012 – overall average 4.6

First and last name and title of teacher	**Josip Lörincz, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Local and access networks
GENERAL INFORMATION ON COURSE TEACHER	
Address	FESB, R. Boškovića 32, 21000 Split, Croatia
Telephone number	0914305665
E-mail address	josip.lerinc@fesb.hr
Personal web page	http://www.josip-lorincz.com
Year of birth	1978.
Scientist ID	272921
Research or art rank, and date of last rank appointment	Scientific advisor, February 2013.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant professor (docent), December 2011.
Area and field of election into research or art rank	Area: electrical engineering, field: telecommunications and informatics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of electrical engineering, mechanical engineering and naval architecture (FESB), University of Split
Date of employment	October 1, 2003.
Name of position (professor, researcher, associate teacher, etc.)	Assistant professor
Field of research	• Information and communication technologies, • Computing, • Electrical engineering, • Telecommunications and informatics, • Energy-efficient networking and computing, • Optimization in telecommunications.
Function	Faculty teacher and research scientist
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Ph. D. in electrical engineering, University of Split, FESB-Split, 2010
Institution	Faculty of electrical engineering, mechanical engineering and naval architecture (FESB), University of Split
Place	Split, Croatia
Date	June 2010.
INFORMATION ON ADDITIONAL TRAINING	
Year	2009-2010
Place	Milano, Italy
Institution	Politecnico di Milano
Field of training	Doctoral research visit
Year	2003, 2009
Place	Split and Zagreb, Croatia
Institution	Croatian academic and research network (CARNet):
Field of training	Professional specialisation for instructor of international CCNA (Cisco Certified Network Associate) i CCNP (Cisco Certified Network Professional) program
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and	English - Excellent (5)

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)	Italian – sufficient (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)	**Introduction of new curriculum:** • Introduction of new course on graduate study: Network and mobile operating systems, Ships local computer networks • Introduction of completely new laboratory exercises for next courses on graduate study: Network and mobile operating systems, Local and access networks, Ships local computer networks • Extension of existing laboratory exercises with new content for next courses on graduate study: Wireless communication networks, IP communications, Engineering graphics and presentation **Establishment and organization of new faculty laboratories:** • Participation in establishment and development of new Laboratory for network technologies of Cathedra of communication technologies and signal processing on FESB, University of Split.
Authorship of university/faculty textbooks in the field of the course	**Authorship of internal teaching materials:** • Internal script: Network and mobile operating systems • Internal script: Local and access networks • Internal script: Ships local computer networks • Internal script: Ships local computer networks **Authorship of internal laboratory exercise manuals:** • Manual for laboratory exercise: Network and mobile operating systems • Manual for laboratory exercise: Wireless communication networks • Manual for laboratory exercise: Local and access networks • Manual for laboratory exercise: Engineering graphics and presentation
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	**Scientific Monography (book):** Josip Lorincz, **„***Optimizing energy consumption of wireless access networks”*, Lambert Academic Publishing, Germany, 2012, str. 210 **Scientific papers published in international scientific journals:** 1. Chiaraviglio, Luca; Cuomo, Francesca; Maisto, Maurizio; Gigli, Andrea; Lorincz, Josip; Zhou, Yifan; Zhao, Zhifeng; Qi, Chen; Zhang, Honggang, Which is the Best Spatial Distribution to Model Base Station Density? A Deep Dive in Two European Mobile Networks, *IEEE Access*, Vol.: 4 (2016) , p.p. 1434-1443 **2.** J. Lorincz, L. Chiaraviglio, F. Cuomo, A Measurement Study of Short-time Cell Outages in Mobile Cellular Networks, Computer communications, Vol.: **79** (2016), p.p.: 92-102 **3.** L. Chiaraviglio, P. Wiatr, P. Monti, J. Chen, J. Lorincz, F. Idzikowski, M. Listanti, L. Wosinska, *„Is Green Networking Beneficial in Terms of Device Lifetime?“,* IEEE Communications

Magazine, Volume: 53, Issue: 5, 2015, p.p.: 232-240

4. .J. Lorincz, I. Bule, M. Kapov, *„Performance Analyses of Renewable and Fuel Power Supply Systems for Different Base Station Sites"*, Energies journal, Volume: 7 Issue:12, 2014, p.p.: 7816 – 7846

5. J. Lorincz, T. Matijevic, G. Petrovic, "*On interdependence among transmit and consumed power of macro base station technologies",* Computer communications (ISSN: 0140-3664), Volume (issue): 50 (2014), p.p.: 10-28

6. J. Lorincz, T. Matijevic, "*Energy-efficiency analyses of heterogeneous macro and micro base station sites*", Computers and Electrical Engineering (ISSN: 0045-7906), Volume: 40, Issue: 2, 2014, p.p.: 330-349

7. J. Lorincz, I. Cubic, T. Matijevic, *„Adaptive and Resilient Solutions for Energy Savings of Mobile Access Networks*", International Journal of Adaptive, Resilient and Autonomic Systems (IJARAS), Svezak: 5, Broj: 3, 2014, p.p.: 82-102

8. J. Lorincz, Energy-efficient wireless cellular communications through network resource dynamic adaptation, International Journal of Business Data Communications and Netwrking (IJBDCN), Svezak: 9, broj: 2, 2013, p.p.: 1-14

9. J. Lorincz, I. Bule, „Renewable energy sources for power supply of base station sites", International Journal of Business Data Communications and Netwrking (IJBDCN), Svezak: 9, broj: 3, 2013, p.p.: 53-74

10. J. Lorincz, A. Capone, D. Begusic, "*Impact of service rates and base station switching granularity on energy consumption of cellular networks*", EURASIP Journal on Wireless Communications and Networking (ISSN: 1687-1499), Volume (issue): 2012 (342), 2012, p.p.: 1-24

11. J. Lorincz, T. Garma, G. Petrovic, "*Measurements and Modelling of Base Station Power Consumption under Real Traffic Loads*", Sensors Journal (ISSN: 1424-8220), Volume 12, Issue: 4, travanj 2012, p.p.: 4281-4310.

12. J. Lorincz, A. Capone, D. Begušić, "*Heuristic Algorithms for Optimization of Energy Consumption in Wireless Access Networks*", KSII Transactions on Internet and Information Systems (ISSN: 1976-7277), Volume: 5, Issue: 5, 2011., p.p.: 514-540

13. J. Lorincz, A. Capone, D. Begušić, "*Optimized Network Management for Energy Savings of Wireless Access Networks",* Computer Networks Journal (ISSN: 1389-1286), Volume: 55, Issue: 2011, p.p.: 626-648

Scientific papers published on international scientific conferences with international review:

1. Luca Chiaraviglio, Josip Lorincz, Paolo Monti, „Towards Luca

	Chiaraviglio, Marco Listanti, Josip Lorincz, Edoardo Manzia, Martina Santucci, „Modelling the Impact of Power State Transitions on the Lifetime of Cellular Networks“, Proceedings of the 2015 IEEE 82nd Vehicular Technology Conference – Fall (IEEE VTC2015-Fall), 06.-09.09.2015, Boston, SAD, p.p.: 1-5 (ISSN: 978-1-4799-8090-1) 2. Luca Chiaraviglio, Josip Lorincz, Paolo Monti, „Towards Sustainable and Reliable Networks with LIFETEL“, Proceedings of the IEEE Conference on Computer Communications - INFOCOM 2015, 26.4.-1.5.2015, Hong Kong, China, p.p.: 39-40, (ISSN: 978-1-4673-7131-5) 3. Lorincz Josip, Mujaric Eldis, Begusic Dinko, „Energy consumption analysis of real metro-optical network“, Proceedings of the 38th International Conference on Information and Communication Technologies, Electronics and Microelectronics (MIPRO2015), 25.-29.5.2015., Opatija, Croatia, p.p.: 621-626., (ISSN: 978-953-233-083-0) 4. L. Chiaraviglio, P. Wiatr, P. Monti, J. Chen, L Wosinska, L. Lorincz, F. Idzikowski, M. Listanti, „Impact of Energy-Efficient Techniques on a Device Lifetime“, Proceedings of the IEEE Online Conference on Green Communications (GreenCom 2014), 12. – 14.11.2014., On-line conference, p.p.: 1-6. 5. Luca Chiaraviglio, Josip Lorincz, “The Impact of Sleep Modes on the Lifetime of Cellular Networks“, The 22nd International Conference on Software, Telecommunications and Computer Networks (SoftCOM 2014), Proceedings of the 22nd International Conference on Software, Telecommunications and Computer Networks (SoftCOM 2014), 17-19. 9. 2014, Split, Croatia, p.p.: 1-5, (ISSN: 978-953-290-051-4)7 6. Luca Chiaraviglio, Antonio Cianfrani, Angelo Coiro, Marco Listanti, Josip Lorincz, Marco Polverini, “Increasing Device Lifetime in Backbone Networks with Sleep Modes”, The 21st International Conference on Software, Telecommunications and Computer Networks (SoftCOM 2013), 18.-20.09.2013, Primošten, Croatia, Proceedings of the 21st International Conference on Software, Telecommunications and Computer Networks (SoftCOM 2013), p.p.: 1-6, (ISSN: 978-953-290-041-5)
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	**Book:** 1. Domagoj Babić, Zvonimir Rakamarić, Josip Lorincz, „A guide for postgraduate study in foreign countries”, P.O.I.N.T. Križevci, Croatia, 2012, p.p.: 100
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	Participation in international scientific projects as project coordinator: • Green networking (HZZ- Croatian Science Foundation) • Doctoral research visit on green networking project (UKF – Unity Through Knowledge Fund)) Participation in international scientific projects as project researcher: • Establish Pan-European Information Space to Enhance seCurity of Citizens – EPISECC (EU FP7: Work programme 2013, Cooperation, Theme 10: Security) • Increasing the LIFEtime of TELecommunication networks (LIFETEL) – University of Rome (La Sapienza)

<table>
<tr><td></td><td>Participation in domestic education projects as project participant:
Modernising doctoral education through implementation of Croatian qualification framework (MODOC) – EU IPA program BGUE 04 06, Human resources development</td></tr>
<tr><td>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?</td><td>In the frame of the programme:
Modernising doctoral education through implementation of Croatian qualification framework (MODOC) – EU IPA program BGUE 04 06, Human resources development
Participation in workshop dedicated to the development of methodological-psychological-didactic-pedagogical competences.</td></tr>
<tr><td colspan="2">PRIZES AND AWARDS, STUDENT EVALUATION</td></tr>
<tr><td>Prizes and awards for teaching and scholarly/artistic work</td><td>Yearly award of Okrug County for scientific/research work and promotion of science in 2013.
Award of Faculty of electrical engineering, mechanical engineering and naval architecture (FESB) for the notable scientific and research results in 2013.
Award „Vera Johanides“ for 2012. of Croatian Academy of engineering (Academia Scientiarum Tehnicarum Croatica)
Award of Faculty of electrical engineering, mechanical engineering and naval architecture (FESB) to the most successful scientific novices in 2011.</td></tr>
<tr><td>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)</td><td>Evaluation organizer: University of Split, Faculty of electrical engineering, mechanical engineering and naval architecture (FESB).
Note on grading scale: global index evaluating overall course on scale 1-5
<table>
<tr><th>Course/average grade</th><th>Global index 2011/12</th><th>Global index 2012/13</th><th>Global index 2013/14</th><th>Global index 2014/15</th><th>Global index 2015/16</th></tr>
<tr><td>Network and mobile operating systems</td><td>4,3</td><td>3,3</td><td>3,9</td><td>4,5</td><td>4,1</td></tr>
<tr><td>Local and access networks</td><td>4,8</td><td>4,4</td><td>4,00</td><td>4,2</td><td>/</td></tr>
<tr><td>Electrotechnical materials and technologies</td><td>4,7</td><td>/</td><td>4,6</td><td>/</td><td>4,5</td></tr>
</table></td></tr>
</table>

First and last name and title of teacher	**Ivan Marasović, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Solar cells Time-frequency signal analysis Computer aided process control
GENERAL INFORMATION ON COURSE TEACHER	
Address	Jurja Šižgorića 14, 21000 Split
Telephone number	+385 21 305826
E-mail address	Ivan Marasovic@fesb.hr
Personal web page	
Year of birth	1983.
Scientist ID	297561
Research or art rank, and date of last rank appointment	Assistant research fellow, 07.07.2015.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assitant professor, 01.10.2015.
Area and field of election into research or art rank	Technical Sciences, Field electrical Engineering, Branch Electronics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	01/09/2007
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Electronics, Micro and nano electronics, Solar cells and photovoltaics, Embedded systems
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	11/05/2012
INFORMATION ON ADDITIONAL TRAINING	
Year	2011. (1 weeks)
Place	Freiburg, Germany
Institution	Fraunhofer ISE
Field of training	Photovoltaics
Year	2011. (2 weeks)
Place	Ljubaljana, Slovenia
Institution	Fakultet za elektrotehniko
Field of training	Semiconductor nanoelectronics
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)	
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)	Electronic devices and circuits, Undergraduate study of Electrical Engineering and Information Technology Basic electronics, Undergraduate study in Computing Digital instrumentation 1, Undergraduate study of Control Engineering and Automation, Electronic and Computer Engineering and Communication
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. L. Mainetti, I. Marasović, L. Patrono,P. Šolić, M.L. Stefanizzi, R. Vergallo "A Novel IoT-aware Smart Parking System based on the integration of RFID and WSN technologies., (2016), 833257 2. I. Marasović, Ž. Milanović, I. Zulim, "Modelling and detection of failure in medical electrodes", (2015), 789296 3. S. Nižetić, I. Marasović, D. Čoko, "Experimental study on a hybrid energy system with small-and medium-scale applications for mild climates., (2014), 694087 4. I. Marasović, Ž. Milanović, T. Betti, "Resistance Fluctuations in GaAs Nanowire Grids", Journal of Nanomaterials, (2014), 428390 5. I. Marasović, T. Garma, T. Betti, "Modelling a nanowire grid for light-sensing applications", Journal of Physics D: Applied Physics 45 (2012)
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	
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)	4,0

First and last name and title of teacher	**Jadranka Marasović, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Computer games programming Operations Research
GENERAL INFORMATION ON COURSE TEACHER	
Address	Split, Zagrebačka 21
Telephone number	385 021 305 830 (institution)
E-mail address	jmar@fesb.hr
Personal web page	/
Year of birth	1955.
Scientist ID	080633
Research or art rank, and date of last rank appointment	Senior Research Scientist, 09. July 2007.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full professor, 01. March 2009.
Area and field of election into research or art rank	Technical science, field of electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Machine Engineering and Naval Architecture, University of Split
Date of employment	04. May 1978.
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Science and Education
Function	/
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Doctor of science
Institution	Faculty of Electrical Engineering, Machine Engineering and Naval Architecture, University of Split
Place	Split
Date	11. July 1997.
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 (excellent -5)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian (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 programme where it is/was offered, and level of study programme)	**Undergraduate studies:** • Measurements and Process Control • Industrial Process Control **Graduate studies:** • Automatic Control • System Identification) • Process Control Laboratory • Optimization Methods • Operations Research • Automation **Postgraduate study:** • Optimization Techniques for Environmental Studies (Wessex Institute of Tecnology, UK i FESB) • Game theory and optimization methods (FESB) • Complex systems modelling and simulation (FESB)
Authorship of university/faculty textbooks in the field of the course	- (autor) Kvantitativno i kvalitativno modeliranje i simuliranje (Quantitative and Qualitative Modelling and Simulation) (ISBN 953-6114-67-4), - (koautor) On-line (web) udžbenik, Informatički projekt MZT-a, http://laris.fesb.hr/digitalno_vodjenje (Digital Control) - (autor) Predavanja iz kolegija Metode optimizacije (Lessons for Optimizaion Methods) (FESB, e-learning). - (autor) Predavanja iz kolegija Modeliranje i simuliranje sustava (Lessons for Modelling and Simulations) (FESB, e-learning).
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	- Marasović, Tea; Papić, Vladan; **Marasović, Jadranka**. *Motion-based Gesture Recognition Algorithms for Robot Manipulation*. // International Journal of Advanced Robotic Systems. 12 (2015), 51; 1-13, doi: 10.5772/60077. - **Marasović, Jadranka**; Marasović, Tea; Đapić, Marija. *Fair Division Methods Approach as the Option of Learning Process Modeling*. // Proceedings of 18th IEEE International Symposium on Computers and Communications (ISCC). 2013; 735-739. - Mance, Davor; **Marasović, Jadranka**. *EMC in Electronic System Developed to Support Measurements in Space Environment*. // Proceedings of 20th International Conference on Software, Telecommunications and Computer Networks (SoftCOM). 2012; 1-5.
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)	Associated member in scientific projects: - Računalna inteligencija za prepoznavanje i potporu ljudskih aktivnosti (RIPrePAkt), - GRS Front End Electronics Characterization for LISA, - Agentski orijentirani inteligentni sustavi za nadzor i zaštitu okoliša (Agents Oriented Intelligent Systems for Environment Control and Protection), - Inteligentni agenti u modeliranju i vođenju kompleksnih sustava (Intelligent Agents used for Complex Systems Modelling and Control), - Vođenje složenih sustava inteligentnim metodama (Intelligent Methods for Complex Systems Control).
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)	

First and last name and title of teacher	**Ivan Marinović, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Electronic circuits Medical electronic devices
GENERAL INFORMATION ON COURSE TEACHER	
Address	Butor dolac 13, 21405 Milna, o. Brač
Telephone number	098 1835911
E-mail address	imarin@fesb.hr
Personal web page	www.fesb.hr/~imarin
Year of birth	1966.
Scientist ID	200263
Research or art rank, and date of last rank appointment	Scientific Advisor, 20.06.2016.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full Professor, 15.07.2016.
Area and field of election into research or art rank	Technical Sciences, Electrical Engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture – Split
Date of employment	21.02.1991.
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Electronics, Radiocommunications
Function	Head of Cathedra for Radiocommunication Circuits and Systems
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture – Split
Place	Split
Date	12.05.2005.
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 (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian (4)
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)	Electronic Circuits, Graduate study programme, Electronic Circuits and Measurements, Graduate study programme
Authorship of university/faculty textbooks in the field of the course	Marinović, Ivan; Čoko, Duje, Električki sklopovi-Upute za laboratorijske vježbe, FESB-Split
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)	
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)	4.8

First and last name and title of teacher	**Ivo Mateljan, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Electroacoustics Electronic and virtual instrumentation Programming languages and compilers
GENERAL INFORMATION ON COURSE TEACHER	
Address	J. Rodina 4, 21215 Kaštel Lukšić
Telephone number	+395 21 305 860
E-mail address	ivo.mateljan@fesb.hr
Personal web page	marjan.fesb.hr/~mateljan/
Year of birth	1953
Scientist ID	76394
Research or art rank, and date of last rank appointment	Scientific Adviser, 2007
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Senior Full Professor, 2011
Area and field of election into research or art rank	Technical Sciences, Electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	1/1/1977
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Programming, Virtual Instrumentation, Electroacoustics
Function	Head of Electroacoustic Laboratory
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PdD
Institution	University of Zagreb, Faculty of Electrical Engineering
Place	Zagreb, Croatia
Date	1992.
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 (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)	Programming, OOP, Electronic circuit
Authorship of university/faculty textbooks in the field of the course	Ivo Mateljan: Programiranje jezikom C, book published by University of Split, 2010. Ivo Mateljan: Electronic and Virtual Instrumentation, FESB, internal script,, 2004

Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Sikora, Marjan; Mateljan, Ivo.: A Method for Speeding up Beam-tracing Simulation Using Thread-level Parallelization. // *Engineering with computers*. **30,** 2014. 2. Sikora M., Mateljan I., Bogunovic, N.: *Beam Tracing with Refraction,* Archives of Acoustics Vol.37, 2012. 3. Mateljan I., Sikora M.: *Estimation of loudspeaker drivers parameters*, Proc. of 5th Congress of the Alps Adria Acoustics Association Zadar, 2012. 4. Slamka M., Mateljan I., Howes M.: Virtual Surround for Headphones and Earbuds Headphone Externalization System, US patent 8270616, US class: 381/17; 381/1; 381/309, Assignee: Logitech Europe S.A., Sept. 18,2012.
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)	Ivo Mateljan: ARTA software, Artalabs, 2004-2017.
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)	4.6/5

First and last name and title of teacher	**Eugen Mudnić, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Database programming
GENERAL INFORMATION ON COURSE TEACHER	
Address	Vinogradska 41, 21000 Split, HR
Telephone number	+385 21 305848
E-mail address	emudnic@fesb.hr
Personal web page	
Year of birth	1968.
Scientist ID	248856
Research or art rank, and date of last rank appointment	Research scientist, 9/7/2009
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant professor, 19/10/2016
Area and field of election into research or art rank	Technical Sciences, Field - Computing systems
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	01/05/2001
Name of position (professor, researcher, associate teacher, etc.)	Assistant professor
Field of research	High performance computing systems, Discrete event simulations
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	16/07/2007.
INFORMATION ON ADDITIONAL TRAINING	
Year	2005-2007.
Place	Geneva, Switzerland
Institution	CERN
Field of training	Grid computing systems
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)	Databases 2, undergraduate 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)	1. Čelar, Stipe; Mudnic, Eugen; Seremet, Zeljko. State-of-the-art of messaging for distributed computing systems / Proceedings of the 27th DAAAM International Symposium / Mostar : Elsevier & DAAAM, 2016. 0298-0307 2. Abelev, B. ...; Antičić, Tome; Gotovac, Sven; Mudnić, Eugen; Planinić, Mirko; Poljak, Nikola; Simatović, Goran; Šuša, Tatjana; Vicković, Linda; et al. Technical Design Report for the Upgrade of the ALICE Inner Tracking System. / Journal of physics. G, Nuclear and particle physics. 41 (2014) ; 087002-1-087002-181 3. Abelev, B. ...; Antičić, Tome; Gotovac, Sven; Mudnić, Eugen; Planinić, Mirko; Simatović, Goran; Šuša, Tatjana; Vicković, Linda; et al. Upgrade of the ALICE Experiment: Letter Of Intent. / Journal of physics. G, Nuclear and particle physics. 41 (2014) ; 87001-1-87001-164. 4.Čelar, Stipo; Vicković, Linda; Mudnić, Eugen. Evolutionary measurement-estimation method for micro, small and medium-sized enterprises based on estimation objects. / Advances in production engineering & management (apem). 7 (2012)
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)	CERN-ALICEexperiment - ALICE collaboration group of University of Split (O2-CWG 3 group).
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)	Databases 4,4/5

First and last name and title of teacher	**Josip Musić, Ph.D ., Assistant professor**
The course he/she teaches in the proposed study programme	Programming mobile robots and drones
GENERAL INFORMATION ON COURSE TEACHER	
Address	Ruđera Boškovića 32, Split
Telephone number	+ 385 (0)21 305 829
E-mail address	jmusic@fesb.hr
Personal web page	http://marjan.fesb.hr/~jmusic
Year of birth	1980
Scientist ID	272932
Research or art rank, and date of last rank appointment	Senior research associate (February 2013)
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant professor (July 2014)
Area and field of election into research or art rank	Technical sciences, Electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of electrical engineering, mechanical engineering and naval architecture, University of Split
Date of employment	September 2014
Name of position (professor, researcher, associate teacher, etc.)	Assistant professor
Field of research	Robotics and automatization
Function	/
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of electrical engineering, mechanical engineering and naval architecture, University of Split
Place	Split
Date	28.04.2010.
INFORMATION ON ADDITIONAL TRAINING	
Year	2012
Place	Glasgow, Scotland, UK
Institution	School of Computing, University of Glasgow
Field of training	human-computer interaction (HCI), signal processing
Year	2008
Place	Glasgow, Scotland, UK
Institution	Department of Computing, University of Glasgow
Field of training	human-computer interaction (HCI), signal processing
Year	2005.
Place	Ljubljana, Slovenia
Institution	Faculty of electrical engineering, University of Ljubljana
Field of training	robotics, biomechanics
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)	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)	Automation (412/512), Automatic control 2 (910,11), Digital electronics (110), Digital control (210), Sensors and transducers (512), Biomechanics Practicum (412/512), Programing mobile robots and drones (221/222/242/250), Computer methods in biomechanics (111), Computers and computer methods in biomechanics (310/330), Telemedicine and biocybernetics (210/220/242)m Introduction to system theory (330)
Authorship of university/faculty textbooks in the field of the course	M. Bonković, J. Musić, I. Stančić, Microcontrollers and embedded network systems based on Arduino development environment, faculty script, 2014
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	. Musić, Josip; Bonković, Mirjana; Cecić, Mojmil: “Comparison of uncalibrated model-free visual servoing methods for small amplitude movement: a simulation study“, International Journal of Advanced Robotic Systems, 2014 (DOI: dx.doi.org/10.5772/58822) 2. Stančić, Ivo; Musić, Josip; Cecić, Mojmil: “A Novel Low-Cost Adaptive Scanner Concept for Mobile Robots”, Ingenieria e Investigacion, 34 (2014), 3; 37-43 3. Stančić, Ivo; Musić, Josip; Zanchi, Vlasta: “Improved structured light 3D scanner with application to anthropometric parameter estimation“, Measurement, 46 (2013), 1; 716-726 4. Musić, Josip; Cecić, Mojmil; Zanchi, Vlasta: “Real-time body orientation estimation based on two-layer stochastic filter architecture”, Automatika : časopis za automatiku, mjerenje, elektroniku, računarstvo i komunikacije, 51 (2010), 3; 264-274 5. Musić, Josip; Murray-Smith, Roderick: “Virtual Hooping: teaching a phone about hula-hooping for Fitness, Fun and Rehabilitation”, Proceedings of Mobile Human Computer Interaction (MobileHCI) 2010. 309-312
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. Compressive sensing and super-resolution in surveillance systems based on optical sensors and UAVs, 2015-2017, Bilateral Croatia-Montenegro cooperation, project lead 2. Supervised and unsupervised learning from imbalanced datasets for assistance in movement of persons with low vision, 2014-2015, Bilateral Croatia-Slovenia cooperation, project lead 3. Prototyping a module for automatization of industrial floor scrubbers, 2014-2016, Split-Dalmatia county and Odabir d.o.o., project lead 4. Computer intelligence for classification and support of human activities, 2014 - , Faculty/University project, researcher 5. Biomechanics of human motion, control and rehabilitation, 2007-2014, Ministry of science, education and sports, 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?	/
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	**Julije Ožegović, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Designing and Using Computer Networks Digital Signal Processing Systems Digital Systems Projecting
GENERAL INFORMATION ON COURSE TEACHER	
Address	Istarska 2, 21000 Split, HR
Telephone number	+385 21 305825
E-mail address	julije.ozegovic@fesb.hr
Personal web page	www.fesb.hr/~julije
Year of birth	1954.
Scientist ID	91795
Research or art rank, and date of last rank appointment	Scientific Advisor, 2008-03-12
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Senior Full Professor, 2013-09-15
Area and field of election into research or art rank	Technical Sciences, Field Electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	1979-10-01
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Digital electronics, Computer networks, Automata theory
Function	Head of Chair of Digital Systems and Computer Network
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	1998-02-27
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)
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)	Digital Electronics, Undergraduate study of Electrotechnics, 2006/2007 - today Discrete systems and structures, Undergraduate study of Computing, 2006/2007 - today Computer Networks, Undergraduate study of Electrotechnics, 2006/2007 - today Computer Networks, Undergraduate study of Computing, 2006/2007 - today Digital Electronics, Graduate study of Electrotechnics (pre-

	Bologna), 1998/1999 -2006/2007 Discrete systems and structures, Graduate study of Computing (pre-Bologna), 19982000/2001 - 2006/2007 Computer Networks, Graduate study of Electrotechnics (pre-Bologna), 1998/1999 -2007/2008 Computer Networks, Graduate study of Computing (pre-Bologna), 1998/1999 -2007/2008
Authorship of university/faculty textbooks in the field of the course	Julije Ožegović, Digitalna i mikroprocesorska tehnika, ISBN 953-6806-26-6, Split University, 2000, several editions Julije Ožegović, Digital electronics, Discrete systems and structures, elearning.fesb.hr, updated from 1998 Julije Ožegović, Computer Networks, elearning.fesb.hr, updated from 1998
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	Kedžo, Ivan; Ožegović, Julije; Kristić, Ante: Contention Overhead — Adaptive Binary Priority Countdown protocol, SoftCOM 2013, ISBN 978-953-290-043-9 Kristić, Ante; Ožegović, Julije; Kedžo, Ivan: Mathematical model of simplified Constrained Priority Countdown Freezing protocol, The 18th IEEE Symposium on Computers and Communications (ISCC'13), 2013, ISBN 978-1-4673-2711 Kristić, Ante; Ožegović, Julije; Kedžo, Ivan: Improved mathematical model of simplified Constrained Priority Countdown Freezing protocol, SoftCOM 2013, ISBN 978-953-290-043-9 Kristić, Ante; Ožegović, Julije; Kedžo, Ivan: Mathematical model of Constrained Priority Countdown Freezing Protocol, SoftCOM 2014, ISBN 978-9-5329-0052-1 Ines Ramadza, Julije Ozegovic, Vesna Pekic: Class based tunnel exclusion router architecture, SoftCOM 2014, ISBN 978-9-5329-0052-1
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. Media access mechanism modelling for wireless local networks (MAMM), FESB Split, od 2014. 2. HGCAL - CERN CMS, from 2015.
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	Me4CataLOgue – Teaching and administrative personnel training
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	Coauthor of awarded paper - ISCC conference 2013.
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)	4

First and last name and title of teacher	**Dragan Poljak, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Electromagnetic compatibility Fields and waves in electronics Numerical Methods in Communications
GENERAL INFORMATION ON COURSE TEACHER	
Address	Vinka Milića 88, Split
Telephone number	0914305698
E-mail address	dragan.poljak @fesb.hr
Personal web page	
Year of birth	1965
Scientist ID	180803
Research or art rank, and date of last rank appointment	Scientific Adviser, 2005.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Senior Full Professor, 2010.
Area and field of election into research or art rank	Technical Sciences, Area Electronics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	September 1990.
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Classical electromagnetiism, Numerical methods in electromagnetics, Electromagnetic compatibility, Bioelectromagnetics, Magnetohydrodynamics
Function	Head of Group for Electriomagnetic Compatibility and Numerical Methods in Electronics
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	9/30/1996
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)	Italian (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	French (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)	Fundamentals of Electrical Engineering I and II, (Undergraduate study programme), Electromagnetic Waves, Fields and Waves in Electronics, Numerical Methods in Communications, Electromagnetic Ecology and Dosimetry, Electromagnetic Compatibility (Graduate study programme)
Authorship of university/faculty textbooks in the field of the course	1. D.Poljak, *Teorija elektromagnetskih polja s primjenama u inženjerstvu*, Šk. knjiga Zagreb, 2014. 2. D.Poljak i dr., *Modeliranje žičanih antena primjenom računala*, Kigen Zagreb 2009. 3. D. Poljak, *Advanced Modeling in Computational Electromagnetic compatibility*, Wiley Interscience, New York 2007.
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Poljak, Dragan; Antonijević, Siniša; Šesnić, Silvestar; Lallechere, S.; El Khamlichi Drissi, K., On deterministic-stochastic time domain study of dipole antenna for GPR applications. // *Engineering analysis with boundary elements*. 73 (2016) ; 14-20. 2. Poljak, Dragan; Šesnić, Silvestar; Drissi, Khalil El-Khamlichi; Kerroum, Kamal; Tkachenko, Sergey, Transient Electromagnetic Field Coupling to Buried Thin Wire Configurations: Antenna Model versus Transmission Line Approach in the Time Domain. // *International Journal of Antennas and Propagation*. (2016); 3943754-1-3943754-11. 3. Poljak, Dragan; Šesnić, Silvestar; Čavka, Damir; Drissi, Khalil El Khamlichi. On the use of the vertical straight wire model in electromagnetics and related boundary element solution. // *Engineering analysis with boundary elements*. 50 (2015) ; 19-28. 4. Poljak, Dragan; Čavka, Damir; Dodig, Hrvoje; Peratta, Cristina; Peratta, Andres. On the use of the boundary element analysis in bioelectromagnetics. // *Engineering analysis with boundary elements*. 49 (2014) ; 2-14. 5. Antonijevic, Sinisa; Poljak, Dragan. A Novel Time-Domain Reflection Coefficient Function: TM Case. // *IEEE transactions on electromagnetic compatibility*. 55 (2013) , 6; 1147-1153.
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)	• ICES SC6 The IEEE International Committee on Electromagnetic Safety (ICES, Tecnical Committee 95), Subcommittee SC6 on Electromagnetic Field Dosimetry • COST Action BM1309: European network for innovative uses of EMFs in biomedical applications • COST Action TU1208: Civil Engineering Applications of Ground Penetrating Radar • COST ACTION IC 1407: Advanced characterisation and classification of radiated emissions in densely integrated technologies (ACCREDIT) • ITER Physics, EUROFusion, WPCD (Code development for Integrated Modeling)

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	Young scientist URSi Award, Toronto, Canada, 1999. National Prize for Science, Zagreb 2004. Annual FESB Prize for Science, Split 2004. Slobodne Dalmacija Award for science, Split 2008. Award for science Nikola Tesla (University of Split), Split 2013. Award for science of Croatian IEEE Section, Zagreb 2016. Annual Award for science (University of Split), Split 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	**Joško Radić, Ph.D:, Associate Professor**
The course he/she teaches in the proposed study programme	Radio frequency identification technology
GENERAL INFORMATION ON COURSE TEACHER	
Address	Put Pašika 5i, 21400 Supetar, HR
Telephone number	+385 21 305634
E-mail address	radic@fesb.hr
Personal web page	
Year of birth	1975.
Scientist ID	248893
Research or art rank, and date of last rank appointment	Senior Research Associate, March 10, 2016.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Associate professor, March 16, 2016.
Area and field of election into research or art rank	Technical Sciences, Field Electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	September 1, 2001.
Name of position (professor, researcher, associate teacher, etc.)	Associate professor
Field of research	Information an Communication technology, Digital Signal Processing, Coding Theory
Function	Head of Chair of Communication and Information Technology
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	July 15, 2001.
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 (3)
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)	Network Analysis, Undergraduate 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)	1. Šolić, Petar; Radić, Joško; Rožić, Nikola. Energy Efficient Tag Estimation Method for ALOHA-based RFID systems. // IEEE sensors journal. 14 (2014) , 10; 3637-3647. 2. Šolić, Petar; Radić, Joško; Rožić, Nikola. Software Defined Radio Based Implementation of RFID Tag in Next Generation Mobiles. // IEEE transactions on consumer electronics. 58 (2012) , 3; 1051-1055. 3. Rožić, Nikola; Radić, Joško; Begušić, Dinko. Noise Squared Norm in OFDM Systems Interfered by Impulse Noise // 2014 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2014) / Greco, Maria . S ; Piva, Alessandro (ur.). Piscataway, NJ, SAD : IEEE, 2014. 404-408. 4. Radić, Joško; Rožić, Nikola. Soft Decision PAPR Reduction in OFDM // 2012 9th International Multi-Conference on Systems, Signals and Devices. Chemnitz, 2012.
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)	3. Look into the Future. 4. ICT Systems and Services Based on Information Integration.
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)	4,6/5

First and last name and title of teacher	**Mladen Russo, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Multimedia systems
GENERAL INFORMATION ON COURSE TEACHER	
Address	Žnjanska 4, Split
Telephone number	091/2305-844
E-mail address	mrusso@fesb.hr
Personal web page	
Year of birth	1977.
Scientist ID	248902
Research or art rank, and date of last rank appointment	Senior scientific associate, 24.10.2013.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant professor, 01.01.2013.
Area and field of election into research or art rank	Technical sciences, electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	FESB - Split
Date of employment	08.06.2001.
Name of position (professor, researcher, associate teacher, etc.)	Assistant professor
Field of research	Signal processing, speech recognition, localization
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Ph.D.
Institution	FESB – Split
Place	Split
Date	29.06.2010.
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, 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian, 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)	

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)	• Sikora, Marjan; Grčić, Đana; Russo, Mladen. A tool for soundscape auralization of ancient archaeological sites // Proceedings of 7th congress of Alps Adria Acoustic Association • Ljubljana, Slovenija, 2016. • Russo, Mladen; Stella, Maja; Kurajica, Maroje. Cochlear Model based Enhancement of Noisy Speech Signals. // International Journal of Circuits, Systems and Signal Processing. 9 (2015), 446-454. • Stella, Maja; Russo, Mladen; Begušić, Dinko. Fingerprinting based localization in heterogeneous wireless networks // Expert systems with applications, 41 (2014), 15; 6738-6747. • Šarić, Matko; Dujmić, Hrvoje; Russo, Mladen. Scene Text Extraction in HSI Color Space using K-means Algorithm and Modified Cylindrical Distance // Przegląd elektrotechniczny, 5 (2013) 117-121. • Russo, Mladen; Šolić, Petar; Stella, Maja. Probabilistic Modeling of Harvested GSM Energy and its Application in Extending UHF RFID Tags Reading Range // Journal of electromagnetic waves and applications, 27 (2013), 4; 473-484. • Primorac, Sanja; Russo, Mladen. Android Application for Sending SMS Messages with Speech Recognition Interface // Proceedings of the 35th International Convention MIPRO, 2012. • Russo, Mladen; Stella, Maja; Rožić, Nikola. Noise reduction in speech signals using a cochlear model. // Advances in Smart Systems Research. 2 (2012), 1; 7-12.
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)	• ELISE: Easy Living in Smart Environments, HRZZ, project leader Mladen Russo, Ph.D., 2015. – 2018. • Advanced Interface for Simpler Human-Computer Interaction, SDŽ, project leader Mladen Russo, Ph.D., 2015. – 2017. • ICT Systems and Services Based on Integration of Information, MZOS, project leader Nikola Rožić, Ph.D., 2007. – 2013.
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)	

First and last name and title of teacher	**Marjan Sikora , Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Programming languages and compilers
GENERAL INFORMATION ON COURSE TEACHER	
Address	Gajeva 17, 21000 Split
Telephone number	0914305859
E-mail address	sikora@fesb.hr
Personal web page	www.fesb.hr/~sikora /
Year of birth	1972.
Scientist ID	238690
Research or art rank, and date of last rank appointment	Research Scientist, 3/2015.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant Professor, 3/2013.
Area and field of election into research or art rank	Technical Sciences, Computer Sciences, Information Systems
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	3/2006.
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Computer Science
Function	Assistant Professor
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	University of Zagreb
Place	Zagreb
Date	2010.
INFORMATION ON ADDITIONAL TRAINING	
Year	2015.-2016.
Place	Online
Institution	Stanford University
Field of training	Automata, Compilers
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)
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)	Programming, Object oriented programming Geographic Information Systems Languages and compilers
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic	- M. Sikora, H. Mihanović, I. Vilibić Paleo-coastline of the

articles published in the last five years in the field of the course (5 works at most)	Central Eastern Adriatic Sea, and paleo-channels of the Cetina and Neretva rivers during the last glacial maximum, Acta Adriatica, Vol. 55, pp. 3-18, 2014. - M.Sikora, I. Mateljan, A Method for Speeding up Beam-tracing Simulation Using Thread-level Parallelization, Engineering with Computers, (DOI) 10.1007/s00366-013-0316-z, Vol., pp. 679-688, 2013. - M.Sikora, I. Mateljan, N. Bogunović, Beam Tracing with Refraction, Archives of Acoustics, Vol. 37, No. 3, pp. 301-316, 2012. - M. Sikora, I. Mateljan, Multithreaded beam tracing, Proceedings of 5rd Congress of Alps Adria Acoustics Association (AAAA 2012), Petrčane (Hrvatska), 12-14. rujan 2012., CD Proceedings - M.Sikora, I. Mateljan, N. Bogunović, Beam Division in Acoustic Simulation of Non-Homogenous Environments, Automatika, Vol. 52, No. 4, pp. 339-352, 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)	- Visualization of wind-power plant, cooperation with PhD Antonio Šarolić - Study on use of GIS in Split city management, City of Split, 2012. - TGM - TIN & Grid Maker – Software for Digital Elevation Models, OBALA d.o.o. Split, 2011.
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)	4,7/5; 5/5

First and last name and title of teacher	**Ivo Stančić, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Optoelectronic measurement methods
GENERAL INFORMATION ON COURSE TEACHER	
Address	R. Boškovića 32
Telephone number	+ 385 (0)21 305 879
E-mail address	istancic@fesb.hr
Personal web page	http://marjan.fesb.hr/~istancic/
Year of birth	1984.
Scientist ID	291143
Research or art rank, and date of last rank appointment	Research associate (October 2013)
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant professor (March 2017)
Area and field of election into research or art rank	Technical sciences, Electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of electrical engineering, mechanical engineering and naval architecture, University of Split
Date of employment	4.5.2007.
Name of position (professor, researcher, associate teacher, etc.)	Assistant professor
Field of research	Electrical engineering / electronics
Function	/
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of electrical engineering, mechanical engineering and naval architecture, University of Split
Place	Split
Date	30. 11. 2012.
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)	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)	

Authorship of university/faculty textbooks in the field of the course	M. Bonković, J. Musić, I. Stančić, Microcontrollers and embedded network systems based on Arduino development environment, faculty script, 2014.
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Stančić, Ivo; Grujić, Tamara; Panjkota Ante. Design, Development, and Evaluation of Optical Motion-Tracking System Based on Active White Light Markers. IET science measurement & technology. 7 (2013) , 4; 206-214. 2. Stančić, Ivo; Grujić, Tamara; Bonković, Mirjana. New Kinematic Parameters for Quantifying Irregularities in the Human and Humanoid Robot Gait. // International Journal of Advanced Robotic Systems. 9 (2012) ; 215-1-215-8 3. Stančić, Ivo; Musić, Josip; Zanchi, Vlasta. Improved structured light 3D scanner with application to anthropometric parameter estimation 4. Stančić, Ivo; Musić, Josip; Cecić, Mojmil. A Novel Low-Cost Adaptive Scanner Concept for Mobile Robots. // Ingeniería e Investigación. 34 (2014) , 3; 37-43 5. Stančić, Ivo; Brajović, Miloš; Orović, Irena; Musić, Josip. Compressive sensing for reconstruction of 3D point clouds in smart systems
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. Compressive sensing and super-resolution in surveillance systems based on optical sensors and UAVs, 2015-2017, Bilateral Croatia-Montenegro cooperation, researcher. 2. Supervised and unsupervised learning from imbalanced datasets for assistance in movement of persons with low vision, 2014-2015, Bilateral Croatia-Slovenia cooperation, researcher. 3. Prototyping a module for automatization of industrial floor scrubbers, 2014-2016, Split-Dalmatia county and Odabir d.o.o., researcher. 4. Development and implementation of methods for identification of bio-system and environment, 2014 - , Faculty/University project, researcher. 5. Biomechanics of human motion, control and rehabilitation, 2007-2014, Ministry of science, education and sports, 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.	

PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	FESTO prize for young scientist and researchers DAAAM Symposium "Intelligent Manufacturing & Automation, Vienna,

	Austria, 26.11.2011. Best paper award in „Symposium on Smart Environment Technologies“ during SofCOM 2016 conference.
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	**Darko Stipaničev, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Artificial Intelligence Digital image processing and analysis
GENERAL INFORMATION ON COURSE TEACHER	
Address	Matoševa 26, 21000 Split
Telephone number	+385 91 4305 643
E-mail address	darko.stipanicev@fesb.hr
Personal web page	http://laris.fesb.hr/dstip-e.html
Year of birth	1955
Scientist ID	44861
Research or art rank, and date of last rank appointment	Scientific Adviser in Computer Science, 2006 Scientific Adviser in Electrical Engineering, 1997
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Senior Full Professor, 2002
Area and field of election into research or art rank	Technical Systems, Field Electrical engineering Technical Systems, Fireld Computer sciences
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	1981
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Computer Science – Artificial Intelligence, Electrical Engineering - Automatic Control
Function	Head of Chair of Modelling and Intelligent Systems
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Electrotechnical Faculty University of Zagreb
Place	Zagreb
Date	1987
INFORMATION ON ADDITIONAL TRAINING	
Year	1988-89
Place	London
Institution	Queen Mary College
Field of training	post-doctoral specialisation
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)	Italian (4)
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)	Process Modelling and Control (1995 – 2005) Process control (2005 – today) Digital control (2005 – today) Modelling and Control of Maritime and Land Vehicles (1995 – today)
Authorship of university/faculty textbooks in the field of the course	D.Stipaničev, J.Marasović, Digitalno vođenje on-line (Digital control on-line), on-line (Web) book, MZT – Informatički projekt, 2004. http://laris.fesb.hr/digitalno_vodjenje
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. D.Stipaničev, J.Božičević, Fuzzy Feedforward and Composite Control, **Transaction Inst. Measurement and Control (UK)**, 8(2), 1986, pp. 67-75 2. D.Stipaničev, Vođenje i zaštita vjetroelektrana u autonomnom elektro-energetskom sistemu, **Sunčana energija**, 8(2), 1987, pp.91-96 3. D.Stipaničev, Diskretno vođenje složenih sustava adaptivnim, nelinearnim PID regulatorima, **Elektrotehnika**, 34(3-4), 1991, pp.153-161 4. D.Stipaničev, Fuzzy Relational Models for Intelligent Control, u knizi R. Hanus, P.Kool, S.Tzafestas(ed) **"Mathematical and Intelligent Models in System Simulation"**, J.C.Baltzer AG Scientific Pub.Co., 1991, pp.275-279 5. M.De Neyer, D.Stipaničev, R.Gorez, Intelligent Self-organising Controllers and their Application to the Control of Dynamic Systems, u knjizi R.Hanus, P.Kool, S.Tzafestas(ed) **"Mathematical and Intelligent Models in System Simulation"**, J.C.Baltzer AG Scientific Pub.Co., 1991, pp.287-292
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. Project Vision based intelligent observers (ViO) (2012 – 2016) 2. Project 023-0232005-2003 – AgISEco – Agent based intelligent systems for environmental monitoring, Contract with Ministary of Science RH (2006 - 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)	4,4/5

First and last name and title of teacher	**Antonio Šarolić, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Bioelectromagnetics Electromagnetic compatibility Maritime radiocommunications Medical electronic devices Wireless communications
GENERAL INFORMATION ON COURSE TEACHER	
Address	FESB, Ruđera Boškovića 32, 21000 Split
Telephone number	021 305 700
E-mail address	antonio.sarolic@fesb.hr
Personal web page	https://nastava.fesb.hr/nastava/nastavnici/detalji/asarolic
Year of birth	1971.
Scientist ID	223430
Research or art rank, and date of last rank appointment	Scientific Advisor, 2016.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full Profesor, 2016.
Area and field of election into research or art rank	Area: Technical Sciences, Field: Electrical Engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	1.1.2006.
Name of position (professor, researcher, associate teacher, etc.)	Full Profesor
Field of research	Applied electromagnetics, wireless communications
Function	Head of Chair for Applied Electromagnetic Fields
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	FER, University of Zagreb
Place	Zagreb
Date	2004.
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)	Italian, 2
COMPETENCES FOR THE COURSE	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	Šarolić, Antonio; Modlic, Borivoj. Measurement of Electric Field Probe Response to Modulated Signals Using Waveguide Setup. // IEEE antennas and wireless propagation letters. 9 (2010) ; 1041-1044 Šarolić, Antonio; Senić, Damir; Živković, Zlatko. Radiation Pattern of a Vertical Dipole over Sea and Setup for Measuring thereof. // Automatika. 53 (2012) , 1; 56-68 Šarolić, Antonio; Matić, Petar. Wireless LAN Electromagnetic Field Prediction for Indoor Environment Using Artificial Neural Network. // Automatika. 51 (2010) , 3; 233-240

	Živković, Zlatko; Šarolić, Antonio. Measurements of Antenna Parameters in GTEM Cell. // Journal of communications software and systems. 6 (2010) ; 125-132 Živković, Zlatko; Senić, Damir; Šarolić, Antonio; Vučić, Ante. Design and Testing of a Diode-Based Electric Field Probe Prototype // 19th International Conference on Software, Telecommunications & Computer Networks - SoftCOM 2011. Split, 2011. 1-5
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	**Ongoing projects:** - Chair of EU COST project Action BM1309: "European network for innovative uses of EMFs in biomedical applications", 2014- - EU COST Action IC1102: "Versatile, Integrated, and Signal-aware Technologies for Antennas (VISTA)", Management Committee Member, 2011- **Completed projects:** - Principal investigator of research project MZOŠ RH "Measurements in EMC and EM health effects research", 2008-2013. - Leader of technological project BICRO PoC4_06_23 "Integral system of radiocommunications and vessel surveillance in marinas", 2013-2014. - EU COST Action IC1004: "Cooperative Radio Communications for Green Smart Environments", Management Committee Member, 2011-2015.
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)	Student evaluations in academic year 2016/17: - "Wireless communications": average grade 4,7 out of 5 - "Antenna systems": average grade 5 out of 5 - "Electromagnetic compatibility": average grade 4,9 out of 5 - "Simulation and measurement of electromagnetic quantities": average grade 4,8 out of 5

First and last name and title of teacher	**Ljiljana Šerić, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Artificial Intelligence
GENERAL INFORMATION ON COURSE TEACHER	
Address	FESB, Ruđera Boškovića 32, 21000 Split
Telephone number	+385 (0)21 305 651
E-mail address	ljiljana.seric@fesb.hr
Personal web page	http://www.fesb.hr/~ljiljana
Year of birth	1979.
Scientist ID	272906
Research or art rank, and date of last rank appointment	Senior Research Associate, 14.02.2013.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant professor, 02.12.2013.
Area and field of election into research or art rank	Technical sciencies, Computer Science
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	University of Split, Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	02.12.2013.
Name of position (professor, researcher, associate teacher, etc.)	Assistant professor
Field of research	Science and education
Function	Assistant professor
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	University of Split, Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	06.10.2010.
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)	German (3)
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)	1. Course name: Artificial Intelligence Name of the study programme in which the course is offered: Automation and Systems, Electrical Engineering, Computer Engineering, Telecommunications and Computer Science, Computer Science The level of the study programme: Graduate study 2. Course name: Intelligent Systems Name of the study programme in which the subject is taught: Electrical Engineering and Information Technology The level of the study programme: Postgraduate study 3. Course name: Web intelligence and large data sets Name of the study programme in which the subject is taught: Electrical Engineering and Information Technology The level of the study programme: Postgraduate study
Authorship of university/faculty textbooks in the field of the course	1) Stipaničev Darko, Šerić Ljiljana. Artificial intelligence. Split, FESB - Internal script, 2012. 2) Bodrožić Ljiljana. Programming languages of artificial intelligence. Split, FESB - Internal script, 2007.
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1) Doko Alen, Štula Maja, Šerić Ljiljana. Improved sentence retrieval using local context and sentence length. Information processing & management, 49 (2013), 6, 1301-1312. 2) Šerić Ljiljana, Stipaničev Darko, Štula Maja. Engineering of holonic multi agent intelligent forest fire monitoring system. AI communications, 26 (2013), 3; 303-316. 3) Šerić Ljiljana, Krstinić Damir, Braović Maja, Milatić Ivan; Mirčevski Aljoša, Stipaničev Darko. Holonic Multi Agent System for Data Fusion in Vehicle Classification. Proceedings of 10th International KES Conference on Agents and Multi-Agent Systems: Technologies and Applications (KES-AMSTA-16). 2016. 4) Stipaničev Darko, Šerić Ljiljana, Krstinić Damir, Bugarić Marin. Wildfire video observers network with physical and virtual sensors. Proceeding of 10th EARSeL Forest Fire Special Interest Group Workshop - Sensors, Multi-Sensor Integration, large Volumes: New opportunities and Challanges in Forest Fire Research, Themistocleous, Kyriacos ; Hadjimitsis, Diofantos; Gitas, Ioannios ; Boschetti, Luigi (ur.). Limassol, Cyprus, 2015. 5) Ukić Nenad, Maras Josip, Šerić Ljiljana. The influence of cyclomatic complexity distribution on the understandability of xtUML models, Software quality journal, PP (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)	AgiSeco – Agent Oriented Intelligent Systems for Environement Monitoring and Control, MZOS, 2007-2012 HOLISTIC – Adriatic Holistic Forest Fire Protection , IPA, 2014- in progres Wind Risk Prevention Projekt – ECHO, Civil Protection Automatic vehicle classification based on computer vision and data fusion
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	20 best junior reasearchers, 2013
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	**Petar Šolić, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Information theory and coding Radio frequency identification technology
GENERAL INFORMATION ON COURSE TEACHER	
Address	Kupreška 14, 21000 Split, HR
Telephone number	+385981752651
E-mail address	psolic@fesb.hr
Personal web page	marjan.fesb.hr/~psolic
Year of birth	1985
Scientist ID	313610
Research or art rank, and date of last rank appointment	Research associate, 20.07.2015.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant professor, 01/10/2015
Area and field of election into research or art rank	Technical Sciences,
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	01/04/2009
Name of position (professor, researcher, associate teacher, etc.)	Assistant professor
Field of research	Telecommunications
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	04/06/2014
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 (4)
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)	
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)	
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 award for science in 2015 (scientific novice category) Scientific novice award in 2014 (doctorand/postdoc category)
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	**Maja Štula, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Windows programming
GENERAL INFORMATION ON COURSE TEACHER	
Address	R. Boškovića 32, Split
Telephone number	021305852
E-mail address	maja.stula@fesb.hr
Personal web page	http://marjan.fesb.hr/~kiki/moja_stranica.htm
Year of birth	1971
Scientist ID	248946
Research or art rank, and date of last rank appointment	
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full professor
Area and field of election into research or art rank	Technical Sciences, Computer engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	15.06.1998.
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	06.05.2005.
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)	Italian, 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)	Windows programming, Graduate study in Computing (before Bologna process) Windows programming, Professional study in Computing (before Bologna process)
Authorship of university/faculty	Programiranje korisničkih sučelja na Windows platformama,

textbooks in the field of the course	FESB, 2010.
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Štula, Maja; Maras, Josip; Mladenović, Saša. Continuously self-adjusting fuzzy cognitive map with semi-autonomous concepts. // Neurocomputing. 232 (2017) ; 34-51 2. Stanković, Rade; Štula, Maja; Maras, Josip. Evaluating fault tolerance approaches in multi- agent systems. // Autonomous agents and multi-agent systems. 31 (2017) , 1; 155-177 3. Štula, Maja; Stipaničev, Darko; Maras, Josip. Distributed Computation Multi-agent System. // New generation computing. 31 (2013) , 3; 187-209 4. Stanković, Rade; Štula, Maja., Fault Tolerance through Interaction and Mutual Cooperation in Hierarchical Multi-Agent Systems // Proceedings of the 5th International Conference on Agents and Artificial Intelligence / Filipe, Joaquim ; Fred, Ana (ur.). Portugal : SCITEPRESS – Science and Technology Publication, 2013. 337-344. 5. Štula, Maja; Šerić, Ljiljana; Stipaničev, Darko. Multi-agent systems in distributed computation // 6th International KES Conference on Agents and Multi-agent Systems – Technologies and Applications / G. Ježić et al. (ur.). 2012. 629-637
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	1. Golčić, Hrvoje; Skelić, Ivana; Štula, Maja. Razvoj, implementacija i korištenje dodataka za osobe s oštećenjem vida u Moodle sustavu, 2015. (brošura). 2. Golčić, Hrvoje; Skelić, Ivana; Štula, Maja. Accessibility Issues Faced By Blind and Visually Impaired Persons in the Field of Studying and Education // Proceedings of CIET 2014 / Plazibat, Bože ; Kosanović, Silvana (ur.).Split : University of Split, 2014. S-187-S-198
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	IPNAS (Inteligentni Protupožarni NAdzorni Sustav) sustav, stručni
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)	

Ivan Zoraja, Ph.D., Associate Professor

3.4. Optimal number of students

The admission quote for the first year of studies is 50.

3.5. Estimate of costs per student

Annual costs of studies per student amount to HRK 25,000.00

3.6. Plan of procedures of study programme quality assurance

<table>
<tr><td colspan="2">In keeping with the European standards and guidelines for internal quality assurance in higher education institutions (according to “Standards and Guidelines of Quality Assurance in the European Higher Education Area”) on the basis of which the University of Zagreb defines procedures for quality assurance, the proposer of the study programme is obliged to draw up a plan of procedures of study programme quality assurance.</td></tr>
<tr><td colspan="2">Documentation on which the quality assurance system of the constituent part of the University is based:</td></tr>
<tr><td colspan="2">• Regulations on the quality enhancement system of FESB
• Quality Assurance Handbook of the constituent part</td></tr>
<tr><td colspan="2">Description of procedures for evaluation of the quality of study programme implementation:
• For each procedure the method needs to be described (most often questionnaires for students or teachers, and self-evaluation questionnaire), name the body conducting evaluation (constituent part, university office), method of processing results and making information available, and timeframe for carrying out evaluation
• If procedure is described in an attached document, name the document and the article.</td></tr>
<tr><td>Evaluation of the work of teachers and part-time teachers</td><td>• Student evaluation of quality of instruction and teaching activities conducted through student survey (printed questionnaires)
• Survey is organised and conducted by the Quality Enhancement Committee of the Faculty (Committee)
• Survey results are processed automatically at the University
• Survey is conducted each semester
• The Committee presents cumulative results of the survey at the sessions of the Faculty Council. The report is published at the Faculty web site.
All procedures are conducted in accordance with the Regulations on organisation and role of the quality assurance system of the University of Split, Regulations on procedure of student evaluation of the quality of teachers and teaching of the University of Split and Regulations on the quality enhancement system of FESB.</td></tr>
<tr><td>Monitoring of grading and harmonization of grading with anticipated learning outcomes</td><td>Committee for study programmes in Graduate university study in Electronics and Computer Engineering is monitoring the harmonisation of grading and learning outcomes.</td></tr>
</table>

	All the procedures are conducted in accordance with the Rules of procedure of the Faculty Council and the Rules of procedure of the Department, since the Committees for study programmes are bodies of the Faculty Council and are accountable to the Faculty Council.
Evaluation of availability of resources (spatial, human, IT) in the process of learning and instruction	• Student evaluation of work performance of administrative and supporting services, learning infrastructure and student life is conducted through e-survey • Evaluation is conducted using an on-line questionnaire which the students complete in each year of study, except the final year • Survey is organised by the Quality Enhancement Centre of the University of Split, and is implemented by the Quality Enhancement Committee of the Faculty (Committee) • Survey results are processed automatically at the University • Survey is conducted every year • Survey results are presented at the Faculty Council sessions and published at the Faculty web site.
Availability and evaluation of student support (mentorship, tutorship, advising)	• Administrative and supporting services are available to students to provide support in their study activities • Supervisors/ mentors are appointed for students' final papers and diploma thesis
Monitoring of student pass/fail rate by course and study programme as a whole	• Analysis of student pass rate by courses and study programmes is carried out once a year • Analysis of pass rate by study programmes is carried out by the University in cooperation with the Committee • Analysis by courses and study programmes is carried out by the Faculty Management Board • Results of both analyses are presented at the Faculty Council sessions and published at the Faculty web site.
Student satisfaction with the programme as a whole	• Student evaluation of work performance of administrative and supporting services, learning infrastructure and student life is conducted through e-survey • Evaluation is conducted using an on-line questionnaire which the students complete following the completion of studies • Survey is organised by the Quality Enhancement Centre of the University of Split, and is implemented by the Quality Enhancement Committee of the Faculty (Committee) • Survey results are processed automatically at the University • Survey results are presented at the Faculty Council sessions and published at the Faculty web site.
Procedures for obtaining feedback from external parties (alums, employers, labour market and other relevant organizations)	• Once every month, the Faculty Management Board meets with the alumni representatives • Once a year, during the annual FESB anniversary event, round tables and workshops are organised with representatives of employers and other stakeholders
Evaluation of student practical education (where this applies)	Professional training is an elective course of the study programme. Head of the professional training from the receiving institution and the head of professional training from the Faculty are appointed to students who enrol professional training course. During the training student

	writes Professional training report which describes working tasks covered by the professional training. Students are obliged to complete professional training in accordance with the Regulation on professional training. Professional training report is validated by the head of professional training from the receiving institution and the head of professional training from the Faculty. Professional training is not evaluated. In addition to the Professional training report student completes a Questionnaire on professional training that evaluates student's satisfaction with organization and performance of the professional training.
Other evaluation procedures carried out by the proposer	• Internal audit of the quality assurance system is conducted once every year • Self-evaluation is carried out every 5 years All the procedures are conducted in line with the Quality Assurance Handbook of FESB.
Description of procedures for informing external parties on the study programme (students, employers, alums)	• All information are available through the Faculty web site: https://www.fesb.hr • Visits to the faculty are organised for high-school students from Split and the wider region • Participation at University fairs • Public media presentations