

UNIVERSITY OF SPLIT

FACULTY OF ELECTRICAL ENGINEERING, MECHANICAL ENGINEERING AND NAVAL ARCHITECTURE

DETAILED PROPOSAL OF THE STUDY PROGRAMME

GRADUATE UNIVERSITY STUDY IN INFORMATION AND COMMUNICATION TECHNOLOGY

SPLIT, July 2017

CONTENT

CONTE	NT	1
GENER	AL INFORMATION OF HIGHER EDUCATION INSTITUTION	2
GENER	AL INFORMATION OF THE STUDY PROGRAMME	2
1. INT	RODUCTION	3
1.1.	Reasons for starting the study programme	3
1.2.	Relationship with the local community (economy, entrepreneurship, civil society, etc.)	4
1.3.	Compatibility with requirements of professional organizations	4
1.4. study	Name possible partners outside the higher education system that expressed interest in the programme) 4
1.5.	Financing	5
1.6. educa	Comparability of the study programme with other accredited programmes in higher tion institutions in the Republic of Croatia and EU countries	5
1.7. Croati	Openness of the study programme to student mobility (horizontal, vertical in the Republic a, and international)	of 6
1.8. propo	Compatibility of the study programme with the University mission and the strategy of the ser, as well as with the strategy statement of the network of higher education institutions	6
1.9.	Current experiences in equivalent or similar study programmes	6
2. DE	SCRIPTION OF THE STUDY PROGRAMME	8
2.1.	General information	8
2.2.	Learning outcomes of the study programme (name 15-30 learning outcomes)	8
2.3.	Employment possibilities	10
2.4.	Possibilities of continuing studies at a higher level	11
2.5. propo	Name lover level studies of the proposer or other institutions that qualify for admission to t sed study	he 11
2.6.	Structure of the study	11
2.7.	Guiding and tutoring through the study system	11
2.8.	List of courses that the student can take in other study programmes	12
2.9.	List of courses offered in a foreign language as well (name which language)	12
2.10.	Criteria and conditions for transferring the ECTS credits	12
2.11.	Completion of study	12
2.12.	List of mandatory and elective courses	13
2.13.	Course description	19
3. STI	JDY PERFORMANCE CONDITIONS 1	41
3.1.	Places of the study performance 1	41
3.2.	List of teachers and associate teachers 1	41
3.3.	Curriculum vitae of the course teacher1	44
3.4.	Optimal number of students1	93
3.5.	Estimate of costs per student 1	93

GENERAL INFORMATION OF HIGHER EDUCATION INSTITUTION

Name of higher education institution	FACULTY OF ELECTRICAL ENGINEERING, MECHANICAL ENGINEERING AND NAVAL ARCHITECTURE
Address	Ulica Ruđera Boškovića 32
Phone	021 305 777
Fax	021 305 776
E.mail	dekanat@fesb.hr
Internet address	htpp://www.fesb.hr

GENERAL INFORMATION OF THE STUDY PROGRAMME

Name of the study programme	Information and Communication Technology							
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 \Box				
Academic/vocational title earned at completion of study	Master of Engineering in Information and Communication Technolog (mag. ing. el.)							

1. INTRODUCTION

1.1. Reasons for starting the study programme

Information and Communication Technology (ICT) is one of the most dynamic sectors of world and European industry. The European Commission, together with the ICT industry, encourages the development of new educational programmes in the field of ICT as a prerequisite for the development of the information society (Digital Agenda for Europe, Grand Coalition for Digital Jobs http://ec.europa.eu/digital-agenda/en/grand-coalition-digital-jobs-0#Article). The development of this sector initiates fundamental changes in all areas of work and life. The area of information and communication technology has become exceptionally wide and interdisciplinary, and there is virtually no human activity in which information and communication technology do not contribute, significantly fostering their development. One of the main features of the field of information and communication technology is its rapid development. Development of microelectronics and computer technology enabled the development of the area of information and telecommunication technology, which became one of the most promising sectors of economy. Information transfer, i.e. image, voice and data transfer came to represent one of major prerequisites for the development of modern society. Technologies like Internet, WWW, e-commerce, mobile communications, digital television and other are rapidly developing and keep integrating thus changing working and living environment.

Continuous and rapid development of this area, driven by new findings and achievements, necessarily requires corresponding educational processes. Well-educated professionals are an essential prerequisite for progress and keeping pace with the developed countries. The development of information and communication technology requires professionals with knowledge in the field of engineering with particular emphasis on the broad systemic perspective.

The area of ICT has been identified as an area of strategic importance for the development of the information society. Strategy of development of Croatia "Croatia in the 21st century" puts emphasis on the need for increasing the number of trained professionals in this field. In the recommendations of the National Foundation for Science, Higher Education and Technological Development of the Republic of Croatia, the field of ICT was highlighted as a priority.

Study programme in Information and Communication Technology 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 Information and Communication Technology is closely related to current scientific achievements in the scientific area of engineering and natural sciences, in the field of electrical engineering, computing and information technology. This programme conforms to the modern concept of interdisciplinary studies.

FESB scientists actively participate in the development of the mentioned scientific and professional fields. Scientific cooperation with renowned international scientific institutions is one of the fundamental commitments of FESB. FESB actively participates in the international scientific projects in the field of information and communication technology: COST 261, COST 286, COST 290, COST BM0704, COST BM1309, COST TD1301, COST IC1004, COST IC1002, COST TU1208, ALIS, CEEPUS, FP6 project PEM, Electromagnetic Pollution ECO-NET. For 23 years, FESB has been organizing International Scientific Conference on Software, Telecommunications and Computer Networks SoftCOM. Technical sponsor of the SoftCOM Conference is the most influential global association for promotion of scientific and expert work in the fields of electrical engineering and computing – IEEE (Institute of Electrical and Electronic Engineers), with the seat in the USA. The Conference gathered together scientists and experts from more than 40 countries. FESB scientists are actively involved in the organization and maintenance of a number of renowned international scientific conferences such as BEM, ELECTROCOMP, COST 286 Workshop, COST BM1309 and others. FESB scientists present their results at numerous academic conferences world-wide and in renowned journals.

The goal of the proposed graduate study programme in Information and Communication Technology is to educate professional staff able to perform the most complex tasks in the area of information and communication technology in the industry, in governmental and other public institutions.

Development of a major part of economy and public sector in the region striving towards information and communication technology is strongly dependent on professionals trained in this area. Dynamic development of the region will most certainly result in increased need for professionals in the field of information and communication technology.

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. Field of study Information and Communication Technology titled Electro-communications was established in 1983.

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.

On completion of the study programme, students will have acquired knowledge necessary for development, design, production, monitoring and maintenance of complex systems in the field of Information and Communication Technology. The study programme has a crucial role in relation to the labour market as the final stage in the framework of two cycle system training broadly educated professional able to perform the most complex scientific-research and engineering tasks. The 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 Information and Communication Technology 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. Ericsson Nikola Tesla, Hrvatska elektroprivreda (national power company), Split-Dalmatia County, Ministry of Defence, Energy institute "Hrvoje Požar", Croatian Telecom, Croatian academic and research network -

CARNet, Technology Centre Split, Brodosplit, Siemens, VIPnet, Microsoft Croatia, etc. It is important to note that the Croatian Armed Forces expressed a special interest in cooperation, since prospective officers are trained at the Faculty.

As far as the area of information and communication technology is concerned, FESB cooperates with Croatian Communications and Information Society (CCIS), which is a sister society of IEEE, the world's most influential technical professional organization. In addition, FESB cooperates with professional organization named ACM.

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

FESB is actively pursuing the process of development in higher education on global level, and especially in Europe. When developing the new curriculum of the study programme in Information and Communication Technology, 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 Information and Communication Technology differ a lot, both worldwide and in Europe. 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. As a rule, the first stage is acquiring knowledge of mathematics and fundamental natural sciences, followed by core courses in electrical engineering and information technology and specific specialist courses related to particular branches of information and communication technology.

The proposed programme of graduate study in Information and Communication Technology, together with the field of study Information and Communication Technology, represents a content unit of the undergraduate study programme in Electrical Engineering and Information Technology.

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/). There are two defined programme modules in the framework of the proposed programme (Telecommunications and Computer Information Systems module and Wireless Communications module) that conform to two specializations in the field of telecommunications as defined in project THEIERE. The structure of the programme is in line with the recommendations of the ASIIN (Accreditation Agency for Study Programs in Engineering, Informatics, Natural Sciences and Mathematics). 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). When developing the curriculum of the study programme, special attention was given to the comparability with relevant study programmes at the Faculty of Electrical Engineering and Computing, University of Zagreb. The organisation of the proposed study programme is comparable with related study programmes at the following European institutions:

- Telekommunikation (Magisterstudium), Technische Univerzität Wien/ Engineering University Vienna, Austria, <u>http://www.tuwien.ac.at/informationen_fuer/studierende</u>
- Informations und Kommunikationstechnik (Studiumrichtung), Elektrotechnik und Informationstechnik (Master studium), Technische Univerzität München, / Department of Electrical and Computer Engineering, Technical University of Munich, Germany, <u>http://www.ei.tum.de/studienbetrieb/master/</u>

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

Graduate university study programme in Information and Communication Technology enables vertical and horizontal mobility of students. In terms of vertical mobility, Graduate university study programme in Information and Communication Technology is open for mobility of students of related postgraduate study programmes at Universities in Croatia and in Europe. In terms of horizontal mobility, the graduate study programme in Information and Communication Technology is open for mobility of students of related study programmes 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

Graduate university study programme in Information and Communication Technology conforms with the Strategy of the University of Split 2015-2020 (Mission, vision and strategic guidelines). In addition to mission and vision of the University of Split, in the process of defining strategic goals, the following strategic documents were taken into account as guidelines:

- EUROPA 2020 strategy for smart, sustainable and inclusive growth,
- Strategic documents of the European Research Area (ERA),
- Strategic documents of the European Higher Education Area (EHEA),
- Strategy of Education, Science and Technology of the Republic of Croatia.

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 Information and Communication Technology conforms with 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. The Faculty has implemented professional studies (level VI in former qualifications system) since 1979 until today, with hiatus during the period 1998-2001.

In 1966, a Computer Centre was established at Faculty and a computer Iskra Zuse Z-23 / V was purchased with the financial support of the local enterprises. This was the first computer purchased in town and the first installed computer at a higher education institution in Croatia. Due to the above mentioned, IT education was offered to the experts from various fields of the economy and the Faculty became the central higher education institution in the field of computer information systems in the region. Continuous work at developing the curricula resulted in establishing a number of study programmes at undergraduate and postgraduate level.

The curriculum of study programme in Electrical Engineering, adopted in 2000, contained two fields of study: Power Engineering and Electronics. The first three semesters of the study programme were identical for both fields of study, and the following semesters provided specialist courses with elective disciplines of study. Study programme in Electro-communications comprised the area of information and communication technology, and was established in 1983.

Faculty delivered postgraduate study programme in Electrical Engineering awarding master and doctoral degrees. The programme provides specialisation in the areas of telecommunications and computer information systems, electronics, power engineering and electromechanical engineering, automation and computing.

Within the Bologna Process, the Faculty introduced new study programmes in 2005. In accordance with the recommendations of the Bologna Declaration and European accreditation agencies, graduate study programme in Information and Communication Technology was introduced, following the experience in delivering the final part of the earlier undergraduate study programme in the framework of the field of study Electro-communication (study programme Electrical Engineering, 5th-9th semester).

Quality of education at FESB is confirmed by success and excellence of FESB graduates worldwide, including the highly developed countries. However, the most important is the fact that professionals trained at FESB represent a foundation of highly educated science and engineering labour force in the region.

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 Information and Communication Technology, or completed other related undergraduate study programme with acquired at least 180 ECTS credits, with possible differential exams.

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 Information and Communication Technology. 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 information and communication technology.
- To apply advanced engineering knowledge and engineering principles in presenting and solving highly complex and original problems in the field of information and communication technology
- 3. To apply acquired knowledge in identifying, formulating and solving highly complex problems in the field of information and communication technology
- 4. To develop innovative analytical methods and advanced modelling procedures in solving highly complex engineering problems in the field of information and communication technology
- 5. To critically review the features of new and upcoming products, processes and methods in the field of information and communication technology
- 6. By applying scientific principles, to design innovative experiments with the use of state-of-theart technological solutions in the area of information and communication technology
- 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 information and communication technology
- 8. To critically assess and provide arguments for the possibilities of applied techniques and methods and their limitations.
- 9.

SKILLS

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

INDEPENDENCE

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

RESPONSIBILITY

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

ADDITIONAL LEARNING OUTCOMES FOR THE MODULE WIRELESS COMMUNICATION

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

ADDITIONAL LEARNING OUTCOMES FOR THE MODULE TELECOMMUNICATIONS AND COMPUTER INFORMATION SYSTEMS

- 1. To consolidate theoretical knowledge and practical skills in solving highly complex problems in the area of telecommunications and computer information systems, wireless and optical networks and the development of telecommunication software.
- 2. To propose new procedures and new solutions for modernisation in the area of telecommunications and computer information systems, wireless and optical networks and the development of telecommunication software

- 3. To develop innovative programming solutions for simulation of systems and networks in the area of telecommunications and computer information systems, wireless and optical networks and the development of telecommunication software
- 4. To design advanced algorithmic solutions in the area of telecommunications and computer information systems, wireless and optical networks and the development of telecommunication software
- 5. To analyse complex systems and networks in the area of telecommunications and computer information systems, wireless and optical networks and the development of telecommunication software
- 6. To organise and manage the investigation of highly complex systems and networks in the area of telecommunications and computer information systems, wireless and optical networks and the development of telecommunication software
- 7. To design innovative solutions in the development, design, implementation and investigation of complex systems and networks in the area of telecommunications and computer information systems, wireless and optical networks and the development of telecommunication software

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 companies related to the field of information and communication technology, public institutions and in the service sectors. There is virtually no working environment in which experts with completed graduate university study in Information and Communication Technology could not find employment and the labour market demands 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 Information and Communication Technology acquire the skills necessary for work in various areas: in companies that produce telecommunication equipment, telecommunication operators, in public institutions, in companies that develop telecommunication and network services, in companies that develop telecommunication software and in the other manufacturing and service industries. After having completed the study programme, the students are capable of testing, maintenance, designing, monitoring and controlling the most complex systems and networks in the field of information and communication technologies. 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. Professionals trained at FESB, at the field of study Electro-communications, represent a foundation of highly educated staff in numerous companies in the region related to the field of Information and Communication Technology including Ericsson Nikola Tesla, Croatian Telecom, Siemens and other.

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 study programme in Information and Communication Technology, 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 programme modules:

- Wireless Communications
- Telecommunications and Computer information systems

In each semester, 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. As far as organisation of study programme in Information and Communication Technology is concerned, of particular importance are: Vice-dean for education, Committee for study programme in Electrical Engineering and Computing, Commission for study programme in Information and Communication Technology, student 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	The requirement for applyin acquired 60 ECTS credits.	g for the diploma thesis is
Procedure of evaluation of final/diploma exam and evaluation and defence of final/diploma thesis	The diploma thesis is evalu graduate thesis and the defe presence of the Commission fo	uated by the Committee for nce is public and held in the r defence of diploma thesis.

2.12. List of mandatory and elective courses

Program module: WIRELESS COMMUNICATIONS - 241

List of courses									
Year of study: 1.									
Semester: I.									
	0005	_		URS I	N SEN	MEST	ER*	ГОТО	
STATUS	CODE	COURSE	L	S	AE	LE	DE	ECIS	
	FELJ01	Digital telecommunications	45	0	15	15	0	6	
	FELH03	Electromagnetic waves	30	0	15	15	0	5	
	FELJ02	Radio communications	30	0	15	15	0	5	
	FELJ17	Numerical methods in communications	30	0	15	15	0	5	
Mandatory	FEMJ02	Information and technology physics	30	0	0	15	0	4	
		Elective course 1**							
	Total		165	0	60	75	0	25	
	*L = predavanja, S = seminar, AE = auditorne vježbe, LE = laboratorijske vježbe, DE = konstrukcijske vježbe								
**lzborni se predmeta p upiše kao iz	predmeti rogramsk borni, pos	mogu birati s predložene liste ovog pro og modula Telekomunikacije i informatik stoji mogućnost da ukupni broj ECTS bodo	grams (242 ova po	kog r 2). Ak seme	nodul ko se estru l	a i lis obve bude	ste ob zni pr veći o	veznih edmet d 30.	
	FELJ03	Transmission systems	30	0	15	15	0	5	
	FELH33	Digital television and video	30	0	0	30	0	5	
	FELJ28	Radars	30	0	0	30	0	5	
Elective**	FENj01	Application of analytical methods in electromagnetic compatibility	30	0	15	15	0	5	
	Bira se: -	1 Elective course							
	*L = predav	vanja, S = seminar, AE = auditorne vježbe, LE = labor	atorijsk	e vježb	e, DE =	= konst	rukcijsk	e vježbe	

	List of courses								
Year of study: 1.									
Semester: II.	Semester: II.								
911TAT9	CODE	COURSE	HO	URSI	N SEN	MEST	ER*	ECTS	
314103	CODE	COOKSE	L	S	AE	LE	DE	ECIS	
	FELJ09	Wireless communication networks	30	0	15	15	0	5	
	FELJ14	Mobile communications	30	0	15	15	0	5	
	FELJ33	Antennas	30	0	15	15	0	6	
Mandatony	FELJ34	Microwave electronics	30	0	15	15	0	5	
Manualory	FETJ01	Project management	30	0	0	15	0	4	
		Elective course 1**						5	
	Total		150	0	60	75	0	30	
	*L = predavanja, S = seminar, AE = auditorne vježbe, LE = laboratorijske vježbe, DE = konstrukcijske vježbe								
**lzborni se	predmeti rogramsko	mogu birati s predložene liste ovog pro og modula Telekomunikacije i informatik	grams	kog r	nodul	a i lis	ste ob	veznih	
upiše kao iz	borni, post	toji mogućnost da ukupni broj ECTS bodo	ova po	seme	estru	bude	veći o	d 30.	
	FELJ10	Optical communication systems	30	0	15	15	0	5	
	FELJ24	Bioelectromagnetics	30	0	0	30	0	5	
	FELJ25	Satellite positioning systems	30	0	0	30	0	5	
	FELH32	Electroacoustics	30	0	0	30	0	5	
Elective**	FELJ30	Maritime radiocommunications	30	0	0	30	0	5	
	FELJ11	IP Communications	30	0	15	15	0	6	
	FELJ37	Analysis methods in fusion technology	30	0	0	30	0	5	
	Bira se: 1	Elective course							
	*L = predava	anja, S = seminar, AE = auditorne vježbe, LE = labor	atorijske	e vježb	e, DE =	= konst	rukcijsk	e vježbe	

List of courses								
Year of study	: 2.							
Semester: III.								
07.47110	0005		HO	URSI	N SEI	MEST	ER*	БОТО
STATUS	CODE	COURSE	L	S	AE	LE	DE	ECTS
	FELH25	Electromagnetic compatibility	45	0	15	15	0	6
	FELJ21	Antenna systems	30	0	15	15	0	5
	FELJ26	Electromagnetic ecology and dosimetry	30	0	0	15	0	4
Mandatory	FELJ22	Measurements in wireless systems	30	0	15	15	0	5
ivial luator y		Elective course 1**						
		Elective course 2**						
	Total	•	135	0	45	60	0	20
*L = predavanja, S = seminar, AE = auditorne vježbe, LE = laboratorijske vježbe, DE = konstrukcijske v								
	*L = predav	vanja, S = seminar, AE = auditorne vježbe, LE = labo	ratorijsk	e vježb	e, DE =	= konst	rukcijsk	e vježbe
**lzborni se predmeta p upiše kao iz	*L = predav predmeti rogramsk borni, pos	vanja, S = seminar, AE = auditorne vježbe, LE = labo mogu birati s predložene liste ovog pro og modula Telekomunikacije i informatil stoji mogućnost da ukupni broj ECTS bod	grams grams (242 ova po	e vježb kog r 2). Ak seme	e, DE = nodul co se estru	a i lis obve bude	te ob zni pr veći o	e vježbe veznih edmet d 30.
**lzborni se predmeta p upiše kao iz	L = predav predmeti rogramsk borni, pos FELJ07	vanja, S = seminar, AE = auditorne vježbe, LE = labo mogu birati s predložene liste ovog pro og modula Telekomunikacije i informatil stoji mogućnost da ukupni broj ECTS bode Radiofrequency electronics	grams grams (242 ova po 30	e vježb kog r 2). Ak seme	e, DE = nodul co se estru 0	konstilla i lis obve bude 30	rukcijsk ste ob zni pr veći o 0	e vježbe veznih edmet d 30.
**lzborni se predmeta p upiše kao iz	*L = predav predmeti rogramsk borni, pos FELJ07 FELJ20	vanja, S = seminar, AE = auditorne vježbe, LE = labo mogu birati s predložene liste ovog pro og modula Telekomunikacije i informatil stoji mogućnost da ukupni broj ECTS bod Radiofrequency electronics Multimedia systems	ratorijski grams (a (242 ova po 30 30	e vježb kog r 2). Ak seme 0 0	e, DE = nodul co se estru 0 0	konsti a i lis obve bude 30 30	rukcijsk ste ob zni pr veći o 0 0	e vježbe veznih edmet d 30. 5
**lzborni se predmeta p upiše kao iz	*L = predav predmeti rogramsk borni, pos FELJ07 FELJ20 FELJ27	vanja, S = seminar, AE = auditorne vježbe, LE = labo mogu birati s predložene liste ovog pro og modula Telekomunikacije i informatil stoji mogućnost da ukupni broj ECTS bodo Radiofrequency electronics Multimedia systems Microwave solid-state circuits	ratorijska grams ka (242 ova po 30 30 30	e vježb kog r 2). Ak seme 0 0	e, DE = nodul co se estru 0 0 0	konsti a i lis obve bude 30 30 30	rukcijsk ste ob zni pr veći o 0 0	veznih edmet d 30. 5 5 5
**lzborni se predmeta p upiše kao iz	*L = predav predmeti rogramsk borni, pos FELJ07 FELJ20 FELJ27 FELK19	vanja, S = seminar, AE = auditorne vježbe, LE = labo mogu birati s predložene liste ovog pro og modula Telekomunikacije i informatil stoji mogućnost da ukupni broj ECTS bodo Radiofrequency electronics Multimedia systems Microwave solid-state circuits Wireless security	ratorijski grams (a (242 ova po 30 30 30 30	kog r kog r 2). Ak seme 0 0 0	e, DE = nodul co se estru 0 0 0 0	 konsti a i lis obve bude 30 30 30 30 30 	te ob zni pr veći o 0 0 0	vježbe veznih edmet d 30. 5 5 5 5
Izborni se predmeta p upiše kao iz Elective	*L = predav predmeti rogramsk borni, pos FELJ07 FELJ20 FELJ27 FELK19 FELJ29	vanja, S = seminar, AE = auditorne vježbe, LE = labo mogu birati s predložene liste ovog pro og modula Telekomunikacije i informatil stoji mogućnost da ukupni broj ECTS bodu Radiofrequency electronics Multimedia systems Microwave solid-state circuits Wireless security Simulation and measurement of electromagnetic quantities	atorijsk grams (a (24) (24) (24) (24) (24) (24) (24) (24)	kog r 2). Ak seme 0 0 0 0	e, DE = nodul co se estru 0 0 0 0 0 0	 konsti a i lis obve bude 30 30 30 30 30 30 30 	rukcijsk ste ob zni pr veći o 0 0 0 0	vježbe veznih edmet d 30. 5 5 5 5 5
lzborni se predmeta p upiše kao iz Elective	*L = predav predmeti rogramsk borni, pos FELJ07 FELJ20 FELJ27 FELK19 FELJ29 FELJ38	vanja, S = seminar, AE = auditorne vježbe, LE = labo mogu birati s predložene liste ovog pro og modula Telekomunikacije i informatil stoji mogućnost da ukupni broj ECTS bodu Radiofrequency electronics Multimedia systems Microwave solid-state circuits Wireless security Simulation and measurement of electromagnetic quantities Radio frequency identification technology	ratorijsk grams (a (24) (24) (24) (24) (24) (24) (24) (24)	kog r 2). Ak seme 0 0 0 0 0	e, DE = nodul co se estru 0 0 0 0 0 0 0 0	 konsti a i lis obve bude 30 	rukcijsk ste ob zni pr veći o 0 0 0 0 0	veznih edmet d 30. 5 5 5 5 5 5 5 5
Izborni se predmeta p upiše kao iz Elective	*L = predav predmeti rogramsk borni, pos FELJ07 FELJ20 FELJ27 FELK19 FELJ29 FELJ38 FELJ36	vanja, S = seminar, AE = auditorne vježbe, LE = labo mogu birati s predložene liste ovog pro og modula Telekomunikacije i informatil stoji mogućnost da ukupni broj ECTS bodu Radiofrequency electronics Multimedia systems Microwave solid-state circuits Wireless security Simulation and measurement of electromagnetic quantities Radio frequency identification technology Systems for wireless transmission of energy	atorijsk grams (a (24) (24) (24) (24) (24) (24) (24) (24)	kog r 2). Ak seme 0 0 0 0 0 0 0 0	e, DE = nodul co se estru 0 0 0 0 0 0 0 0 0 0	 konsti a i lis obve bude 30 	rukcijsk ste ob zni pr veći o 0 0 0 0 0 0 0	e vježbe veznih edmet d 30. 5 5 5 5 5 5 5 5 5 5 5
Izborni se predmeta p upiše kao iz Elective	*L = predav predmeti rogramsk borni, pos FELJ07 FELJ20 FELJ27 FELJ27 FELJ29 FELJ38 FELJ36 FEXX06	vanja, S = seminar, AE = auditorne vježbe, LE = labo mogu birati s predložene liste ovog pro og modula Telekomunikacije i informatil stoji mogućnost da ukupni broj ECTS bodu Radiofrequency electronics Multimedia systems Microwave solid-state circuits Wireless security Simulation and measurement of electromagnetic quantities Radio frequency identification technology Systems for wireless transmission of energy Professional Training	ratorijsk grams (a (24) (24) (24) (24) (24) (24) (24) (24)	kog r 2). Ak seme 0 0 0 0 0 0 0 0 0 0	e, DE = nodul co se estru 0 0 0 0 0 0 0 0 0 0 0	 konsti a i lis obve bude 30 30<!--</td--><td>rukcijsk ste ob zni pr veći o 0 0 0 0 0 0 0 0 0</td><td>e vježbe veznih edmet d 30. 5 5 5 5 5 5 5 5 5 5 5 5</td>	rukcijsk ste ob zni pr veći o 0 0 0 0 0 0 0 0 0	e vježbe veznih edmet d 30. 5 5 5 5 5 5 5 5 5 5 5 5
Izborni se predmeta p upiše kao iz Elective	*L = predav predmeti rogramsk borni, pos FELJ07 FELJ20 FELJ27 FELK19 FELJ29 FELJ38 FELJ36 FEXX06 Bira se: -	vanja, S = seminar, AE = auditorne vježbe, LE = labomogu birati s predložene liste ovog proog modula Telekomunikacije i informatilstoji mogućnost da ukupni broj ECTS bodeRadiofrequency electronicsMultimedia systemsMicrowave solid-state circuitsWireless securitySimulation and measurement ofelectromagnetic quantitiesRadio frequency identification technologySystems for wireless transmission of energyProfessional Training2 Elective courses	atorijsk grams (a (24) (24) (24) (24) (24) (24) (24) (24)	e vježb kog r 2). Ak seme 0 0 0 0 0 0 0 0 0 0 0 0 0	e, DE = nodul co se estru 0 0 0 0 0 0 0 0 0 0 0 0 0 0	 konsti a i lis obve bude 30 0 	rukcijsk ste ob zni pr veći o 0 0 0 0 0 0 0 0 0 0 0	e vježbe veznih edmet d 30. 5 5 5 5 5 5 5 5 5 5 5 5 5

List of courses								
Year of study: 2								
Semester:	Semester: IV.							
			HO	URSI	N SEN	NEST	ER*	ГОТО
STATUS	CODE	COURSE	L	S	AE	LE	DE	ECIS
	FEXX02	Diploma thesis						30
	Total							
*L = predava	anja, S = sem	inar, AE = auditorne vježbe, LE = laboratorijske vježbe,	, DE = k	onstrul	kcijske	vježbe		

Program module: TELECOMMUNICATIONS AND INFORMATICS - 242

List of courses								
Year of study: 1.								
Semester: I.			_					
	0005		HO	URS I	N SEI	MEST	ER*	FOTO
STATUS	CODE	COURSE	L	S	AE	LE	DE	ECTS
	FELJ01	Digital telecommunications	45	0	15	15	0	6
	FELJ03	Transmission systems	30	0	15	15	0	5
	FELJ02	Radio communications	30	0	15	15	0	5
Mondotory	FELJ19	Information systems	30	0	0	30	0	5
Manualory	FEMJ02	Information and technology physics	30	0	0	15	0	4
		Elective course 1**						
	Total		165	0	45	90	0	25
	*L = predav	vanja, S = seminar, AE = auditorne vježbe, LE = labor	atorijske	e vježb	e, DE =	= konst	rukcijsk	e vježbe
**lzborni se predmeti mogu birati s predložene liste ovog programskog modula, programskog modula Bežične komunikacije (241) ili s lista obveznih i izbornih predmeta zimskih semestara sveučilišnih diplomskih studija ERI (220) i Računarstvo (250). Ako se obvezni predmet upiše kao izborni, postoji mogućnost da ukupni broj ECTS bodova po semestru bude veći od 30.								
	FELH03	Electromagnetic waves	30	0	15	15	0	5
	FELH33	Digital television and video	30	0	0	30	0	5
Floctivo**	FELK13	Data compression	30	0	0	30	0	5
Elective	FELJ17	Numerical methods in communications	30	0	15	15	0	5
	FELH11	Artificial intelligence	30	0	0	30	0	5
	Bira se: -	1 Elective course						
	*L = predav	vanja, S = seminar, AE = auditorne vježbe, LE = labor	atorijske	e vježb	e, DE =	= konst	rukcijsk	e vježbe

	List of courses							
Year of study	: 1.							
Semester: II.								
OTATUO			НО	URS I	N SEI	MEST	ER*	FOTO
STATUS	CODE	COORSE	L	S	AE	LE	DE	ECIS
	FELJ09	Wireless communication networks	30	0	15	15	0	5
	FELJ10	Optical communication systems	30	0	15	15	0	5
	FELJ11	IP communications	30	0	15	15	0	6
Mandatory	FELJ12	Algorithms	30	0	15	15	0	5
Manualory	FETJ01	Project management	30	0	0	15	0	4
		Elective course 1**						5
	Total		150	0	60	75	0	30
	*L = predav	anja, S = seminar, AE = auditorne vježbe, LE = labor	atorijsk	e vježb	e, DE =	= konst	rukcijsk	e vježbe
**lzborni se modula Bež sveučilišnih izborni, pos	predmeti tične kom diplomsk toji moguć	mogu birati s predložene liste ovog pr unikacije (241) ili s lista obveznih i izb ih studija ERI (220) i Računarstvo (250). most da ukupni broj ECTS bodova po sen	ogram ornih Ako se nestru	skog predi obve bude	mod neta ezni p veći	ula, p ljetnik redmo od 30	rograi n sem et upi	mskog lestara še kao
	FELJ13	Operating systems	30	0	0	30	0	5
	FELH32	Electroacoustics	30	0	0	30	0	5
	FELJ14	Mobile communications	30	0	15	15	0	5
	FELJ33	Antennas	30	0	15	15	0	6
Elective**	FELJ34	Microwave electronics	30	0	15	15	0	5
	FELK10	Cryptography and network security	30	0	0	30	0	5
	FELJ30	Maritime radiocommunications	30	0	0	30	0	5
	Bira se: 1	Elective course						
	*L = predav	anja, S = seminar, AE = auditorne vježbe, LE = labor	atorijsk	e vježb	e, DE =	= konst	rukcijsk	e vježbe

List of courses								
Year of study:	: 2.							
Semester: III.								
			HO	URS I	N SEM	VEST	ER*	FOTO
STATUS	CODE	COURSE	L	S	AE	LE	DE	ECIS
	FELH30	Local and access networks	30	0	0	30	0	5
	FELJ18	Software engineering in telecommunications	30	0	0	30	0	5
	FELJ35	Network and mobile operating systems	30	0	0	30	0	5
Mandatory	FELJ20	Multimedia systems	30	0	0	30	0	5
Manualory		Elective course 1**						
		Elective course 2**						
	Total		120	0	0	120	0	20
	*L = predav	vanja, S = seminar, AE = auditorne vježbe, LE = labor	atorijske	e vježb	e, DE -	= konstr	rukcijsk	e vježbe
**lzborni se modula Bež sveučilišnih izborni, pos	predmeti ične kom diplomsk toji mogu	mogu birati s predložene liste ovog pro unikacije (241) ili s lista obveznih i izbo tih studija ERI (220) i Računarstvo (250). / ćnost da ukupni broj ECTS bodova po sen	ogram rnih p Ako se nestru	skog redm obve bude	modi eta zi ezni p veći	ula, p imskil redmo od 30	rograr ı sem et upi	nskog estara še kao
	FELJ07	Radiofrequency electronics	30	0	0	30	0	5
	FELH25	Electromagnetic compatibility	45	0	15	15	0	6
	FELJ21	Antenna systems	30	0	15	15	0	5
	FELJ22	Measurements in wireless systems	30	0	15	15	0	5
Elective**	FELK19	Wireless security	30	0	0	30	0	5
Elective	FELJ38	Radio frequency identification technology	30	0	0	30	0	5
	FELJ36	Systems for wireless transmission of energy	30	0	0	30	0	5
	FEXX06	Professional Training	0	0	0	0	0	5
	Bira se: -	2 Elective courses						
	*L = predavanja, S = seminar, AE = auditorne vježbe, LE = laboratorijske vježbe. DE = konstrukcijske vježbe							

List of courses										
Year of stu	dy: 2.									
Semester:	Semester: IV.									
STATUS	CODE COURSE	НО	FOTO							
		COURSE	L	S	AE	LE	DE	ECIS		
	FEXX02	Diploma thesis						30		
	Total									
*L = predava	anja, S = sem	inar, AE = auditorne vježbe, LE = laboratorijske vježbe,	, DE = k	onstrul	kcijske	vježbe				

2.13. Course description

NAME OF THE COURSE	ALGORITHMS									
Code	FELJ12	Year of study	1.							
Course teacher	Matko Šarić, Ph.D., Assistant Professor	Credits (ECTS)	5							
Associate teachers	Ante Topić, Teaching Assistant	Type of instruction (number of hours)	L 30	S 0	AE 15	LE 15	DE 0			
Status of the course	Obligatory		I <u> I</u>							
	COURSE	E DESCRIPTION								
Course objectives Training students for: - Design of efficient algorithms and analysis of algorithms properties (speed and memory) - Adopting the practical knowledge about sorting algorithms and graph-based algorithms										
Course enrolment requirements and entry competences required for the course	BsC degree.									
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: Analyze the execution time of the algorithm explain and apply different sorting algorithms explain and apply graph-based algorithms apply dynamic programming 									
	Course content			l	L or S hours		∖E burs			
	Introduction. What are algo Example D-2 maximum		3		0					
	Analyzing of the loops. Sol maximum - method of cros		3		0					
	Asymptotic notation. Limite	ed rule.			3		0			
Course content	The technique of divide and execution time analysis).		3		0					
broken down in detail by weekly class schedule	Recursion (search pattern, Master theorem.	iteration, recursion tree m	ethod).		3		0			
(syllabus)	Heap data structure. Heap analysis).	sort (pseudocode, execution	on time		3		0			
	Quicksort (pseudocode, ex	ecution time analysis)			3		0			
	The lower limit of sorting al linear time. (counting sort,	gorithms execution time. Sradix sort).	Sorting t	у	3		0			
	The algorithms based on graphs (basic concepts and definitions).						0			
	Graph representation using adjacency list. BFS algorith	the adjacency matrix and the adjacency matrix and	1		3		0			

gest common su sion problems. N	bseque	nce. Matr	مناهما م		_									
sion problems. I	Desision problems, NP problems and polynomial time													
verification. NP completeness. Reduction. Hamiltonian path 3 and Hamiltonian cycle. 3														
of laboratory or o	design e	xercises				LE hours								
sis of typical rur	nning tir	nes				2								
ng of summatior	าร					2								
irsions						2								
e sort l						2								
erge sort II														
eap sort														
Quicksort Linear time sorting algorithms Graph representation														
								BFS algorithm Floyd-Warshall algorithm						
x chain multiplic	ation					2								
 ☑ lectures □ seminars and workshops □ independent assignments □ multimedia □ aboratory □ work with mentor □ (other) 														
s attendance	2,0	Researc	h	Practical tr	aining									
erimental work		Report		Individual v	work	2,2								
ау		Seminar essay	,	Laboratory	exercises	0,5								
S	0,2	Oral exa	m	Preparation laboratory	n for exercises									
en exam	0,1	Project		(Oth	ner)									
There exam by a final exams is a first midtern exam is after 7 weeks of a secturing and the second one is after the next 6 weeks. Midtern test and final test consist of theoretical questions and numerical problems. In the final exams tudents that did not pass the midtern exams take part. The midtern 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 midtern exam or the final exam. Grade (in percentage) is formed according to the formula: Grade(%) = 0,5 (M1 + M2) he activities in percentage: • M1, M2 – test results.														
	Hamiltonian cyc of laboratory or of visis of typical run ng of summation risions e sort I e sort I e sort I sort csort ur time sorting al h representation algorithm I-Warshall algor est common sub x chain multiplic ctures eminars and work exercises in line in entirety artial e-learning eld work s attendance erimental work s attendance erimental work s attendance erimental work is a attendance erimental work	Hamiltonian cycle. of laboratory or design e visis of typical running times ng of summations rsions e sort I e sort II sort csort in time sorting algorithms h representation algorithm I-Warshall algorithm est common subsequent x chain multiplication ctures eminars and workshops cercises n line in entirety artial e-learning eld work s attendance 2,0 erimental work s 0,1 re are two midterms and ring and the second on rist of theoretical questers ents that did not pass ins are carried out as witive assessment of labin or the final exam. Gradient of the final exam. Gradiex	Hamiltonian cycle. of laboratory or design exercises rsis of typical running times ng of summations rsions e sort I e sort II sort common subsequence x chain multiplication ctures eminars and workshops kercises n line in entirety artial e-learning eld work s attendance 2,0 s sattendance 2,0 seminar essay s 0,2 oral exa en exam 0,1 project e are two midterms and final exa ring and the second one is after ist of theoretical questions ar ents that did not pass the midt ns are carried out as wri	Hamiltonian cycle. of laboratory or design exercises rsis of typical running times ng of summations rsions e sort I e sort III sort nine in entirety artial e-learning ald work sattendance 2,0 Research arimental work Report wor Seminar essay s s 0,2 oral exam en exam on,2 Oral exam en exa	Hamiltonian cycle. ff laboratory or design exercises rsis of typical running times ng of summations rsions e sort I e sort II sort	Hamiltonian cycle. of laboratory or design exercises risis of typical running times rg of summations rsions e sort I sort sort sort sort r time sorting algorithms h representation algorithm 								

	50% do 63% sufficient (2) 64% do 77% good (3) 78% do 91% very good (4) 92% do 100% excellent (5)						
	Title	Number of copies in the library	Availability via other media				
Required literature (available in the	Individual work		e-learning portal				
library and via other	Laboratory exercises						
meula)	Preparation for laboratory exercises						
Optional literature (at the time of submission of study programme proposal)	T.Cormen, C.Leiserson, R.Rivest, C.Stein: "Introduct edition, third printing, McGraw-Hill, 2002	T.Cormen, C.Leiserson, R.Rivest, C.Stein: "Introduction to Algorithms", second edition, third printing, McGraw-Hill, 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 Feedback from students who have already obtained BsC degree 						
Other (as the proposer wishes to add)							

NAME OF THE COURSE	ANALYSIS METHODS IN FUSION TECHNOLOGY								
Code	FELJ37	Year of study	3						
Course teacher	Dragan Poljak, Ph.D., Full Professor	Credits (ECTS)	5						
Associate teachers	Anna Šušnjara, Teaching Assistant	Type of instruction (number of hours)	L 30	S 0	AE 0	LE 30	DE		
Status of the course	Elective	Percentage of application of e-learning	0				8		
	COURSE	DESCRIPTION	•						
Course objectives	 Training students for: Understanding and ap physics and magnetohy Solve MHD equations v Solve MHD equations v Permanent adopting technology 	 Training students for: Understanding and application of fundamental principles and laws of plasma physics and magnetohydrodynamics (MHD), Solve MHD equations via analytical methods, Solve MHD equations via numerical methods Permanent adopting and fostering the knowledge in the area of fusion technology. 							
Course enrolment requirements and entry competences required for the course	Fundamental of Electrical Engineering 1 and 2, Electromagnetic Fields								
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: Analyze magnetic flux in plasma by analytically solving MHD equations Analyze magnetic flux in plasma by numerically solving MHD equations Use researchsoftware packages for the analysis of plasma systems 								
	Course content	Course content					AE burs		
	Energy problem in 21st cer		2						
	Fundamentals of plass macroscopic definition of p	Ind	2						
	Termonuclear fusion and p	lasma confinement.			2				
	Fundamentals of magnetol	nydrodynamics.			2				
Course content	MHD equations; induction equation.	equation, motion equation	on, ener	ſġy	2				
detail by weekly	MHD equilibrium.				2				
class schedule	Simple configuration of MH	ID equilibrium; cylindrical	geomet	ry.	2				
(syllabus)	Equilibrium in toroidal geo Current Diffusion Equation	ometries; Grad-Shafranov (CDE).	equation	on.	2				
	Analytical and numerical m	ethods for solving MHD e	quation	s.	2				
	Application of the Finite Ele	ement Method (FEM).			2	1			
	Application of toroidal p controlled termonuclear fus	lasma; tokamak, nucela sion, basic parts of reactor	r react	or,	2				
	Basics of fusion technology	у.			2				
	international termonuclear e	xperimental reactor (ITER)	researcl	h.	2				

	List of laboratory or o	design e	exercises					LE hours
	Modeling of a single	particle	plasma s	ystem				4
	Analytical solution of	motion	equation.					4
	Analytical solution of	linear c	ylindrical	config	juration (<i>binch</i> plasma)		6
	Analytical solution of	Grad-S	hafranov	equat	ion			4
	Numerical solution of	Grad-S	Shafranov	equat	tion by Fl	EM		4
	Analytical solution of	diffusio	n equatio	n				4
	Numerical solution of	ⁱ diffusic	on equation	on by F	FEM			4
Format of instruction	 ☑ lectures □ seminars and workshops □ exercises □ multimedia □ aboratory □ work with ment □ (other) 					nt assignments nentor er)		
Student responsibilities	The presence on lec Performed all require	tures in ed labor	the amo atory exe	unt of a rcises	at least 7	0 % of the time	s sche	duled.
Screening student	Class attendance 2 Research Pra				Practical traini	ng		
proportion of ECTS	Experimental work		Report			(Other)		2,2
creaits for each activity so that the total number of	Essay		Seminar essay			(Other)		0,2
ECTS credits is	Tests	0,2	Oral exam		(Other)		0,2	
value of the course)	Written exam	0,2	Project			(Other)		
	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)							
Grading and	where M1 and M2 and percentage score:	re the m	idterm te	st resu	ults, and i	s determined t	hrough	following
evaluating student	Percentage score:		Grad	e:				
the final exam	From 50% to 62% From 63% to 75% From 76% to 88% From 89% to 100%	suffi goo very exce	icient (2) d (3) [,] good (4) ellent (5)	I				
	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.							
Required literature (available in the		Title	•			Number of copies in the library	Availa othe	ability via r media
library and via other media)	D.Schnack: Lecture Springer-Verlag, Ber	es <i>in l</i> Iin 2009	Magnetol).	iydrod	lynamics,			5
	D.Poljak, Teorija	elektro	omagnets	kih	polja s	5		

	primjenama u inženjerstvu, Šk. knjiga Zagreb, 2014.
Optional literature (at the time of submission of study programme proposal)	 H. Goedbloed, S. Poedts, <i>Principles of Magnetohydrodynamics</i>, Cambridge University Press, New York, 2004. H. Goedbloed, S. Poedts, <i>Advanced Magnetohydrodynamics</i>, Cambridge University Press, New York, 2010. D. Poljak, <i>Advanced Modeling in Computational Electromagnetic Compatibility</i>. New Jersey, USA: Wiley-Interscience, 2007.
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	ANTENNA SYSTEMS									
Code	FELJ21 Year of study 2.									
Course teacher	Antonio Šarolić, Ph.D., Full Professor	Credits (ECTS) 5								
Associate teachers	Niko Ištuk, Teaching Assistant	Type of instruction (number of hours)	L 30	S	AE 15	LE 15	DE			
Status of the course	Obligatory Percentage of 0 application of e-learning									
	COURSE	E DESCRIPTION								
Course objectives	 Training students for: analysis of complex antennas as radiating structures application of antenna systems in wireless communication systems design and engineering of antennas and antenna systems 									
Course enrolment requirements and entry competences required for the course	None.	None.								
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: calculate the electromagnetic field in the surrounding of complex antenna structures analyze planar antenna arrays analyze wideband antennas and assess their characteristics analyze surface antennas for microwave frequencies elaborately assess the applicability of a certain antenna system for specific purpose utilize the antenna parameters as the basis for antenna application in ICT calculate electromagnetic field above ground design the circuits for antenna matching to the transmission line design the antenna system specific to application 									
	Course content				L or S	/ hc	\E ours			
	Superdirective arrays. Plar	ar arravs.			2		1			
	Yagi antenna. Wideband a	ntennas. Spiral antennas.			2		1			
	Logperiodic antennas. Heli	x antennas.			2		1			
	Aperture as a radiation source	e. Open waveguide. Horn ant	enna.		2		1			
Course content	Slot antenna. Duality princi	ple. Babinet principle.			2		1			
broken down in detail by weekly class schedule	Reflector antennas. Flat re reflector.	flector. Angle reflector. Pa	rabolic		2		1			
(syllabus)	Symmetry matching. Balur	. Dipole feed.			2		1			
	Impedance matching.				2		1			
	Vertical and horizontal dipo	ble above perfectly conduc	ting pla	ne.	2		1			
	Vertical and horizontal dipo	Vertical and horizontal dipole above finite conducting plane.					1			
	Patch antennas. Antenna s	systems for RFID.			2		1			
	Antenna systems for variou	us applications (mobile ter	minals,		2		1			

	base stations, wireless sensors, biomedical applications)							
	Practical examples of	of anten	na install	ations i	n use –	field trip.	2	1
	List of laboratory or	design e	exercises					LE or DE hours
	Superdirective arrays	s. Plana	r arrays.					2
	Yagi antenna. Wideb	and ant	ennas. S	piral an	tennas.			_
	Logperiodic antenna: Aperture as a radiation	s. Helix on sourc	antennas ce. Open	wavegi	uide. Ho	orn antenna.		2
	Slot antenna. Duality Reflector antennas. I	r principl Flat refle	e. Babine ector. Ang	et princi gle refle	ple. ctor. Pa	rabolic reflect	ctor.	2
	Symmetry matching. Impedance matching	Balun. I.	Dipole fe	əd.				2
	Vertical and horizont Vertical and horizont	al dipole al dipole	e above p e above fi	erfectly nite cor	conduc	cting plane. g plane.		2
	Patch antennas. Ante Antenna systems for stations, wireless ser	enna sys various nsors, bi	stems for applicati iomedica	RFID. ons (mo applica	obile ter ations)	minals, base	•	2
	Practical examples of antenna installations						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	Student is required to attend the lectures and auditory exercises in the amount of least 70% of the schedule. Student is required to attend the laboratory exercises is the amount of 100% of the schedule and to complete all tasks associated with laboratory exercises.							nount of at ercises in with
Screening student	Class attendance	1,5	Researc	h		Practical tra	ining	0,5
proportion of ECTS	Experimental work	0,5	Report			Laboratory	exercises	0,5
credits for each activity so that the total number of	Essay		Semina essay			Individual w	ork	0,5
ECTS credits is	Mid-exam	0,5	Oral exa	ım		(Othe	ər)	
value of the course)	Written exam	0,5	Project		0,5	(Othe	ər)	
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							

	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) 37,5% - 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								
	Exam terms: according to the academic year calenda	Exam terms: according to the academic year calendar							
Required literature	Title	Number of copies in the library	Availability via other media						
(available in the library and via other media)	 E. Zentner: Antene i radiosustavi, Graphis, Zagreb 2001. 								
(includ)	 Constantine A. Balanis: Antenna Theory: Analysis and Design, Wiley, 1997. 								
Optional literature (at the time of submission of study programme proposal)	 V. Roje: Antene I dio, skripta, Sveučilište u Splitu 1981. Handbook of antennas in wireless communications, CRC Press, 2002. 								
Quality assurance methods that ensure the acquisition of exit competences	Surveys providing student feedback								
Other (as the proposer wishes to									

NAME OF THE COURSE	ANTENNAS								
Code	FELJ33								
Course teacher	Antonio Šarolić, Ph.D., Full Professor	Credits (ECTS)	6						
A i - t - t k	Niko Ištuk, Teaching	L	S	AE	LE	DE			
Associate teachers	Assistant	(number of hours)	30		15	15			
Status of the course	Obligatory Percentage of 0 application of e-learning								
	COURSE	E DESCRIPTION							
Course objectives	 Training students for: understanding the phenomena of radiation analysis of antennas as radiating structures application of antennas in 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 the antenna parameters as the basis for antenna application in ICT elaborately assess the applicability of a certain antenna for specific purpose calculate the electromagnetic field in the surrounding of simple antenna structures analyze the parameters of linear antennas analyze the parameters of linear antennas 								
	Course content				L or S AE hours hours		AE ours		
	Introduction. Antenna para pattern.		2		1				
	Directivity. Gain. Antenna i		2		1				
	Effective length. Antenna fa parameters. Friis equation.	na	2		1				
	Elementary electrical dipole	e (EED). Field around the	EED.		2		1		
Course content	Radiated power and radiat	ion resistance of EED. Effi	ciency	of	2		1		
broken down in	Zones surrounding the ante	enna – near and far field.			2		1		
class schedule	Resonant dipoles. Halfwav	e dipoles. Fullwave dipole	s.		2		1		
(syllabus)	Electrically short dipole and	d unipole.			2		1		
	Mutual impedance of dipole	es.			2		1		
	Antenna array. Uniform line	ear antenna array.			2		1		
	Array with uniform amplitude distribution.						1		
	Arrays with non-uniform an	nplitude distribution.			2		1		
	Practical examples of anter	nna installations in use – f	ield trip		2		1		
	List of laboratory or design	exercises				LEI	hours		
	Introduction. Antenna parar Directivity. Gain. Antenna ir	neters. Polarization. Radia npedance. Effective area.	ation pa	ittern.			2		

	Effective length. Ante parameters. Friis equ around the EED.	enna fac uation. E	tor. Rela Iementa	tions lin y electi	king the	e antenna ole (EED). Field	2			
	Radiated power and Zones surrounding th	radiation ne anten	n resistar ina – nea	nce of E ir and fa	ED. Eff ar field.	iciency of EED.	2			
	Resonant dipoles. Had ipole and unipole.	alfwave	dipoles. I	Fullwav	e dipole	s. Electrically short	2			
	Mutual impedance of array.	f dipoles	. Antenna	a array.	Uniforr	n linear antenna	2			
	Array with uniform ar amplitude distributior	nplitude າ.	distributi	on. Arr	ays with	non-uniform	2			
	Practical examples of antenna installations									
Format of instruction	 lectures seminars and wo exercises on line in entirety partial e-learning field work 	 ☑ lectures ☑ seminars and workshops ☑ exercises ☑ on line in entirety ☑ partial e-learning ☑ field work ☑ independent assignments ☑ multimedia ☑ aboratory ☑ 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	Class attendance	2	Researc	h	h Practical training		0,5			
work (name the proportion of ECTS	Experimental work	0,5	Report	t Laboratory exercise		Laboratory exercises	0,5			
activity so that the	Essay		Seminar essay			Individual work	1			
ECTS credits is	Mid-exam	0,5	Oral exa	am		(Other)				
value of the course)	Written exam	0,5	Project		0,5	(Other)				
Grading and evaluating student work in class and at the final exam	During the semester the middles of the s exercises are compl The first mid-exam mid-exam is based of To pass at each mid exam containing nu 50% of points must from the lectures). To earn the right to earned from the par from auditory exerci- the first mid-exam co- lf a student earns th have passed the wh exams. At the first exam ter half of the material the At all other exam ter course material.	Written exam0,5Project0,5(Other)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.								

	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						
Required literature (available in the library and via other media)	Title	Number of copies in the library	Availability via other media				
	 E. Zentner: Antene i radiosustavi, Graphis, Zagreb 2001. 						
	 Constantine A. Balanis: Antenna Theory: Analysis and Design, Wiley, 1997. 						
Optional literature (at the time of submission of study programme proposal)	 V. Roje: Antene I dio, skripta, Sveučilište u Splitu 1981. Handbook of antennas in wireless communications, CRC Press, 2002. 						
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	APPLICATION OF ANALYTICAL METHODS IN ELECTROMAGNETIC COMPATIBILITY								
Code	FENj01	Year of study	1.						
Course teacher	Silvestar Šesnić, Ph.D., Assistant Professor	Credits (ECTS)	5						
A i - t		Type of instruction	L S AE		LE	DE			
Associate teachers	-	(number of hours)	hours) 30 0				0		
Status of the course	Elective	Percentage of application of e-learning	0						
COURSE DESCRIPTION									
Course objectives	 Training students for: mathematical modelling in electromagnetic compatibility; application of analytical methods for the solution of differential, integral and integro-differential equations; computer application of analytical methods. 								
Course enrolment requirements and entry competences required for the course	Completed undergraduate information technology	Completed undergraduate study in the field of electrical engineering and information technology							
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 analyse scientific literature in the field of analytical methods; prepare and present a student paper regarding the analytical methods in electromagnetic compatibility; evaluate advantages and disadvantages of existing analytical methods; mathematically model phenomena in electromagnetic compatibility. 								
	Course content				L hours	/ hc	AE ours		
	Mathematical modelling in electromagnetism.						1		
	Mathematical modelling in		2		1				
	Overview of methods for the in electromagnetic compation	S	2		1				
	Overview of methods for the electromagnetic compatibil		2		1				
Course content	Approximation procedures.		2		1				
broken down in	Analytical methods in frequ		4		2				
detail by weekly	Analytical methods in time domain.						2		
class schedule (svllabus)	Comparison of analytical and numerical methods.						1		
(cynabac)	Application of analytical me	6.		2		1			
	Application of analytical me	ns.		2		1			
	Application of analytical me	s.		2		1			
	Application of analytical methods in bio-electromagnetism				2				
	Application of analytical methods in magneto-hydrodynamics.						1		
	List of laboratory or design exercises					LEI	hours		
	Analytical methods in frequency and time domain.						3		
	Comparison of analytical and numerical methods.								

	Analytical modelling	of anten	na syste	ms.				2
	Analytical modelling of grounding systems.						2	
	Analytical modelling of transmission lines.						2	
	Analytical modelling in bio-electromagnetism.							2
	Analytical modelling	in magn	eto-hydro	odynam	nics.			2
Format of instruction	 ☑ lectures ☑ seminars and workshops ☑ exercises ☑ on line in entirety ☑ partial e-learning ☑ field work ☑ independent ☑ multimedia ☑ multimedia ☑ work with me ☑ (other) 			nt assignments nentor				
Student responsibilities								
Screening student	Class attendance	1,5	Researc	h	-	Practical training	g	-
proportion of ECTS	Experimental work	-	Report		-	Individual work		2
activity so that the	Essay	-	Seminal essay	ŕ	0,5	Laboratory exer	cises	0,5
ECTS credits is equal to the ECTS	Tests	-	Oral exa	(am 0,5		(Other)		
value of the course)	Written exam	-	Project		-	(Other)		
Grading and evaluating student work in class and at the final exam	 grade for the wri grade for its oral grade for the lab 	 I he final grade is determined as an average of: grade for the written seminar essay; grade for its oral presentation; grade for the laboratory exercises. 						
	Title					Number of copies in the library	Availab other i	ility via nedia
	J. D. Jackson, <i>Classical Electrodynamics</i> . New York, USA: John Wiley & Sons, Inc., 1999.							
Required literature	E. J. Rothwell and M. J. Cloud, <i>Electromagnetics</i> . Boca Raton, London, New York, Washington, D.C.: CRC Press, 2001.							
(available in the library and via other media)	A. Hoorfar and D. C. Chang, "Analytic Determination of the Transient Response of a Thin- Wire Antenna Based upon an SEM Representation," <i>IEEE Trans. Antennas Propag.</i> , vol. 30, no. 6, pp. 1145-1152, November 1982.							
	R. W. P. King, "A Review of Analytically Determined Electric Fields and Currents Induced in the Human Body When Exposed to 50–60-Hz Electromagnetic Fields," <i>IEEE Trans. Antennas Propag.</i> , vol. 52, no. 5, pp. 1186-1192, May 2004.							
Optional literature (at the time of submission of study programme proposal)	-							
Quality assurance	 evaluation of results in accordance with the learning outcomes; feedback from students survey; 							

exit competences	-	self-evaluation of the teacher;
	-	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 30 0 0 30				DE 0	
Status of the course	Elective	Percentage of application of e-learning						
	COURSE	E 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: Explain the differences between biological intelligence, artificial intelligence, computational intelligence and distributed intelligence. Present complex tasks and prepare them for automatic solving them. Understand the difference between data, information and knowledge and systems based on knowledge. Explain the procedures of knowledge elicitation and knowledge storing using different types of mathematical logic (propositional logic, predicate logic, non-standard logic). Apply the structural representation of knowledge, particularly semantic networks, frames, scenarios, stereotypes, and production rules. Describe and present standard methods of solving tasks of artificial intelligence, especially methods of searching the knowledge base (undirected and directed search) Apply logical reasoning, probabilistic reasoning, fuzzy reasoning Apply simple machine learning tasks (unsupervised and supervised). Write simple programs in programming languages and tools of artificial intelligence (Prolog, LISP, AIXML, Jess). Describe the application of artificial intelligence, in particular through expert 							

Course content broken down in detail	Course content					L or S hours	LE hours		
	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 Al methods. Problem solving techniques using search (undirected and directed search)						4	0	
	Knowledge and sto data, information, k Knowledge and sto logic (standard and	rage of nowledo rage of non-sta	knowledg ge. Know knowledg indard log	ge – I pa ledge-b ge - II pa gic).	art introc ased sy art math	duction, stems. ematical	4	0	
schedule (syllabus)	Logical reasoning. I conditional probabil models). Fuzzy (fuz	Probabil lity, Bay zzy) reas	listic reas s networl soning.	oning (ks, hidd	probabil en Mark	ity, cov	6	0	
	Knowledge and sto storage knowledge script, frames, prod	rage of (seman uction s	knowledo tic netwo ystems).	ge - Par rks, ste	t III strue reotype	cture s, the	2	0	
	Machine learning (u	unsuper	vised and	super	/ised)		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 assignment ☑ independent assignment ☑ multimedia ☑ work with mentor ☑ (other) 				ents				
Student responsibilities	The presence on le Performed all requi	ctures ii red labo	n the amo ratory ex	ount of a ercises	at least [°]	70 % of the	times sche	duled.	
Screening student	Class attendance	1,5	Researc	h		Practical tr	aining		
work (name the proportion of FCTS	Experimental work		Report			Individual work			
credits for each activity so that the	Essay		Semina essay	r		Laboratory exe		1,5	
total number of ECTS credits is equal to the ECTS value of the course)	Tests		Oral exa	am Preparatio laboratory		Preparation laboratory	n for exercises		
	Written exam	2	Project (Of		ner)				
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. Durin the semester will be two tests. The first colloquium in 8 weeks of classes, th second at 18 weeks. A student can pass the course by these tests. In the two fin exams in June and July, students who have not collected inadequate number points through colloquia take the whole subject covered by the two tests. Th condition for taking the final exam is successfully finished practical lab exercises.					n. During sses, the two final umber of ests. The ercises. erial 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 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								
	a signature.								
	a signature. Title	Number of copies in the library	Availability via other media						
Required literature (available in the library and via other media)	Title D.Stipaničev, Lj. Seric, Lectures from artificial intelligence, lecturing notes and internal textbook	Number of copies in the library	Availability via other media e-learning portal						
Required literature (available in the library and via other media)	Title D.Stipaničev, Lj. Seric, Lectures from artificial intelligence, lecturing notes and internal textbook	Number of copies in the library	Availability via other media e-learning portal						
Required literature (available in the library and via other media) Optional literature (at the time of submission of study programme proposal)	Title D.Stipaničev, Lj. Seric, Lectures from artificial intelligence, lecturing notes and internal textbook - A.Cawsey, The Essence of Artificial Intelligence, P - S.Russel, P.Norvig, Artificial Intelligence: A Modern Ed. 2002 AI on the Web (http://http.cs.berkeley.edu/%7Eruse - American Association for Artificial Intelligence (www.edu/%4000000000000000000000000000000000000	Number of copies in the library	Availability via other media e-learning portal 998. rentice Hall, 2nd						
Required literature (available in the library and via other media) Optional literature (at the time of submission of study programme proposal) Quality assurance methods that ensure the acquisition of exit competences	 a signature. Title D.Stipaničev, Lj. Seric, Lectures from artificial intelligence, lecturing notes and internal textbook - A.Cawsey, The Essence of Artificial Intelligence, P - S.Russel, P.Norvig, Artificial Intelligence: A Modern Ed. 2002. - AI on the Web (<u>http://http.cs.berkeley.edu/%7Eruse</u> - American Association for Artificial Intelligence (wwww. - Evaluation of results in accordance with the - Feedback from students via surveys - Self-evaluation of teachers - Institutional and non-institutional evaluations 	Number of copies in the library	Availability via other media e-learning portal 998. rentice Hall, 2nd						

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, Teaching Assistant	Type of instruction (number of hours)	L 30	S	AE	LE 30	DE			
Status of the course	Elective	Percentage of application of e-learning	0							
	COURSE	E 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.	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 									
	Course content				L hours	A ho	\E ours			
	Introduction and history.				2		0			
	Structure of neuron and mu	uscle cells.			2		0			
	Membrane potential.				2		0			
	Axon as transmission line ((cable).			2		0			
Course content	Membrane activation.				2		0			
broken down in	Synapses, receptors and b	rain.			2		0			
detail by weekly	Heart.				2		0			
(syllabus)	Volume source. Volume co	onductor.			2		0			
	Electrocardiography (ECG)).			2		0			
	Electroencephalograhpy (E	EG).			2		0			
	Electrophysiology of the ey	e. Electrodermal reaction.			2		0			
	Other diagnostic and thera electromagnetics. Magnetic	peutic methods based on c resonance imaging (MRI	applied).		2		0			
	Visit to Medical School of t companies related to the c	he University of Split. Visit ourse topics.	to		2		0			
	List of laboratory or design	exercises				LE	nours			
	Membrane potential.						4			

	Axon as transmissior	n line (ca	able).				2			
	Membrane activation.									
	Synapses, receptors	and bra	iin.				2			
	Electrocardiography (ECG).									
	Electroencephalograhpy (EEG).									
	Electrodermal reaction	on.					2			
	Other diagnostic and therapeutic methods based on applied electromagnetics. Magnetic resonance imaging (MRI).									
	Visit to Medical Scho related to the course	ol of the topics.	Univers	ity of Sp	olit. Visit	to companies	6			
	⊠ lectures									
	oxtimes seminars and wo	rkshops			epender	nt assignments				
Format of instruction	⊠ exercises			⊡ mui	timedia					
Format of instruction	□ on line in entirety				Dratory	aantar				
	□ partial e-learning				K WITH H					
	⊠ field work				(othe	ər <i>)</i>				
Student responsibilities	Student is required t least 70% of the sch the amount of 100% laboratory exercises	o attend edule. S of the s	I the lectu Student is schedule	res and require and to d	d audito ed to att complet	ry exercises in the am end the laboratory exe e all tasks associated	ount of at ercises in with			
Screening student	Class attendance	1	Researc	:h		Practical training				
proportion of ECTS	Experimental work	0,5	Report			Laboratory exercises	0,5			
credits for each activity so that the total number of	Essay		Seminal essay	-	1	Individual work	1			
ECTS credits is	Mid-exam	0,5	Oral exa	ım	m (Other)					
equal to the ECTS value of the course)	Written exam	0,5	Project			(Other)				
Grading and evaluating student work in class and at the final exam	During the semester the middles of the s exercises are compl The first mid-exam mid-exam is based of To pass at each mid exam containing nu 50% of points must from the lectures). To earn the right to earned from the par from auditory exerci- the first mid-exam co If a student earns th have passed the wh exams. At the first exam ter half of the material th At all other exam ter course material. Approaching the er responsibilities.	Mritten exam0,5Project(Other)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.The second mid-exam is based on the first 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.								

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

	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 knj The Biomedical Engineering Handbook (Second I Bronzino, CRC Press, 2000. 	 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	Surveys providing student feedback					
Other (as the proposer wishes to add)							

NAME OF THE COURSE	CRYPTOGRAPHY AND NETWORK SECURITY									
Code	FELK10	Year of study	1.							
Course teacher	Mario Čagalj, Ph.D., Full Professor	Credits (ECTS)	5							
Associate teachers	Toni Perković, Ph.D., Assistant Professor	Type of instruction (number of hours)	L 30	S 0	AE 0	LE 30	DE			
Status of the course	Obligatory	Percentage of application of e-learning	0				1			
	COURSE	E DESCRIPTION								
 The main objectives of the course are: provide students with insight into basic features and aspects of digital information protection by using cryptographic mechanisms present students with proven tools and mechanisms for the protection of digital information enable students to apply cryptographic mechanisms in real-world communication-information 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)	 After successfully mastering the course, students will be able to: Explain key concepts of information security (confidentiality, integrity and availability) Explain the essential difference between ensuring integrity and confidentiality of messages Select appropriate / secure mechanisms to protect digital information Characterize the level of protection provided by IPsec and TLS protocols for the given configuration Establish a virtual private network (VPN) by using cryptographic protection at the network and transport level Recommend cryptographic mechanisms to protect confidentiality and integrity at the application level Integrate and use cryptographic libraries in their own software solutions Generate and manage digital certificates Design systems for authentication of users based on digital certificates 									
	Course content				L nours	/ hc	AE ours			
	Introduction to Information Security Aims)	Security (Security Threats	, Basic		2					
Course content broken down in detail by weekly	Cryptography based on the cryptography)	e symmetric secret key (se	cret-ke	у	2					
class schedule (syllabus)	Basic Modes of Modern Co mode)	odes (ECB, CBC, CFB, OF	B, CTF	2	2					
	Cryptography based on an cryptography)	asymmetric public key (pu	ublic-ke	у	4					
	Authentication Functions (h signatures and digital publi	nash and MAC algorithms, c key certificates)	digital		4					

	First midterm exam						
	Internet Security Protocol (IPsec)				2		
	IPsec: Internet Key I	Exchang	ge (IKE) p	rotocol		2	
	Web Security: Secur Layer Security (TLS)	re Socke)	et Layer (SSL) a	nd Transport	4	
	Network firewalls						
	Second midterm exa	am					
	List of laboratory exe	ercises					LE hours
	Vulnerabilities in Con	nputer N	letworks	(MitM,	DoS, ARP spoofi	ng attacks)	4
	Symmetric cryptogra	phy (DE	S, 3DES	, AES,	CBC, CTR)		4
	Asymmetric cryptogra	aphy (R	SA, Diffie	-Hellm	an)		4
	Authentication Functi and digital public key	ions (ha certifica	sh and N ates)	IAC alg	orithms, digital si	gnatures	6
	IPsec and IKE protoc	cols					5
	Web Security: Secure S	Socket La	ayer (SSL)	and Tra	ansport Layer Secu	ırity (TLS)	4
	Network firewalls						3
Format of instruction	 lectures seminars and workshops exercises on line in entirety partial e-learning field work 			□ inde □ mul ⊠ labo □ wor □	ependent assignr timedia pratory k with mentor (other)	nents	
Student responsibilities	The presence on lec Performed all require	tures in ed labor	the amo atory exe	unt of a rcises.	t least 70 % of th	e times sche	eduled.
Screening student	Class attendance	0,7	Researc	h	Practical	training	
proportion of ECTS	Experimental work		Report		Individua	al work	2
credits for each activity so that the total number of	Essay		Semina essay	•	Laborato	ory exercises	; 2
ECTS credits is	Tests	0,2	Oral exa	ım			
equal to the ECTS value of the course)	Written exam	0,1	Project		(0	Other)	
Grading and evaluating student work in class and at the final exam	Written exam 0,1 Project (Other) 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. Students are also required to submit a written report on their work on the laboratory assignments. The final grade is formed as follows: Grade = Round[0,05 P + 0,10 LV + 0,35 M1 + 0,50 M2] where: P – is a grade based on attendance at lectures, LV – a grade earned during laboratory exercises, M1, M2 – test results. NOTE: If a student fails a given task (P, LV, M1, M2), the corresponding grade is set to 0 in the above formula						

Required literature (available in the	TitleNumber of copies in the libraryAvailability other medi							
media)	Lecture notes and presentations		e-learning portal					
Optional literature (at the time of submission of study programme proposal)	 Menezes J., van Oorschot P. C., Vanstone S. A.: AppliedCryptography, CRC Press, 1996. Stallings W.: Cryptography and Network Security, Prentice Hall, 2005. 	Menezes J., van Oorschot P. C., Vanstone S. A.: Handbook of AppliedCryptography, CRC Press, 1996. Stallings W.: Cryptography and Network Security, Principles and Practice, Prentice Hall, 2005.						
Quality assurance methods that ensure the acquisition of exit competences	 Evaluation of results in accordance with the above Feedback from students via surveys Self-evaluation of teachers Institutional and non-institutional evaluations 	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	DATA COMPRESSION									
Code	FELK13 Year of study 1.									
Course teacher	Matko Šarić, Ph.D., Assistant Professor	Credits (ECTS)	5							
Associate teachers	dipl. ing. Ante Topić	Type of instruction (number of hours)	L 30	S 0	AE 0	LE 30	DE 0			
Status of the course	Elective	Percentage of application of e-learning	0							
	COURSE	E DESCRIPTION								
Course objectives	 Training students for: Designing of efficient algorithms in order to minimize running time and memory requirements Adopting theoretical an practical knowledge about data compression methods 									
Course enrolment requirements and entry competences required for the course	BsC degree	BsC degree								
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: describe the basics of data compression theory explain data compression methods apply appropriate compression methods depending on kind of signal implement selected data compression methods 									
	Course content			l	₋ or S hours	ہ hc	\E ours			
	Basics of data compression theory (source model, the source encoding, entropy)				2		0			
	Basics of data compression theory (Shannon limits, distortion-speed ratio)				2		0			
	Quality measures for data Lossless compression, loss	compression algorithms sy compression			2		0			
Course content	Vector and scalar quantiza LBG)	tion (optimality criteria, alg	orithm		2		0			
broken down in	Transform coding (DFT, D	CT)			2		0			
detail by weekly class schedule	Transform coding (DWT, K	arhunen-Loeve transform)			2		0			
(syllabus)	Predictive coding				2		0			
	Probability based coding (H	Huffman, Shannon-Fano)			2		0			
	Arithmetic coding, dictional	ry coding, adaptive coding			2		0			
	Run length coding, Lempel	-Ziv-Welch (LZW) algorith	m		2		0			
	Estimation movement algo	rithms			2		0			
	Data reduction standards				2	0				
	List of laboratory or design	exercises				LE	nours			
	Compression quality measu	ures					2			
Vector and scalar quantization							2			

	Transform coding							2	
	Huffman and Shanno	luffman and Shannon Fano coding						2	
	Arithmetic coding							2	
	Movement estimatior	n algorit	hms	1				2	
Format of instruction	 ☑ lectures □ seminars and workshops □ exercises □ on line in entirety □ partial e-learning □ field work 			t assignments entor er)					
Student responsibilities									
Screening student	Class attendance	1,5	Researc	h		Practical traini	ng		
work (name the proportion of ECTS	Experimental work		Report			Individual work	(2,2	
credits for each activity so that the	Essay		Seminal essay	r		Laboratory exe	ercises	1	
ECTS credits is equal to the ECTS	Tests	0,2	Oral exa	am		Preparation for laboratory exe	r rcises	0	
value of the course)	Written exam	0,1	Project						
Grading and evaluating student work in class and at the final exam	There are two midte lecturing and the se consist of theoretic students that did no exams are carried of positive assessmen exam or the final exa the activities in perco • M1, M2 – te The final grade is de 50% do 63% sufficie 64% do 77% good (3 78% do 91% very go 92% do 100% excel	 There are two midterms and final exams. The first midterm exam is after 7 weeks of ecturing and the second one is after the next 6 weeks. Midterm test and final test consist of 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(%) = 0,5 (M1 + M2) he activities in percentage: M1, M2 – test results. 50% do 63% sufficient (2) 64% do 77% good (3) 78% do 91% very good (4) 							
	Khalid Qaraada II. ta	Title	e to Data			Number of copies in the library	Availab other	ility via media	
Required literature (available in the	Knalid Sayood: "Intro Morgan Kaufmann F	Publishe	rs, 2000	compre	ssion",		e-lea portal	rning	
ilbrary and via other media)									
						1			

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 Feedback from students who have already obtained BsC degree
Other (as the proposer wishes to add)	

NAME OF THE COURSE	DIGITAL TELECOMMUNICATIONS									
Code	FELJ01	Year of study	1.							
Course teacher	Joško Radić, Ph.D., Associate Professor	Credits (ECTS)	6							
Associate teachers	Petar Šolić, Ph.D., Assistant Professor	Type of instruction (number of hours)	L 45	S 0	AE 15	LE 15	DE 0			
Status of the course	Obligatory	Percentage of application of e-learning	0							
	COURSE	E DESCRIPTION								
Course objectives	Course objectives Training students for: - Understanding the structure of a digital communication system - Application of analytical models necessary to understand the effects and the design of digital communication systems - Implement and analyse a simple communication system Acquiring knowledge about the ways of realization of communication petworks									
Course enrolment requirements and entry competences required for the course	None	None								
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: Compare different systems with redundant coding Analyze the properties of communication systems with redundant coding applied Design transceiver filters for transmission without ISI Explanation of the role of synchronization in a digital communication system Select the corresponding ARQ system with respect to the parameters of the communication channel Identify the topology of the communication network and describe ways of switching in the network 									
	Course content				L hours	A hc	∖E ours			
	Real channels Equalisatior	ו			3		2			
	Nyquist filters, correlation f	ilters,			3		2			
	Linear and non-linear equa	lization, Nyquist signaling	filters,		3		2			
	Echo cancellation, scrambling,				3		2			
Course content	Parallel and serial, synchro and duplex transmission,	pnous and asynchronous, s	simplex		3		2			
broken down in	Synchronization of digital s	ignals (clock, the frame ar	nd carrie	r)	3		2			
detail by weekly	Redundant coding, block, o	convolutions and trellis coo	des,		3		2			
class schedule (syllabus)	First midterm exam									
	BCH and Reed-Solomon c	odes, turbo coding								
	ARQ system, FEC systems	s, encryption and protocols	5,		3		2			
	The topology of the networ	k. networking groups and	signaling	g	3		2			
	Routing and numbering pla	an, types of switching syste	ems		3	1	2			
	Circuit switching, multistag	e switching			3	1	2			
	Spatial and temporal switch	hing			3		2			
	Second midterm exam									

	List of laboratory exe	ercises					L	.E hours	
	Eye pattern							2	
	Equalisation							2	
	Scrembling							2	
	Channel coding: Bloc	ck codes	5					2	
	Channel coding: Con	volutior	nal codes					2	
	Optimum receiver							2	
	⊠ lectures								
	□ seminars and workshops □ multimedia					C C			
Format of instruction				⊠ labo	oratory				
	\Box on line in entirety			□ wor	k with m	nentor			
	\Box partial e-learning				(othe	er)			
Student		turoo in	the eme		t looot 7	0.º/ of the time	a aabadi	ulod	
responsibilities	Performed all require	ed labor	atory exe	ercises.			S SCHEU	uleu.	
Screening student	Class attendance	1,8	Researc	h		Practical traini	ng		
proportion of ECTS	Experimental work		Report			Individual work	K	3	
credits for each activity so that the total number of	Essay		Seminar essay		Laboratory exe	ercises	0,5		
ECTS credits is equal to the ECTS	Tests	0,1	Oral exam		Preparation fo laboratory exe	r rcises	0,5		
value of the course)	Written exam	0,1	Project	ect		(Other)			
Grading and evaluating student work in class and at the final exam	During the semeste and final exams con not pass the midtern The midterm and fir passing grade is the on each midterm of according to the form Grade (%) = 0,8 * (0 M1, M2 - points at th laboratory (with com The final evaluation percentage Rating 50% to 61% is suffic 62% to 74% good (3 75% to 87% of very 88% 100% Excellent	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 bassing 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 (%) = $0.8 * (0.5 * M1 + 0.5 * M2) + 0.2 * L$; M1, M2 - points at the mid-term expressed as a percentage, and L - points from the aboratory (with completed all lab. Exercises) expressed as a percentage. The final evaluation is determined as follows: bercentage Rating 50% to 61% is sufficient (2) 52% to 74% good (3) 75% to 87% of very good (4)							
Required literature		Title	9			Number of copies in the library	Availat other	oility via media	
(available in the	J. Proakis: Digita	l Comm	unication	n, IV. Ec	ł.				
library and via other media)	S. Benedetto: Pri with wireless app	inciples olication	of digital	transm	ission:				
	L. W. Couch II: Digital and Analog Communication Systems								
	Communication	Systems	5						
Optional literature	Communication	Systems	6						

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
Other (as the proposer wishes to add)	

NAME OF THE COURSE	DIGITAL TELEVISION AND VIDEO							
Code	FELH33	Year of study	1.					
Course teacher	Mladen Russo, Ph.D., Assistant Professor Nikola Rožić, Ph.D., Professor Emeritus	Credits (ECTS)	5					
Associate teachers		Type of instruction (number of hours)	L 30	S O	AE	LE 30	DE	
Status of the course	Elective	Percentage of application of e-learning 0						
	COURSI	E DESCRIPTION						
Course objectives	 Fraining students for: understanding of stochastic model of video (TV) signal and the principles of classic television technology, understanding and knowledge of the basics of colorimetry and transformation of different color systems (RGB, CMY, HSL, YUV, YCbCr) understanding transmission systems PAL, NTSC, SECAM, CATV and television systems MAC, MUSE understanding of digital coding and compression, H.261 and MPEG standards, formats for tapes (R-DAT) and disk drives (CD-ROM, DVD) understanding of digital HDTV system, understanding of basic principles of television transmitters, transponders and receiving systems for cable or satellite television 							
Course enrolment requirements and entry competences required for the course	Passed exams in Information theory and Communications systems.							
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: explain stochastic mod explain the basic prind system and transmissi define the most import describe HDTV digital explain the operation of systems for cable or sa 	lel of video (TV) signal iples of colorimetry and tra on system PAL, NTSC, SE ant algorithms for digital co systems of television transmitters, tr atellite television	nsform ECAM oding a anspor	ation of nd cor	of diffe npress and rec	rent co ion eiving	olor	
	Course content			l	or S nours	A ho	\E ours	
	Analog television systems, analysis.	scanning television signal	and its	5	2		0	
Course content	Color television, colorimetr	y and color transformation	•		2		0	
broken down in	Component and composite	e color systems			2	<u> </u>	0	
detail by weekly	RGB systems and color mi	xing			2		0	
(syllabus)	PAL and NTSC television s multiplexing and MAC stan	standards, teletext services Idard	5,		2		0	
	MPEG encoding				2		0	
	Cable television (CATV), s modulation and encryption TV	atellite television (DBS sys , receiving equipment for s	stems), atellite		2		0	

	Video signal process and component colo standard	sing and rs, conv	coding, ersion be	system: etween	s with co PAL and	omposite d NTSC	2	0)
	The basic structure of receivers	of transr	nitters, tr	anspon	ders and	d TV	2	0)
	Coding standards fo discs (R-DAT, CD-R commercial systems	r digital OM, D∖	video tap ′D), redu	oes, ma ndant c	gnetic a oding fo	nd optical r	2	0)
	Processing of digital	audio a	nd video	signals	in digita	al TV	2	0)
	HDTV digital system	s, home	theater				2	0)
	Stereoscopy, hologra	aphy an	d 3-D sy	stems			2	0)
	List of laboratory exe	ercises						LE hou	E urs
	Analog television sys	tems, s	canning t	elevisio	n signal	and its ana	alysis.	2	2
	Color television, colo	rimetry	and color	r transfo	ormation	•		2	>
	Component and com	posite c	olor syst	ems				2	>
	RGB systems and co	olor mixi	ng					2	2
	PAL and NTSC television standards, teletext services, multiplexing and MAC standard							2	>
	/IPEG encoding							2	>
	Cable television (CATV), satellite television (DBS systems), modulation and encryption, receiving equipment for satellite TV						2	>	
	Video signal process component colors, co	ing and poversio	coding, s n betwee	systems en PAL	ទ with co and NT ទ	mposite and SC standard	b k	2	>
	The basic structure o	of transm	nitters, tra	anspond	ders and	TV receive	ers	2	2
	Coding standards for DAT, CD-ROM, DVD	digital v), redun	/ideo tap idant cod	es, mag ling for (gnetic ar commer	nd optical di cial system	scs (R- s	2	<u>}</u>
	Processing of digital	audio ai	nd video	signals	in digita	I TV		2	>
	HDTV digital systems	s, home	theater					2	>
	Stereoscopy, hologra	aphy and	d 3-D sys	tems				2	2
Format of instruction	 lectures seminars and work exercises on line in entirety partial e-learning field work 	rkshops		 □ inde □ mul ⊠ labo □ wor □ 	ependen timedia pratory k with m (othe	t assignme lentor er)	nts		
Student responsibilities	The presence on lect Performed all require	tures in ed labor	the amo atory exe	unt of a ercises.	t least 7	0 % of the t	imes sche	duled	Ι.
Screening student	Class attendance	3	Researc	:h		Practical tra	aining		
work (name the proportion of ECTS	Experimental work		Report			Individual v	vork		1,7
creans for each activity so that the total number of	Essay		Semina essay	r		(Oth	ier)		
ECTS credits is	Tests	0,2	Oral exa	am		(Oth	er)		
value of the course)	Written exam	0,1	Project			(Oth	er)		

Grading and evaluating student work in class and at the final exam	Title Number of copies in Availability via other media							
	Title	Number of copies in	Availability via other media					
Required literature		the library						
Required literature (available in the library and via other media)	 N.Rožić: Digitalna televizija i video, internal script 	the library	e-learning portal					
Required literature (available in the library and via other media)	 N.Rožić: Digitalna televizija i video, internal script H.Benoit: Digital Television, MPEG1,2 and DVB Systems 	the library	e-learning portal e-learning portal					
Required literature (available in the library and via other media) Optional literature (at the time of submission of study programme proposal)	 N.Rožić: Digitalna televizija i video, internal script H.Benoit: Digital Television, MPEG1,2 and DVB Systems K.G. Jackson, G.B. Townsend: TV&Video Engine 1994. A.C. Luther: Digital Audio and Video, Artech House 	the library er's Reference se, 1997.	e-learning portal e-learning portal e Book, B/H Ltd.					
Required literature (available in the library and via other media) Optional literature (at the time of submission of study programme proposal) Quality assurance methods that ensure the acquisition of exit competences	 N.Rožić: Digitalna televizija i video, internal script H.Benoit: Digital Television, MPEG1,2 and DVB Systems K.G. Jackson, G.B. Townsend: TV&Video Engine 1994. A.C. Luther: Digital Audio and Video, Artech Hous Evaluation of results in accordance with the abov Feedback from students via surveys Self-evaluation of teachers Institutional and non-institutional evaluations 	the library er's Reference se, 1997. re learning out	e-learning portal e-learning portal e Book, B/H Ltd.					

NAME OF THE COURSE	ELECTROACOUSTICS								
Code	FELH32	Year of study	1.						
Course teacher	Ivo Mateljan, Ph.D., Full Professor	Credits (ECTS)	5						
		Type of instruction	L	S	AE	LE	DE		
Associate teachers		(number of hours)	30			30			
Status of the course	Elective	Percentage of application of e-learning							
	COURSE	E DESCRIPTION							
Course objectives	Training students for: - Understandind bas - Understanding prir - Understanding bas - Rooom acoustics e	 raining 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: Define equations for propagation of sound Define characteristics of sound emiters and receivers Define characteristics od electroacoustic transducers Define basic psychoacoustical quantities and units: loudness, SPL, fon and son Define basic characteristics of loudspeakers and microphones Make project of sound system in open and closed appear 								
	Course content			L	_ or S hours	ہ hc	λE burs		
	Acoustic wave equation an	d wave phenomena			2		0		
	Sound emitters in open spa	ace			2		0		
	Sound field in closed space	e – reverberation			2		0		
	Hearing system				2		0		
	Psychoacoustics				2		0		
	Measurement od acoustica	al signals			2		0		
Course content	Transducers				2		0		
detail by weekly	Electrodynamic driver and	Thiel Small parameters			2		0		
class schedule	Loudspeaker boxes				2		0		
(syllabus)	Microphones types				2		0		
	Design of microphones				2		0		
	PA systems				2		0		
	Architectural acoustics				2		0		
	List of laboratory or design	exercises				LEI	hours		
	Spectral analysis of acousti	cal signals					2		
	Hearing characteristics – S	PL and loudness					2		
	Loudspeaker frequemcy rea	sponse					2		

	Detection of resonan	Detection of resonances						
	Room acoustics mea	sureme	ents					2
	Design od loudspeak	ker boxe	s and cro	ssover	S			2
Format of instruction	 lectures seminars and wo exercises on line in entirety partial e-learning field work 	 ☑ lectures ☑ seminars and workshops ☑ exercises ☑ on line in entirety ☑ partial e-learning ☑ field work 				nt assignments nentor er)		
Student responsibilities								
Screening student	Class attendance	2	Researc	h		Practical traini	ng	
proportion of ECTS	Experimental work		Report			Individual work	ĸ	2
credits for each activity so that the total number of	Essay		Semina essay	ŕ	0.5	Lab. Exercise		0.5
ECTS credits is	Tests		Oral exa	am		Lab. Exercise	test	
value of the course)	Written exam		Project					
Grading and evaluating student work in class and at the final exam	There are seminar laboratory exercise. of laboratory exercise Grade (in percentag the activities in perce • SR – semina • LV – laborat • UI – final ex	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, final exam. 						
Required literature	Title Number of copies in the library					Availab other	ility via media	
(available in the library and via other modia)	 Ivo Mateljan: Ele 2008 	ektroaku	ıstika– sk	ripta, F	ESB,		Inte	rnet
incula)	 Ivo Mateljan: AR ARTALABS, FE 		Inte	rnet				
Optional literature (at the time of submission of study programme proposal)								
Quality assurance methods that ensure the acquisition of exit competences	 Evaluation of res Feedback from s Self-evaluation o Institutional and 	ults in a tudents f teache non-inst	iccordanc via surve ers itutional e	e with eys evaluati	the abov	ve learning outc	comes	
Other (as the proposer wishes to add)								

NAME OF THE COURSE	ELECTROMAGNETIC COMPATIBILITY							
Code	FELH25	Year of study	2.					
Course teacher	Dragan Poljak, Ph.D., Full Professor Antonio Šarolić, Ph.D., Full Professor	Credits (ECTS)	6					
Accesiote teachere	Niko Ištuk, Teaching	Type of instruction	L	S	AE	LE	DE	
Associate teachers	Assistant	(number of hours)	45		15	15		
Status of the course	Obligatory	Percentage of application of e-learning	0					
	COURSE	E DESCRIPTION						
Course objectives	 Training students for: understanding the electronic systems application of acquired circuits, devices and systems application of acquired systems to electromage 	aining 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						
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 com compatibility calculate electromagne disturbance voltages in analyze the conducted design filters for rejecti analyze shielding and g test the electromagneti standards and regulation analyze electromagneti with concentrated para analyze wire antennas 	ponents and circuits from etic field around parasitic a aduced in such structures emissions and susceptibil on of disturbances grounding of electrical dev ic compatibility by measure ons ic compatibility of devices meters, distributed param- with the application in elect	the asp ntenna lity of el ices and ements and sys eters ar ctromag	ect of struct ectrica d circu in acc stems nd tran inetic	electr aures, a al devi uits cordan using nsmiss compa	omagi as wel ces ce wit mode ion lin atibility	netic I as h Is ies /	
	Course content				L hours	A ho	AE ours	
	Introduction to electromage	netic compatibility.			3		1	
	Electronic components and	their equivalent circuits.			3		1	
Course content	Radiated emissions and su	isceptibility.			3		1	
broken down in	Conducted emissions and	susceptibility			3		1	
class schedule	Filtering.				3	1	1	
(syllabus)	Shielding.				3		1	
	Grounding.				3		1	
	Measurements in electrom	agnetic compatibility.			3		1	
	Electromagnetic compatibil regu-lations. Electromagnetic	lity requirements, standard	ls and		3		1	

	radiocommunication systems.								
	Historical overview of with concentrated particular	of EMC	modelling rs.	J. Low-f	requend	cy models	3	1	
	High-frequency mod	lels with	distribute	ed para	meters.		3	1	
	Analysis of wire ante	ennas in	EMC ap	plicatio	ns.		3	1	
	Transmission line m	odels.					3	1	
	List of laboratory or	design e	exercises					LE hours	
	Introduction to electr	omagne	tic compa	atibility.				1	
	Electronic componer	nts and t	heir equi	valent c	ircuits.			1	
	Radiated emissions	and sus	ceptibility					1	
	Conducted emission	s and su	usceptibili	ty				1	
	Filtering.							1	
	Shielding.							1	
	Grounding.							1	
	Measurements in ele	ectroma	gnetic cor	npatibil	ity.			1	
	Electromagnetic corr Electromagnetic corr	npatibility npatibility	y requirer y in radio	nents, : commu	standar nication	ds and regula systems.	ations.	1	
	Historical overview of EMC modelling. Low-frequency models with concentrated parameters.							1	
	High-frequency models with distributed parameters.							1	
	Analysis of wire antennas in EMC applications.						1		
	Transmission line models.						1		
	☑ lectures	⊠ lectures							
	□ seminars and workshops				epender	nt assignmer	ItS		
Format of instruction	⊠ exercises				aratory				
	□ on line in entirety			\square work with mentor					
	□ partial e-learning			\Box (other)					
	☐ field work				(0				
Student responsibilities	Student is required t least 70% of the sch the amount of 100% laboratory exercises	o attend edule. S of the s	d the lectu Student is schedule	ures and require and to (d audito ed to att complet	ery exercises and the labo e all tasks as	in the an ratory ex- ssociated	ount of at ercises in with	
Screening student	Class attendance	2	Researc	:h		Practical tra	ining	0,5	
proportion of ECTS	Experimental work	0,5	Report			Laboratory	exercises	0,5	
credits for each activity so that the total number of	Essay		Semina essay	ŕ		Individual w	ork	1	
ECTS credits is	Mid-exam	0,5	Oral exa	am		(Othe	er)		
value of the course)	Written exam	0,5	Project		0,5	(Othe	er)		
Grading and evaluating student work in class and at the final exam	the course)Written exam0,5Project0,5(Other)and ng student class and at examDuring the semester, two mid-exams will be held. The first mid-exam will the middles of the semester, while the second will be held after the lec 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 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 period exam containing numerical problems (material from auditory exercises)						be held in ctures and ne second part of the and min.		

	from the lectures). To earn the right to approach the second mid-exam earned from the part of the first mid-exam containing from auditory exercises) and min. 30% of points mu the first mid-exam containing theory (material from th If a student earns the positive grades on both mid-e have passed the whole exam with the grade calcula exams.	o earn the right to approach the second mid-exam, min. 30% of points must be arned from the part of the first mid-exam containing numerical problems (material om auditory exercises) and min. 30% of points must be earned from the part of he first mid-exam containing theory (material from the lectures). a student earns the positive grades on both mid-exams, he/she is considered to ave passed the whole exam with the grade calculated as average from both mid- xams. t the first exam term, students may choose to take the exam containing only that alf of the material that they haven't passed at mid-exams.								
	At the first exam term, students may choose to take half of the material that they haven't passed at mid-ex At all other exam terms, students must take the w course material.	the exam cor xams. /hole exam, c	ntaining only that containing all the							
	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									
Required literature	Title	Number of copies in the library	Availability via other media							
Required literature (available in the library and via other	Title Clayton R. Paul: Introduction to Electromagnetic Compatibility, Wiley, 2006. 	Number of copies in the library	Availability via other media							
Required literature (available in the library and via other media)	Title • Clayton R. Paul: Introduction to Electromagnetic Compatibility, Wiley, 2006. • Dragan Poljak: "Advanced modeling in computational electromagnetic compatibility", Wiley Interscience, 2007.	Number of copies in the library	Availability via other media							
Required literature (available in the library and via other media) Optional literature (at the time of submission of study programme proposal)	Title • Clayton R. Paul: Introduction to Electromagnetic Compatibility, Wiley, 2006. • Dragan Poljak: "Advanced modeling in computational electromagnetic compatibility", Wiley Interscience, 2007. • Handbook of Electromagnetic Compatibility, ed. R 1995. • Tesche, F.M.: Ianoz, M.V., Karslsson, T.: EMC Ar Computational Models, John Wiley & Sons, 1997.	Number of copies in the library	Availability via other media emic Press, Is and							
Required literature (available in the library and via other media) Optional literature (at the time of submission of study programme proposal) Quality assurance methods that ensure the acquisition of exit competences	Title • Clayton R. Paul: Introduction to Electromagnetic Compatibility, Wiley, 2006. • Dragan Poljak: "Advanced modeling in computational electromagnetic compatibility", Wiley Interscience, 2007. • Handbook of Electromagnetic Compatibility, ed. R 1995. • Tesche, F.M.: lanoz, M.V., Karslsson, T.: EMC Ar Computational Models, John Wiley & Sons, 1997. Surveys providing student feedback	Number of copies in the library	Availability via other media emic Press, Is and							

NAME OF THE COURSE	ELECTROMAGNETIC ECOLOGY AND DOSIMETRY								
Code	FELJ26	Year of study	2						
Course teacher	Dragan Poljak, Ph.D., Full Professor	Credits (ECTS)	4						
Associate teachers	Anna Šušnjara, Teaching Assistant	Type of instruction (number of hours)	L 30	S 0	AE 0	LE 15	DE		
Status of the course	Obligatory	Percentage of application of e-learning	ng ⁰						
	COURSE	DESCRIPTION							
Course objectives	 Training students for: Understanding and thermal dosimetry, Assessment of hum electromagnetic fields Permanent adopting bioelectromagnetism Application of national human exposure to not bioelectromagneties 	 raining students for: Understanding and apply fundamental principles of electromagnetic and thermal dosimetry, Assessment of human exposure to low frequency and high frequency electromagnetic fields Permanent adopting and deepening knowledge in the area of bioelectromagnetism Application of national and international regulations for the assessment of human exposure to non-ionising radiation 							
Course enrolment requirements and entry competences required for the course	- Electromagnetic fields, Electromagnetic waves								
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: Define fundamental no Apply methods for the Apply methods for the Analyze the level of the Analyze the level of the national and internation Mathematically formula from thin wire structure Analyze simple transm Compute fundamental body models. Use commercial software of the human body. 	tions in bioelectromagnetic measurement of external I calculation of external LF a ne human body exposure hal regulations ate simple cases of electr ission lines, grounding sys parameters of internal c are packages for applicatio	cs, _F and H and HF to to non-i omagne stems ar losimetry	HF fie fields onizir etic w nd an y by listic	Ids ng rad ave ar tennas mean dosim	ation nd rad s of s etry m	using liation imple iodels		
	Course content	otic pollution of the on	ironmo	I	L hours	/ hc	\E ours		
	lonising and non-ionising ra	adiation.	ronmei	it.	2				
Course content broken down in detail by weekly class schedule	Coupling mechanisms of e body. Biological effects frequency and high frequ statistical studies.	electromagnetic field and t of electromagnetic fie lency effects. Epidemiolo	he huma Ids. Lo gical ar	an ow nd	2				
(Syliadus)	Fundamental quantities of density, induced electric fi specific absorption(SA), ex	electromagnetic dosimete eld, specific absorption ra ternal fields, power densit	ry, curre ate (SAF y.	ent R),	2				
	Guidelines for protection and international regulation	of non-ionising radiation	. Nation d refere	nal ent	2				

	leves. Protection measures.							
	Methods of theoreti and internal field dos	cal and simetry.	experim	iental d	losimetr	y. Incident	2	
	Incident field dosin Calculation and mea power lines and sub-	netry; F asureme station t	Radiation ent of LF ransform	source electric ers.	e chara field. E	cterization. xposure to	2	
	Incident field dosime electromagnetic fiel phones, base station	etry; Ca d. Expo ns.	lculation osure to	an dm RFID	easuren antenn	nent of HF as, mobile	2	
	Classification of mo anatomical body mo	dels for dels.	internal	dosime	try. Sim	plified and	2	
	LF Electromagnetic the body. Whole body	modelin ly expos	g. LF Ele sure to lo	ectroma w frequ	gnetic n encies.	nodeling of	2	
	HF Electromagnetic non-ionising radiatio	modelir n.	ng. The e	eye and	brain e	exposure to	2	
	The human body ex	posure t	o transie	nt radia	tion.		2	
	Thermal response of the human body exposed to HF electromagnetic radiation visokih frekvencija. Thermal response to the eve and brain due to plane wave exposure						2	
	Biomedical applications of electromagnetic fields. Electrical stimulation of nerves. Laser radiation of the eye. Methods of the human brain stimulation. Transcranial magnetic stimulation.						2	
	List of laboratory or	design e	exercises					LE hours
	Human exposure to non-ionising EM radiation (frequencies MHz) – simulation models						up to 10	2
	Human exposure to MHz) – simulation me	non-io odels	nising El	M radia	ation (fr	equencies a	above 10	2
	Measure equipment a to EM fields	and met	hods for	the ass	essmer	nt of human	exposure	3
	Measurement of LF e	electric f	ields					2
	Measurement of LF r	nagneti	c fields					2
	Measurement of HF EM fields							2
	EM field calculation in the vicinity of base stations							2
Format of instruction	 ☑ lectures ☑ seminars and workshops ☑ exercises ☑ on line in entirety ☑ partial e-learning ☑ field work 				nts			
Student responsibilities	The presence on lect Performed all require	tures in ed labor	the amo atory exe	unt of a prcises.	t least 7	'0 % of the t	imes sche	eduled.
Screening student	Class attendance	1,8	Researc	:h		Practical tra	aining	
work (name the proportion of ECTS	Experimental work		Report			(Oth	ier)	1,8
credits for each activity so that the total number of	Essay		Semina essay	r		(Oth	ier)	0,1
ECTS credits is	Tests	0,1	Oral exa	am		(Oth	ner)	0,1
value of the course)	Written exam	0,1	Project			(Oth	ier)	

	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:					
Grading and	Grade(%) = 0,5 (M1 + M	2)				
	where M1 and M2 are the midterm test results, and is percentage score:	s determined t	hrough following			
evaluating student work in class and at	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.					
Required literature	Title	Number of copies in the library	Availability via other media			
(available in the library and via other media)	D.Poljak, Teorija elektromagnetskih polja s primjenama u inženjerstvu, Šk. knjiga Zagreb, 2014.					
ineula)	D. Poljak: <i>Izloženost ljudi elektromagnetskom zračenju</i> , Kigen, Zagreb, 2007.					
Optional literature (at the time of submission of study programme proposal)	 D. Poljak, Advanced Modeling in Co compatibility, Wiley Interscience, New York 2 D. Poljak: Human Exposure to Electron Southampton- Boston, 2003 R.W.Y. Habash, Electromagnetic Fields at 2002. 	omputational 2007. nagnetic Fiel nd Radiation,	<i>Electromagnetic</i> ds, WIT Press, Marcel Dekker,			
	 D. Poljak: Exposure of Humans to Electro Library 2002. 	magnetic Rac	liation, SoftCOM			
Quality assurance methods that ensure the acquisition of exit competences	 7. D. Poljak: <i>Exposure of Humans to Electro</i> Library 2002. Evaluation of results in accordance with the a Feedback from students via surveys Self-evaluation of teachers Institutional and non-institutional evaluations 	magnetic Rac	<i>liation</i> , SoftCOM outcomes			

NAME OF THE COURSE	ELECTROMAGNETIC WAVES						
Code	FELH03	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 30	S 0	AE 15	LE 15	DE
Status of the course	Obligatory	Percentage of application of e-learning	0				
	COURSE	E DESCRIPTION					
Course objectives	 Training students for: Understanding and app wave propagation, Formulating and solve and radiation of antenn. Permanent adopting an wave propagation, Applying of analytica electromagnetic wave propagation 	 raining students for: Understanding and apply fundamental principles and laws of of electromagnetic wave propagation, Formulating and solve simple problems in electromagnetic wave propagation and radiation of antenna systems, Permanent adopting and fostering the knowledge in the area of electromagnetic wave propagation, Applying of analytical and numerical methods to solve problems in 					
Course enrolment requirements and entry competences required for the course	- Electromagnetic Fields						
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: Define fundamental propagation, Apply fundamental I parameters of electrom Apply methods and to propagation and radiat Mathematically formula for the case of interfa antennas. Analyze electromagned lines, grounding system Compute quantities of antennas, radar cross services of realistic antenna system 	nenomena, quantities and aws of electromagnetic nagnetic waves echniques to solve probl ion of thin wire antenna ar ate propagation, reflection ice between two dielectric etic wave coupling to at ns and antennas of simpler lines, lightning section s and use commercial s on, electromagnetic compa- items.	laws of theory ems of rays and difr c media povegrou povegrou rods, s	elect to elect actio and nd a grour pack	tromag calcu romag n of pl radiat and be nding kages nd for th	netic late netic ane v on of elowgr electr for so ne an	wave basic wave vaves f wire round odes, olving alysis
Course content broken down in detail by weekly class schedule (syllabus)	Course content Introduction. Maxwell's equ conditions. Potentials. Poyr Hamilton principle in elect Maxwell's equations. Introd current. Principle of du Equivalent sources.	uations. Wave equations. nting theorem tromagnetism. Symmetric ducing magnetic charge do uality an dequivalence	Continuit al form o ensity an principle	y bf d e.	2 2	A	AE burs 1
	Plane wave. Propagation in	n different media.			2		1
	Difraction, reflection and	transmission of plane	wave for	or	2		1

	different polarizatio dielectrice media, di – lossy medium. No	lifferent polarizations. Plane wave at interface of two lielectrice media, dielectric – perfect conductor and dielectric - lossy medium. Normal and oblique incidence.							
	Type of wave guid waves. Fundament metallic waveguide a	ance. Z als of and diele	Zero and wavegu ectric wav	total i ide the veguide	reflectio eory. R e.	n. Surface ectangular	2	1	
	Analytical methods separation of variabl	for solv es.	ving wav	eguide	fields.	Method of	2	1	
	Numerical methods phenomena. Finite method.	for the Eleme	solution ent Meth	of elec nod. B	ctromag oundary	netic wave / Element	2	1	
	Short antenna. Nea antenna arrays.	r and fa	ar field. [Dipole a	antenna	. Thin wire	2	1	
	Electromagnetic wave coupling to transmission line Telegrapher's equations in frequency domain and time domain.						2	1	
	Electromagnetic sc section (RCS).	attering	. Detern	nination	of ra	idar cross	2	1	
	Fundamentals of gro	ounding	system a	nalysis	•		2	1	
	Fundamentals Electromagnetic belowground lines.	of interfere	electroma ence o	agnetic n ab	co ovegroi	mpatibility. und and	2	1	
	Lightning channel modeling. Modeling of direct and indirect lightning strike.						2	1	
	List of laboratory or design exercises							LE hours	
	Propagation of EM wave in a dielectric and a lossy medium.							2	
	Normal incidence of two dielectric media.	EM wav	e on perf	ect gro	und and	interface be	etween	3	
	Oblique EM incidenc	e on pei	rfect grou	ınd.				2	
	Oblique EM incidenc	e on two	o dielectri	ic media	а			2	
	Total reflection and z	ero refle	ection.					2	
	Oblique EM incidenc	e on im	perfect gr	ound.				2	
	Radiated EM field of	a short	dipole.					2	
Format of instruction	 ☑ lectures □ seminars and workshops ☑ exercises □ independent assignr □ multimedia □ laboratory 				nt assignme	nts			
	□ on line in entirety				k with m	nentor			
	☐ partial e-learning				(othe	er)			
Student responsibilities	The presence on lec Performed all require	tures in ed labor	the amo atory exe	unt of a ercises.	t least 7	0 % of the t	imes sche	eduled.	
Screening student	Class attendance	2	Researc	h		Practical tra	aining		
proportion of ECTS	Experimental work		Report			(Oth	er)	2,2	
credits for each activity so that the total number of	Essay		Semina essay	r		(Oth	er)	0,2	
ECTS credits is	Tests	0,2	Oral exa	am		(Oth	er)	0,2	
value of the course)	Written exam	0,2	Project			(Oth	er)		
Grading and evaluating student	There are two midte lecturing and the sec	rms and cond on	l final exa e is after	ams. Th the nex	e first m kt 6 wee	idterm exar ks. Each m	n is after idterm tes	7 weeks of st (120 min	

work in class and at the final exam	in duration) consists of 3 questions (each containing theoretical part and shorn 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 + M	12)						
	where M1 and M2 are the midterm test results, and is percentage score:	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)	rom 50% to 62%sufficient (2)rom 63% to 75%good (3)rom 76% to 88%very good (4)rom 89% to 100%excellent (5)						
	tudents who do not pass midterm exams are obliged to pass final test (150 min in uration) in winter/fall examination period. Final test consists of 4 questions (each ontaining theoretical part and short numerical problem) and 2 longer numerical roblems. The requirement for passing grade is 50 % points. Final grade is former ccording to the described procedure. The midterm and final exams are carried ou s 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. 							
	2. 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. S. Ratnajeevan, H. Hoole, P. Ratnamahilan, P. Hoole: A Modern Short Course in Engineering Electromagnetics, Oxford University Press, 1996. S.M.Wentworth: Fundamentals of Electromagnetics with Engineering Applications, Wiley, 2005 E. Yamashita: Analysis Methods for Electromagnetic Wave Problems, Vol 2, Artech House 1996 A.F.Peterson, S.L.Ray, R.Mittra: Computational Methods for Electromagnetics, 							
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	INFORMATION AND TEC	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,	Type of instruction	L	S	AE	LE	DE	
Associate teachers	Toni Vrdoljak	(number of hours)	30	0		15	0	
Status of the course	Obligatory	Percentage of application of e-learning	0					
	COURSI	E 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 quantur 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), Hadro						ntum g from f dron	
	Course content			L	hours	h	AE ours	
	Special theory of relativity				2			
	General theory of relativity				2			
	Particle properties of wave	S			2			
Course content	Wave properties of particle	9			2			
broken down in	Introduction to wave mecha	anics - Schrodinger equat	ion		2			
detail by weekly	Application of Schrodinger	equation			2			
(syllabus)	Schrodinger equation for h	ydrogen atom			2			
, , , , , , , , , , , , , , , , , , ,	Electrical properties of mat	erial			2			
	Semiconductors				2			
	Magnetic properties of mat	erial			2			
	Phenomenology of superco	onductor			2			
	Atomic nuclei				2			
	Application of nuclear phys	sics			2			

	List of laboratory or	List of laboratory or design exercises					
	Measuring Planck's	constan	ıt				1
	Measuring the temp (measuring band gap	erature o in silico	depende on)	nce of s	emicon	ductor resistance	2
	Hall effect						2
	Measuring the prope	erties of	semicon	ductor p	photode	tectors	1
	Demonstration of su	perconc	ductivity –	- Meissi	ner effe	ct	1
	Demonstration of un	certaint	y principl	е			1
	Measuring the atten	uation o	f gamma	radiatio	on		2
	Measuring the prope	erties of	solar cel				1
Format of instruction	 Iectures seminars and work exercises on line in entirety partial e-learning field work 	 Iectures seminars and workshops independent assignments multimedia multimedia independent assignments multimedia multimedia independent assignments multimedia multimedia independent assignments multimedia multimedia independent assignments independent assidnet independent assignment					
Student responsibilities	The presence on lec	he presence on lectures in the amount of at least 70 % of the times scheduled.					
Screening student	Class attendance	1,0	Researc	h		Practical training	
proportion of ECTS	Experimental work		Report			Individual work	2,6
credits for each activity so that the total number of	Essay		Seminar essay			(Other)	
ECTS credits is	Tests	0,2	Oral exam		(Other)		
value of the course)	Written exam	0,2	Project			(Other)	
	There are two midte midterm exam is aft weeks. Each midter questions: The requirement for	erm exa er 7 we rm test	ms, two eeks of le lasts for g grade a	final ex ctures 90 mi	ams an and the nutes a	d one make-up exam. second one is after th and consists of the fo exams is to have at le	The first ne next 6 lowing 4 east 50%
Grading and	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.						ams can d consist n each of
Grading and evaluating student work in class and at the final exam	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 make-up exam at the final exam.	pass the e beginr	e course hing of fa	through II. This	n midter exam fe	ms and/or final exams atures the same forma	nave one t as the
	Exam schedule is pr	edeterm	nined thro	ough the	e acade	mic calendar.	

	Title	Number of copies in the library	Availability via other media				
Required literature	Knapp, V.; Colić, P.: Uvod u električna i magnetska svojstva materijala, Školska knjiga, Zagreb, 1997						
(available in the library and via other media)	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 Sveu Tehnička knjiga, Zagreb, 1988. D. Halliday, R. Resnick, J. Walker: Fundamentals of I Wiley & Sons, Inc., 2013.	učilišta u Berke Physics 10th e	eley, svezak 4., edition, John				
	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 SYSTEMS							
Code	FELJ19	Year of study	1.					
Course teacher	Mladen Russo; Ph.D., Assistant Professor	Credits (ECTS)	5					
Associate teachers		Type of instruction (number of hours)	L 30	S 0	AE 0	LE 30	DE 0	
Status of the course	Obligatory/elective	Percentage of application of e-learning	0		II			
	COURSE	E DESCRIPTION						
Course objectives	 understanding and knowledge of the model of storage systems, information use and processing, the role of hardware, software and administrator understanding the relation between information systems (IS) and company's business, the role of IS in conducting business and decision-making knowledge of data organization model based on relational and semantic models knowledge of the basic components of software engineering, development, testing, maintenance and management of IS data processing, forecasting methods, decision models application of "soft computing" methods, fuzzy logic models understanding artificial intelligence methods and expert systems 						n ⁄'s t,	
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: - classify information syste - define the DBMS syste - make an ER diagram - create a relational data - apply methods for data	stems m base i forecasting and processir	ng					
	Course content				L	/ hc	λE	
	Information and information sy	vstems, hardware, software a	nd staff		2		0	
	Basics of information syste model, functional areas and organizations	ms planning, business org d business processes, acti	janizatio ivities ar	n nd	2		0	
Course content	Relational database, group and database managemen	ing of IS subsystems, data t systems (DBMS)	abases		2		0	
broken down in	Relational and semantic da	atabases, object modeling			2		0	
class schedule	Distributed data processing	g, middleware server syste	ms		2		0	
(syllabus)	Multimedia and hypermedia	a systems, Web systems			2		0	
	Information systems and G	SM			2		0	
	Languages and tools for IS	development, CASE tools	6		2		0	
	Administration, maintenand	ce and management of IS			2	1	0	
	Collecting and basics of da	collecting and basics of data processing, statistical ana					0	
	Estimation of statistical par methods, technological for	ameters, time series avera	aging		2		0	

	Natural language processing, voice control of applications and databases 2							0
	Integration of inform	ation an	d expert	system	S		2	0
								LE hours
	Company model							2
	Databases 1							2
	Databases 2							2
	Mean values of a dis	crete da	ita set					2
	Positional mean valu	es of a	discrete d	lata set				2
	Calculated mean val	ues of a	continuc	us data	i set			2
	Positional mean valu	es of a	continuou	us data	set			2
	Moments and measu	ires of d	ispersior	, symm	etry and	kurtosis		2
	Chain indices and gr	owth rat	es					2
	Bayesian estimation	method	of arithm	ietic me	ean			2
	Moving average met	hod						2
	Exponential moving average method						2	
	Linear regression mo	odel						2
Format of instruction	 ☑ lectures □ seminars and workshops ☑ exercises □ on line in entirety □ partial e-learning □ (other) 							
Student responsibilities	The presence on lec Performed all require	tures in ed labor	the amo atory exe	unt of a ercises.	t least 7	0 % of the t	imes sche	duled.
Screening student	Class attendance	3	Researc	:h		Practical tra	aining	
proportion of ECTS	Experimental work		Report			Individual work		1,7
credits for each activity so that the total number of	Essay		Semina essay	ŗ		(Oth	ner)	
ECTS credits is	Tests	0,2	Oral exa	am		(Oth	ner)	
value of the course)	Written exam	0,1	Project			(Oth	ner)	
Grading and evaluating student work in class and at the final exam	During a semester midterms are held a take the test from th midterms or take commission exam st The requirement for exam. Grade (in per Grade(%) = $0,5*M1+$ The final grade is de Percentage Grade 50% to 61% sufficie 62% to 74% good (75% to 87% very g 88% to 100% excelled	there the comp the comp the mic tudents passing centage +0,5*M2 etermine ent (2) (3) ood (4) ent (5)	are two g to the cour leter cour take the grade is grade is grade is (grade is))))))	midterr calendal se if they at they cest from 50% po ed acco – midte ws:	ms and r of clas ey do no did no n the co oints on rding to erm test	final exar ses. At the ot have a p t pass. At mplete cour each midte the formula results.	n. Final final exar ositive gra the mal rse. rm exam :	exam and n students ade on the ce-up and or the final

Required literature (available in the	Title	Number of copies in the libraryAvailabili other m						
media)	 N. Rožić, M. Russo: Informacijski sustavi, internal script 		e-learning portal					
Optional literature (at the time of submission of study programme proposal)	 P. Beynon-Davies: Information Systems Develops "Baze podataka za krajnjeg korisnika" 	eynon-Davies: Information Systems Development, MacMillan J. Martin: ze podataka za krajnjeg korisnika"						
Quality assurance methods that ensure the acquisition of exit competences	 Evaluation of results in accordance with the above Feedback from students via surveys Self-evaluation of teachers Institutional and non-institutional evaluations 	e learning outo	comes					
Other (as the proposer wishes to add)								

NAME OF THE COURSE	IP COMMUNICATIONS						
Code	FELJ11	Year of study	1.				
Course teacher	Mladen Russo, Ph.D., Assistant Professor	Credits (ECTS)	6				
Associate teachers		Type of instruction (number of hours)	L 30	S 0	AE 15	LE 15	DE 0
Status of the course	Obligatory/elective	Percentage of application of e-learning	0				1
	COURSE	E DESCRIPTION					
Course objectives	 Training students for: understanding network reference model and p knowledge of TCP/IP p understanding address understanding routing and quality of service (knowledge of the most and http communicatio voice over IP (VoIP) ar 	architecture and protocol acket commutation protocol stack, layer specif sing methods in IPv4 and I protocol mechanisms, pro QoS) important applications of in, file transfer protocol (FT nd IP television (IPTV)	s basec ic proto Pv6 net tocols fo TCP/IP TP), ren	l on th cols a tworks or mul netwo note o	ne ISO Ind fun timedi orks, e peratio	-OSI ctions a traff -mail, on (tel	ic www net),
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: - compare the ISO-OSI - describe the mechanis - compare IPv4 and IPv6 - create a computer netw - set up VoIP communic	model and the TCP/IP pro ms of packet routing 6 protocols vork ation	tocol st	ack			
	Course content				L hours	/ hc	AE ours
	And None. Students will be able to: - compare the ISO-OSI model and the TCP/IP protocol stack e level - 4 to 10 mes) - - compare IPv4 and IPv6 protocols - create a computer network - set up VoIP communication Course content Network architectures, technologies and services, ISO OSI model and TCP/IP networks and protocols IP protocol, addressing and routing Managing subnets, ARP, Internet control messages (ICMP) IPv6 protocol -	O OSI		2		1	
			2		1		
	Managing subnets, ARP, Ir	nternet control messages ((ICMP)		2		1
	IPv6 protocol				2		1
Course content	Transport layer (TCP), unre	eliable and reliable packet	deliver	у	2		1
broken down in	Traffic management and co	ongestion control			2		1
detail by weekly	Static and dynamic routing	, RIP and OSPF routing pr	otocols		2		1
(syllabus)	Dial-up access, SLIP and F	PPP protocols			2		1
	Multimedia protocols in IP applications (RIP), resourc applications (RSVP)	networks, routing in real-ti es reservation in real-time	me		2		1
	Network management (SN	MP)			2		1
	WWW, HTTP, HTML, e-ma	ail, FTP, Telnet			2		1
	Voice over IP (VoIP), H.32 communications	3 and SIP protocols, mobil	e IP		2		1
	IP television and video				2		1

								LE hours
	Computer networkinç	3						2
	ARP protocol							2
	IP protocol – header	analysis	s, subnet	ting				2
	TCP three way hand	shake p	rocedure					2
	ICMP protocol							2
	VoIP communication	S						2
Format of instruction	 □ lectures □ seminars and workshops □ exercises □ on line in entirety □ partial e-learning □ field work □ field work □ dependent a □ multimedia □ anultimedia □ work with men □ (other) 				nt assignments nentor er)			
Student responsibilities	The presence on lec Performed all require	tures in ed labor	the amore atory exe	unt of at ercises.	t least 7	0 % of the time	s sche	duled.
Screening student	Class attendance	3	Researc	h		Practical trainir	ng	
proportion of ECTS	Experimental work		Report			Individual work	ζ	2,7
credits for each activity so that the total number of	Essay		Seminar essay		(Other)			
ECTS credits is	Tests	0,2	Oral exam		(Other)			
value of the course)	Written exam	0,1	Project			(Other)		
Grading and evaluating student work in class and at the final exam	During a semester th are held according to from the complete co the midterm that they the test from the com The requirement for exam. Grade (in perc Grade(%) = 0,5*M1+0 The final grade is det Percentage Grade 50% to 61% sufficie 62% to 74% good (75% to 87% very g 88% to 100% excelled	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)						
Required literature (available in the library and via other		Title)			Number of copies in the library	Availa othe	ibility via r media
media)	Casad, J.: TCP/I	P in 24 l	hours, Sa	ams Put	ol. 2012	1	e-le p	arning ortal
Optional literature (at the time of submission of study programme proposal)	W. Stallings: HiglB. Khasnabish: Ii	h Speec mpleme	l Network nting Voi	ks: TCP ce over	/IP Desi IP, Wile	gn Principles, F ey Interscience,	Prentice 2003.	e Hall
Quality assurance methods that ensure the acquisition of exit competences	 Evaluation of res Feedback from s Self-evaluation o Institutional and p 	ults in a tudents f teache non-inst	ccordanc via surve rs itutional (e with t eys evaluatio	he abov ons	e learning outc	omes	
Other (as the proposer wishes to add)								
NAME OF THE COURSE	LOCAL AND ACCESS N	ETWORKS						
---	---	--	--	--	---	---	---------------------------------------	--
Code	FELH30	Year of study	2.					
Course teacher	Josip Lörincz, Ph.D., Assistant Professor	Credits (ECTS)	5	5				
	Dinko Begušić, Ph.D., Full	Type of instruction	L	S	AE	LE 30 Ind acce f inform smissic sed in la ation smissio ssion n, orks, of loca A ho ation	DE	
Associate teachers	Professor	CCESS NETWORKS Year of study 2. n.D., Credits (ECTS) 5 Ph.D., Full Type of instruction (number of hours) L S AE application of e-learning 10% 10% COURSE DESCRIPTION s for: I understanding of the fundamental concepts of local ar ne characteristics of the medium for the transmission of ass network (metal wires, optical fibre and wireless transinfigure local and access networks and network devices ' participation in the design and maintenance of local ar ausition of knowledge in the field of new technologies us as: sic concepts and technology in the area of data inform immunication protocols. asic computer skills. nglish language. able to: terms and concepts of local and access networks, implement protocols, systems and techniques for transmi- nolocal and access networks based on different transmi- sior al and access networks based on different transmi- ding metal wires, optical fibre and wireless transmission al and access networks based on different transmi- ding metal wires, optical fibre and wireless transmission al and access networks based on different transmi- ding metal wires, optical fibre and wireless transmission al and access networks based on different transmi- ding metal wires, optical fibre and wireless transmission al and access networks based on different criteria. Implement protocol	0	30				
Status of the course	 Obligatory (university graduate programme, 242) 	Percentage of application of e-learning	10%					
	COURSE	E DESCRIPTION						
Course objectives	Training students for: - knowledge and understar networks, - knowledge of the character in local and access network - capability to configure loc - qualification for participati networks, - permanent acquisition of access networks.	nding of the fundamental c eristics of the medium for t k (metal wires, optical fibre al and access networks ar ion in the design and main knowledge in the field of n	oncepts the tran and w nd netw tenance ew tech	s of loo smiss ireless ork de e of lo nnolog	cal and ion of s trans evices, cal an ies us	d acce inform missio d acce ed in l	ess nation on), ess local	
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 evaluate and implemen information in local and medias including metal configure local and acc participate in the design permanently acquire kn access networks. 	concepts of local and acce t protocols, systems and t access networks based o wires, optical fibre and wir ess networks and network n and maintenance of loca lowledge about new techn	ess netw echniqu n differo reless tr device l and ac ologies	works, ues for ent tra ransm s, ccess in the	trans nsmis ission netwo area	missio sion rks, of loca	on of al	
	Course content				L hours	A ho	AE ours	
	Introduction. Standards.						2	
	The division of the LAN net	twork according to differen	t criteri	a.			2	
	Local area networks of type	e Ethernet.					2	
Course content broken down in	Local area networks of type DQDB	e: Token ring, Token bus,	FDDI,				2	
detail by weekly	Gigabit Ethernet, switched	LAN					2	
Gigabit Ethernet, switched LAN (syllabus) Gigabit Ethernet, switched LAN Networks: ATM, ATM LAN							2	
	Virtual Private Networks-V	PN					2	
	Wireless Communication S systems	Systems-general, cellular (mobile)				2	
	Wireless LAN (WLAN) netw	works					2	
	Broadband access network	ks-general					2	

	xDSL technology: H	DSL, AD	DSL, VDS	SL				2	
	Fiber optical network	ks: FTTx	technolo	ogy				2	
	HFC technology, Wi	MAX teo	chnology					2	
	List of laboratory or	design e	exercises					LE hours	
	Exercise 1.: Introduc	tion - ba	sics Rive	rbed M	odeler s	imulator		2	
	Exercise 2.: Local Ar network	ea Netw	ork - The	e role of	Switch	in LAN Eth	ernet	2	
	Exercise 3.: Local Ar with different users, t	ea Netw erminals	vork - a n s and ser	etwork vices)	design (planning ne	etwork	2	
	Exercise 4.: ATM (ce oriented connections	ll switch)	ing techr	nology b	ased or	n connectio	n	2	
	Exercise 5.: RIP prot state)	ocol (Ro	outing pro	otocol ba	ased on	an link algo	orithm	2	
	Exercise 6.: TCP Tra on pre-established lir	insmissi nks)	on Contro	ol Proto	col (Tru	sted protoc	ol based	2	
	Exercise 7.: The met discard packets)	hods of	sorting (d	queuing	, waiting	to transmi	t or	2	
	Exercise 8.: The wire mobile station)	Exercise 8.: The wireless local area network (media access control for 2 nobile station)							
	Exercise 9.: Mobile wireless networks (wireless cellular networks with mobile devices)						2		
	Exercise 10.: OSPF	routing p	protocol b	ased o	n an link	-state algo	rithm	2	
	Exercise 11.: Border	Gatewa	y Protoc	ol (BGP) - (Rou	ting data tra	affic	2	
	between different ad	ministrat	tive doma	ains)					
	Compensation exerc	ises						2	
		ul co la orono		🗆 inde	ependen	t assignme	nts		
		rksnops		🗆 mul	timedia				
Format of instruction	\Box on line in entirety			🛛 labo	laboratory				
	\Box partial e-learning			\boxtimes work with mentor					
	☐ field work				(othe	er)			
	The conditions for o	verall po	sitive as	sessme	nt are:				
	 positive assessr 	nent of	laborator	y exerc	ises (ab	ove 50 %)			
Student	 minimum preser 	nce durir	ng 70% o	f overal	Il class t	eaching tim	ie in a serr	nester,	
responsibilities	 presence on lab time in a semestication 	oratory (exercises	during	100% c	of overall lab	poratory ex	kercise	
	 minimum 50% p 	oints at	each mic	l-term c	or final ex	xam (or cor	rectional c	or	
	commission exa	m).	1			,			
Screening student	Class attendance	1,0	Researc	h		Practical tra	aining		
work (name the proportion of ECTS	Experimental work		Report			Independe	nt work	2,2	
credits for each activity so that the total number of	Essay		Seminai essay	•		Laboratory	exercises	1,0	
ECTS credits is equal to the ECTS	Tests		Oral exa	ım		Preparation Laboratory	n for exercises	0,5	
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	Written exam	0,3	Project			(Oth	ner)		

Grading and evaluating student work in class and at the final exam	During the semester there will be two mid-term ex exam will be after 8 weeks of classes, and the 2nd the 1st and 2nd of the final exams, students take curricula which they did not pass on some of the mi 4th of the final (correctional) exam, students take curricula. Rating (%) = 0.1PL + 0,2LA + 0.35 (M1 + M2) PL – presence on the lectures (expressed in percenta LA- grades from laboratory assessment (expressed in M1, M2- the 1st and 2nd mid-term exam grades or fir percentage), 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 1 st or 2 ^r and 4 th final (correctional) exams students take exam the case of organization of commission exam, studer curricula content. Requirements related to the admiss (commission) exam is a positive assessment of labor Examinations: 1 st Final exam 2 nd Final (correctional) exam 5 th Final (correctional) exam 5 th Final (correctional) exam 5 th Final (correctional) exam 5 th Final (correctional) exam	ams (tests). T after 15 week e exam of the d-term exams (e exam of c age), n percentage), nal exam grade	The 1st mid-term s of classes. On the 3rd and complete course es (expressed in ams, on the 3 rd cula content. In kam of entire nd correctional s.
	Title	Number of copies in the library	Availability via other media
	 Milutin Kapov, Josip Lorincz, "Local and Access Networks", FESB-Split, 2015, (2009), internal script 		e-learning portal
Required literature (available in the library and via other	 Josip Lorincz, "Instructions for performing laboratory exercises in local and access networks", FESB Split, internal script, 2015. 		e-learning portal
ineula)	 Alen Bažant and others: "The basic architecture of the network", ELEMENT, Zagreb, 2004. 	5	
	 M. Vrdoljak and others: "New Communication Technologies", FESB Split, HT TKC Split, softcore library Split in 1999. 	5	
Optional literature (at the time of submission of study programme proposal)	 M. Jose ., M. Caballero and others, "SDH / SONE Synchronization Networks", Artech House, Boston Alex Gillespie: "Broadband Access Technology In Artech House, Boston, London, 2000. Annabel Z. Dodd, "Telecommunications", Algorith 	n, ATM, xDSL , London, 200 terfaces and M m, Zagreb 200	. and)3. Management,)2.

Quality assurance methods that ensure the acquisition of exit competences Other (as the	 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
Other (as the proposer wishes to add)	1

NAME OF THE COURSE	MARITIME RADIOCOMM	UNICATIONS							
Code	FELJ30	Year of study	1.						
Course teacher	Antonio Šarolić, Ph.D., Full Professor	Credits (ECTS)	TS) 5						
Associate teachers	Niko Ištuk, Teaching Assistant	Type of instruction (number of hours)	L 30	S	AE	LE 30	DE		
Status of the course	Elective	Percentage of application of e-learning	0						
	COURSE	E DESCRIPTION							
Course objectives	Training students for: - understanding the spe- - acquiring knowledge o	cificities of maritime radioc n maritime radiocommunic	commu	nicatio system	ns s				
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 specificitie - apply the knowledge of - identify the maritime ra- - use the maritime radio - connect the maritime ra-	Idents 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							
	Course content			L ho	urs	AE hours			
	Introduction to maritime rac	diocommunications.			2		0		
	Basics of maritime telecom		2	0					
	Basics of maritime radiocol	mmunications.		2 2 4	0				
	Terrestrial radio links.				2		0		
	Satellite radio links.	adio links.					0		
	Terrestrial radiocommunica	ation systems.			2		0		
	Satellite radiocommunication	on systems.			2		0		
	GMDSS system.				2		0		
Course content	Shipboard navigational rad	lar.			2		0		
broken down in	GPS.				2		0		
detail by weekly	Visit to systems in use (fiel	d trip).			4		0		
class schedule	List of laboratory or design	exercises				LE h	ours		
(Syllabus)	Introduction to maritime rad	liocommunications.					2		
	Basics of maritime telecom	munications.					2		
	Basics of maritime radiocor	nmunications.					4		
	Terrestrial radio links.						2		
	Satellite radio links.						2		
	Terrestrial radiocommunica	tion systems.					2		
	Satellite radiocommunicatio	on systems.					2		
	GMDSS system.						2		
	Shipboard navigational rada	ar.					2		
	GPS.						2		

	Visit to systems in us	se (field	trip).					4
Format of instruction	 Iectures seminars and workshops exercises on line in entirety partial e-learning field work Student is required to attend the learning 			□ inde □ mul ⊠ labe □ wor	 ☐ independent assignments ☐ multimedia ☑ laboratory ☐ work with mentor ☐ (other) 			
Student responsibilities	Student is required t least 70% of the sch the amount of 100% laboratory exercises	udent is required to attend the lectures and auditory exercises in the amou ast 70% of the schedule. Student is required to attend the laboratory exerc e amount of 100% of the schedule and to complete all tasks associated wit poratory exercises.					int of at ises in th	
Screening student	Class attendance	1	Researc	h		Practical training	Practical training	
proportion of ECTS	Experimental work	0,5	Report			Laboratory exercis	ses	0,5
credits for each activity so that the total number of	Essay		Seminai essay	ŕ	1	Individual work		1
ECTS credits is	Mid-exam	0,5	Oral exa	am		(Other)		
value of the course)	Written exam	0,5	Project			(Other)		
Grading and evaluating student work in class and at the final exam	During the semester the middles of the s exercises are compl The first mid-exam mid-exam is based of To pass at each mid exam containing nu 50% of points must from the lectures). To earn the right to earned from the par from auditory exerci- the first mid-exam co If a student earns th have passed the wh exams. At the first exam ter half of the material th At all other exam ter half of the material. Approaching the er responsibilities. The overall point pe of points earned in a Percentage -> Grad 50% - 62,4% -> suff 62,5% - 74,9% -> go 75% - 87,4% -> very 87,5% - 100% -> ex Final grade can be individual and exper	r, two missemeste eted, sc is base on the fin d-exam, imerical be earned approa t of the ises) an ontaining he positi- nole exam m, stude hat they erms, st exams is rcentage all exam e icient (2) ood (3) y good (4) cellent (5) supplei imental ing to th	id-exams r, while the hedules to d on the rst secon min. 50% problem ed from to ch the secon first mid- d min. 30 g theory (ve grade m with the ents may haven't p sudents r s subject e defining question 4) 5) mented to work, in a	will be will be the sec to be ac first ha d half o 6 of poi s (mate he part econd r exam c 0% of p materia s on bo bassed nust ta t to fi t the ov s, corre	held. T ond will greed wi alf of th f the co nts mus erial from of the e mid-exa containin oo the e and-exa containin oo the e e calcula to tak at mid-e ke the ulfilling erall gra ected by	he first mid-exam v be held after the ith the students. e course material. urse material. it be earned from the m auditory exercise exam containing the m, min. 30% of po ng numerical proble nust be earned from he lectures). exams, he/she is co ated as average from e the exam contain exams. whole exam, contain the requirements ade is calculated as the result of oral verse practical project we the teacher.	vill be lectur The me pare es) are ory (r ints n ems (r n the conside ing o aining on the a erifica	held in res and second rt of the nd min. material part of lered to oth mid- nly that all the student average tion:

	Title	Number of copies in the library	Availability via other media			
Required literature (available in the	 Kim, J.C., Muehldorf, E.I., Naval Shipboard Communication Systems, Prentice Hall, 1995. 					
library and via other media)	 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	MEASUREMENTS IN WIR	Year of study 2							
Code	FELJ22	Year of study	2						
Course teacher	Zoran Blažević, Ph.D., Full Professor	Credits (ECTS)	5						
Associate teachers	Maja Škiljo, Ph.D.	Type of instruction (number of hours)	L 30	S 0	AE 15	LE 15	DE 0		
Status of the course	Obligatory: 241 Elective: 242	Percentage of application of e-learning	2 5 L S AE 30 0 15 0 0 15 rent environments io-channel characte Ins and Information Information system Information system			<u> </u>			
	COURSE	E DESCRIPTION							
Course objectives	 Training students for: radio-channel measure statistical modelling of various radio systems, applying empirical and 	ements and analysis, radio propagation in differ statistical models for radio	ent env o-chanr	ironm	ents a	nd for izatior	٦.		
Course enrolment requirements and entry competences required for the course	Finished the undergraduate	inished the undergraduate study of Communications and Information Technology							
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: calculate radio-channel parameters, perform measurements and analysis of fixed and mobile radio systems parameters statistically characterize radio propagation of arbitrary radio-systems on the base of measurements, Apply various channel models 								
	Course content				L hours	/ hc	\E ours		
	Introduction to Measureme	nts in Wireless Systems.			1		1		
	Fixed radio-links channel p	arameters. Fading			2		1		
	Ground radio links planning	g and measurements			2		2		
	Fading in mobile radio chai	nnels.	d and mobile radio system of arbitrary radio-system ms. 1 2 2 2 2 2 2 2 2 2 2 3 2 2 3 2 2 3 2 2 3 2 3 2 3 3 3 3 3 3	2		1			
	Mobile radio channel parar	neters.	2 2 2 2 2 2			1			
	Propagation path-loss mod	lels. Hata-Okumura model			3		1		
Course content	First midterm exam								
detail by weekly class schedule	Statistical channel models with Maxwell theory based	of ground networks compa model.	arison		2		1		
(syllabus)	Satellite radio-channels. St measurements (Loo model	atistical models based on , Suzuki model).			4		1		
	Wide-band channel parameters. Wide-band measurements. 4					3			
	Wide-band channel models	s based on measurements	i.	2 1					
	Wide-band indoor radio cha	annel modelling.			3		1		
	Second midterm exam								
	List of laboratory exercises					LEI	nours		
	Antenna measurements by Measurements calibration.	Vector Network Analyser	measur	emen	ts.		3		

	Narrow-band channe	row-band channel measurements at various frequencies. 3						3
	Wide-band channel r	neasure	ements					3
	Wide-band indoor ch	annel m	easurem	ents				3
	Radio-links planning	by using	g measur	ed data	and sof	tware.		3
Format of instruction	 lectures seminars and work exercises on line in entirety partial e-learning field work 	rkshops		□ inde □ mult ⊠ labo □ work	pendent imedia ratory with ma (othe	t assignments entor r)		
Student responsibilities	The presence on lec Performed all labora	tures in tory exe	the amo ercises re	unt of at quired.	least 70) % of the time	es schedu	uled.
Screening student	Class attendance 2,0 Research				Practical traini	ng		
work (name the proportion of ECTS	Experimental work		Report	ort I		Individual work	ĸ	1.5
credits for each activity so that the	Essay		Seminai essay	•		Laboratory exe	ercises	0,8
ECTS credits is equal to the ECTS	Tests	0,5	Oral exa	ım		Preparation for laboratory exe	r rcises	0,2
value of the course)	Written exam		Project			(Other)		
Grading and evaluating student work in class and at the final exam	 Increate two indicernist and inflat exams. The instantiatem exam is after 7 week lecturing and the second one is after the next 6 weeks. Each midterm test and tests consists of theoretical questions and numerical. The students that did pass the midterm exams take part In the final exams. The midterm and final exams the midterm exams take part In the final exams. The midterm and final exams are carried out as written tests. The requirement for passing grade is the po assessment of laboratory exercises and 40 % points on each midterm exam of final exam. Grade (in percentage) is formed according to the formula: Grade(%) = 0,1 NP + 0,1 LV + 0,4 (M1 + M2) the activities in percentage: NP - attendance at lectures, LV – laboratory assessment, M1, M2 – test results. 						and final did not l exams positive n or the	
		Title)			Number of copies in the library	Availab other	ility via media
Required literature (available in the	 Z. Blažević; Mjer predavanja 	enja u b	ežičnim	sustavim	na,		e-lea poi	rning rtal
library and via other media)	 M. Patzold: "Mob 2002. 	oile Fadi	ng Chanr	nels", W	iley,	1		
	Doble, J.: "Introd Fixed and Mobile House Boston - I	uction to Comm _ondon,	o Radio F unication GB, 199	Propagat s", Arteo 6.	tion for ch	1		
Optional literature (at the time of submission of study programme proposal)	 G. H. Bryant: "Pr Zentner, E.: Ante 	inciples ene i rad	of Microv iosustavi	wave Me , Graphi	easurem s Zagre	nents", IEE Pul b, 2001.	blishing,	1993.
Quality assurance methods that ensure	 Evaluation of res Feedback from s 	sults in a students	accordan s via surv	ce with t eys	he abov	ve learning out	comes	

the acquisition of exit competences	- Self-evaluation of teachers
	- Institutional and non-institutional evaluations
Other (as the proposer wishes to add)	

NAME OF THE COURSE	MICROWAVE ELECTRO	NICS							
Code	FELJ34	Year of study	1.						
Course teacher	Ivan Marinović, Ph.D., Full Professor	Credits (ECTS)	ECTS) 5						
Associate teachers		Type of instruction (number of hours)	L 30	S	AE 15	LE 15	DE		
Status of the course	Obligatory: 241 Elective: 242	Percentage of application of e-learning							
	COURSE	E DESCRIPTION							
Course objectives	Training students for: - understanding basics of - application of scatterin - microwave measureme	of microwave components g matrices (S-matrices) ar ents applying SG, SA and	and cir nalysis VNA	cuits					
Course enrolment requirements and entry competences required for the course	Finished course Electronic	ished course Electronic components and circuits							
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: understand basics of n calculate stubs matchin analyze microwave con understand behavior of understand characterist tubes and solid-state of 	 Students will be able to: understand basics of microwave electronics (transmission line, waveguide) calculate stubs matching parameters applying Smith-chart analyze microwave components and circuits applying S-matrices understand behavior of simple passive microwave components understand characteristics of basic active microwave components (vacuum tubes and solid-state ones) 							
	Course content				L hours	/ hc	AE ours		
	Transmission lines				5		2		
	Impedance matching, Smit	h chart			6		5		
	Waveguides				4		3		
	S-matrices				1		1		
	Microwave passive compo	nents			6		4		
	Klystron, reflex klystron, ma	agnetron, TWT			4		0		
broken down in	GUNN diode, IMPATT diod	de			2		0		
detail by weekly	Microwave oscillators				1		0		
class schedule	Microwave amplifiers				1		0		
	List of laboratory or design	exercises				l hc	_E ours		
	Slotted line, impedance ma	tching					3		
	Directional coupler						2		
	Sweep generator and spec	trum analyzer					3		
	Directional coupler Sweep generator and spectrum analyzer Vector network analzer								
	Cable power loss measurer	ments					2		
	Microwave amplifier						2		

Format of instruction	 ☑ lectures ☐ independen ☐ multimedia ☑ aboratory ☐ aboratory ☐ work with m ☐ (othe 			t assignments entor er) int of at least 70% of the times es.				
Screening student	Class attendance	2	2 Research			Practical traini	na	
work (name the proportion of ECTS	Experimental work		Report	ort		Exercises		1
credits for each activity so that the total number of	Essay		Seminar essay	r		Individual work	<	2
ECTS credits is	Tests		Oral exa	am		(Other)		
equal to the ECTS value of the course)	Written exam		Project			(Other)		
Grading and evaluating student work in class and at the final exam	There are two midte lecturing and the se theoretical questions exams students that carried out as written grading is applied.	There are two midterms and final exams. The first midterm exam is after 7 weeks lecturing and the second one is after next 6 weeks. Each midterm test consists theoretical questions and numerical problems as well as the final test. In the fin exams students that did not pass the midterm exams take part. The midterms a carried out as written tests while the final exams are written and oral. The absolu grading is applied.						eeks of sists of he final rms are bsolute
Required literature		Title	}			Number of copies in the library	Availabi other r	lity via nedia
library and via other media)	Z. Smrkić, Mikrovaln Zagreb.	a elektr	onika, Šk	olska k	njiga,	5		
	J. Bartolić, Mikrovalr	na elekti	ronika, Gi	raphis, i	Zagreb	5		
Optional literature (at the time of submission of study programme proposal)	-							
Quality assurance methods that ensure the acquisition of exit competences	 Evidence of stud Annual analysis Teachers self-ev Students feedba 	dents att of grade valuation ack via c	tendance es achiev n questionn	′ed aires ar	nd surve	ys		
Other (as the								

NAME OF THE COURSE	MICROWAVE SOLID-STATE CIRCUITS										
Code	FELJ27	`	Year of st	tudy		2.	2.				
Course teacher	Ivan Marinović, Ph.D Full Professor).,	Credits (E	ECTS)		5					
Associate teachers		-	Type of instruction L S (number of hours) 30				S	AE	LE 30	DE	
Status of the course	Elective		Percentag	ge of n of e-le	earning						
	CC	OURSE	DESCRI	PTION							
Course objectives	Training students for: - analysis of complex microwave solid-state components and circuits										
Course enrolment requirements and entry competences required for the course	Finished course <i>Mic</i>	rowave	electronic	cs							
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - understand principles of different microwave components - make analysis of solid-state microwave circuits										
	Course content							L hours	h	AE ours	
	1. Microwave solid-state diodes: PIN, GUNN, IMPATT 8										
Course content	2. Microwave oscillators with negative resistance 4										
broken down in detail by weekly	3. Microwave solid-state transistors: MESFET, HEMT 10										
class schedule	4. Microwave mixers and amplifiers 8										
(syllabus)	List of laboratory or design exercises								LE	hours	
	1. Measurements on microwave oscillator 1GHz									10	
	2. Measurements on microwave amplifiers 1-2GHz, 2-4GHz, 4-8GHz i 20 0.04-3GHz								20		
Format of instruction	 ☑ lectures □ seminars and workshops □ exercises □ on line in entirety □ partial e-learning □ field work □ independent assignme □ multimedia □ aboratory □ work with mentor □ (other) 				nmer	its					
Student responsibilities	The presence on lec scheduled. Performe	tures ar ed all ree	nd exercis quired lab	ses in th oratory	ie amou exercis	unt of at ses.	leas	t 70% o	f the t	imes	
Screening student	Class attendance	2	Researc	h		Practic	al tra	ining			
proportion of ECTS	Experimental work		Report			Exercis	ses			1	
activity so that the total number of	Essay		Seminar essay			Individu	ual w	ork		2	
ECTS credits is	Tests		Oral exa	im			(Othe	ər)			
value of the course)	Written exam		Project				(Othe	er)			

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 next 6 weeks. Each midterm test consists of theoretical questions and numerical problems as well as the final test. In the final exams students that did not pass the midterm exams take part. The midterms are carried out as written tests while the final exams are written and oral. The absolute grading is applied.						
Required literature (available in the	Title	Title Number of copies in the library					
library and via other media)	Z. Smrkić, Mikrovalna elektronika, Školska knjiga, Zagreb.	5					
	J. Bartolić, Mikrovalna elektronika, Graphis, Zagreb	5					
Optional literature (at the time of submission of study programme proposal)	-						
Quality assurance methods that ensure the acquisition of exit competences	 Evidence of students attendance Annual analysis of grades achieved Teachers self-evaluation Students feedback via questionnaires and survey 	/S					
Other (as the proposer wishes to add)							

NAME OF THE COURSE								
Code	FELJ14	Year of study	1.					
Course teacher	Zoran Blažević, Ph.D., Full Professor 5							
Associate teachers	Maja Škiljo, Ph.D.	Type of instruction (number of hours)	Type of instructionLS(number of hours)300					
Status of the course	Obligatory: 241 Elective: 242	Percentage of application of e-learning	0					
	COURSE	E DESCRIPTION						
Course objectives	Training students for: - understanding and app - physical OSI layer of c - mobile radio networks	 Training students for: understanding and application of basic principles of radio-networks, physical OSI layer of cellular radio-networks calculation and analysis, mobile radio networks analysis 						
Course enrolment requirements and entry competences required for the course	Finished the undergraduate	Finished the undergraduate study of Communications and Information Technology						
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: Calculate optimal radio system configuration in sense of selecting digital modulation and coding, model and perform basic calculation of cellular networks: base stations power and interference budget calculate and analyse (narrow- and wide-band) radio-channel parameters, conduct and analyse radio-channel measurements 							
	Course content				L hours	/ hc	∖E ours	
	Introduction to Mobile Com		1		1			
	Classification of digital radi		2		1			
	Digital radio system perforr		2		2			
	Systems with bandwidth lin	nitation.			2		1	
	Power limited systems.				2		1	
Course content	Power limited and bandwid	g.	2		1			
broken down in	Direct Sequence-Spread S	pectrum Systems			2		1	
detail by weekly class schedule	Cellular radio systems. Coo interference.	channel and adjacent char	nel		2		1	
(syllabus)	Path-loss law. Base station	ling budget. Multipath rec	eption.		2		2	
	First midterm exam							
	Cell radio-coverage calcula	ation.			2		1	
	Mobile propagation channe	el analysis.			2		1	
	Radio channel measureme	nts.			2		1	
	Propagation channel classification. Delay-spread and channel coherence bandwidth.						1	
	Second midterm exam							

	List of laboratory exe	ercises						LE hours
	Radio channel characterization by Vector Network Analyser measurements.							5
	Communication syste	Communication systems testing and simulating by Matlab and Simulink						2
	Analog and digital mo	odulatio	n simulat	ions				2
	Multipath fading char	nnels sir	nulations					2
	Adjacent and co-channed	el interfe	rence in c	ellular sy	/stems s	imulations by Sin	nulink	2
	COST 207 and GSM	/EDGE	channel ı	nodels	by Matl	ab		2
Format of instruction	 ☑ lectures ☑ seminars and workshops ☑ exercises ☑ on line in entirety ☑ partial e-learning ☑ field work 				nt assignments mentor er)			
Student responsibilities	The presence on lec Performed all labora	tures in tory exe	the amo ercises re	unt of at quired.	t least 7	0 % of the time	es sche	duled.
Screening student	Class attendance	2,0	Researc	h		Practical traini	ng	
work (name the proportion of ECTS	Experimental work		Report			Individual work	ĸ	1.5
credits for each activity so that the	Essay		Seminai essay			Laboratory exercises		0,8
ECTS credits is equal to the ECTS	Tests	0,5	Oral exa	am Preparation for laboratory exercis			r rcises	0,2
value of the course)	Written exam		Project			(Other)		
Grading and evaluating student work in class and at the final exam	There are two midter lecturing and the sec tests consist of theoret the midterm exams carried out as writte assessment of labor final exam. Grade (in Grade (in Control of the activities in percen- NP - attenda LV – laborat M1, M2 – test	 There are two midterms and final exams. The first midterm exam is after 7 weeks or lecturing and the second one is after the next 6 weeks. Each midterm test and final tests consist of theoretical questions and numerical. The students that did not pass the midterm exams take part In the final exams. The midterm and final exams are carried out as written tests. The requirement for passing grade is the positive assessment of laboratory exercises and 40 % points on each midterm exam or the final exam. Grade (in percentage) is formed according to the formula: Grade(%) = 0,1 NP + 0,1 LV + 0,4 (M1 + M2) the activities in percentage: NP - attendance at lectures, LV – laboratory assessment, M1, M2 – test results. 						' weeks of t and final d not pass exams are e positive am or the
		Title)			Number of copies in the library	Availa othe	ability via r media
Required literature	 Z. Blažević: Mobi FESB 	ilne korr	nunikacije	e, preda	vanja,		e-learning portal	
library and via other media)	 I. Zanchi, Z. Blaž predavanja, FES 	ević: Ra B	adiokomu	nikacije	,		e-le F	earning portal
	David Parson.: T Channel, Pentec	he Mob h Press	ile Radio Pub. Lor	Propag ndon, 19	ation 992.	2		

Optional literature (at the time of submission of study programme proposal)	 R. Steele: "Mobile Radio Communications", Pentech Press, London, GB and IEEE Press, Piscataway, USA, 1992. Vijag, K. Garg, Joseph, E. Wilkes: Wireless and Personal Communications Systems, Prentice Hall PTR, NY 1996.
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	MULTIMEDIA SYSTEMS							
Code	FELJ20 Year of study 2.							
Course teacher	Mladen Russo, Ph.D., Assistant Professor	Credits (ECTS)	5					
	Jelena Čulić, Teaching	-	L	S	AE	LE	DE	
Associate teachers	Assistant Martina Bašić, Teaching Assistant	lype of instruction (number of hours)	30	0	0	30	0	
Status of the course	Obligatory: 242 Elective: 241	Percentage of application of e-learning	0					
	COURSE	E DESCRIPTION						
Course objectives	 Training students for: understanding of multin knowledge of the prope and video signals (inclu understanding of the minage and video signals 	nedia systems and virtual rties and methods for gen ding 3D images and video ost important algorithms fo s	reality erating) or comp	speec ressir	ch, auc ng spe	lio, ima ech, a	age udio,	
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				L hours	A ho	\E ours	
	Introduction. History of mul Overview of multimedia so applications.	rms. Itimedia	l	2		0		
	Audio signal. How humans modelling.			2		0		
Course content	Generic compression techr specific algorithms (mp3).	niques for audio signals. A	udio		2		0	
broken down in detail by weekly class schedule	Speech specific algorithms and applications in mobile encoding speech and audio	(LPC, CELP, RELP, MPE telephony. Review of stand p signals.	, RPE) dards fo	or	2		0	
(syllabus)	Color in images and video people perceive electromatic colors.	signal. The perception of o gnetic radiation). Theory o	color (ho f mixing	ow I	2		0	
	Color models for image sig models for video signal (YU color models (HSB, HLS, H signal (resolution, depth, m formats (gif, tiff, jfif, ps, bm	nal (RGB, CMY, CMYK). (JV, YIQ, YCbCr). Software ISV). Gamma correction. I nemory requirements). Ima p).	Color e-oriente mage ige	ed	2		0	
	Basics of video and televis	ion. Analog television and	Basics of video and television. Analog television and video. 2					

	Digital television and requirements.	Digital television and video. Video formats and memory requirements.						
	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 virt vision. Software and	ual real hardwa	ity. Histor are for vir	y. Stere	eoscopio lity.	c (3D)	2	0
								LE hours
	Sound recording. Sea	arching	of voiced	and ur	voiced	speech. Pito	ch period.	2
	Speech specific algo	rithms (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 1	rames or	n video	quality			2
	Multimedia systems o	on mobi	le device	s (Andr	oid prog	ramming)		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 wor ☑ exercises ☑ on line in entirety ☑ partial e-learning ☑ field work 	rkshops		□ inde □ mul ⊠ labo □ wor □	ependen timedia pratory k with m (othe	nt assignme nentor er)	nts	
Student responsibilities	The presence on lec Performed all require	tures in ed labor	the amo atory exe	unt of a rcises.	t least 7	0 % of the t	imes sche	eduled.
Screening student	Class attendance	3	Researc	:h		Practical tra	aining	
proportion of ECTS	Experimental work		Report			Individual v	vork	1,7
activity so that the	Essay		Seminal essay	•		(Oth	er)	
ECTS credits is	Tests	0,2	Oral exa	ım		(Oth	ier)	
value of the course)	Written exam	0,1	Project			(Oth	ier)	
Grading and evaluating student work in class and at the final exam	During a semester there are two midterms and final exam. Final exam a midterms are held according to the calendar of classes. At the final exam studer take the test from the complete course if they do not have a positive grade on t midterms or take the midterm that they did not pass. At the make-up a commission exam students take the test from the complete course. The requirement for passing grade is 50% points on each midterm exam or the fine exam. Grade (in percentage) is formed according to the formula: Grade(%) = 0.5*M1+0.5*M2: M1_M2 - midterm test results					exam and n students ade on the ke-up and or the final		

	The final grade is determined as follows:								
	Percentage Grade								
	50% to 61% sufficient (2)								
	62% to 74% good (3)	2% to 74% good (3)							
	75% to 87% very good (4)								
	88% to 100% excellent (5)								
Required literature (available in the	Title	Number of copies in the library	Availability via other media						
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: Processing", Prentice Hall, 2002 Rao, Bojkovic, Milovanovic: "Multimedia Commun Standards and Networks", Prentice Hall, 2002 	Media Coding	g and Content ns: Techniques,						
Quality assurance	- Evaluation of results in accordance with the above learning outcomes								
methods that ensure	- Feedback from students via surveys								
exit competences	- Self-evaluation of teachers								
- Institutional and non-institutional evaluations									
Other (as the proposer wishes to add)									

NAME OF THE COURSE	NETWORK AND MOBILE OPERATING SYSTEMS							
Code	FELJ35 Year of study 2.							
Course teacher	Josip Lörincz, Ph. D., Assistant Professor	Credits (ECTS)	5	5				
	Dinko Begušić, Ph. D., Full	Type of instruction	L	S	AE	LE	DE	
Associate teachers	Professor Ante Dagelć, mag. ing. comp.	(number of hours)	30	0	0	30		
Status of the course	Obligatory Percentage of application of e- learning 10%							
	COURSE DE	SCRIPTION	-					
Course objectives	 a objectives b objectives a bility to configure networks and network devices, b knowledge of application development techniques for network and mobile platforms, b knowledge of basic techniques of virtualization 							
Course enrolment requirements and entry competences required for the course	Basic computer skills. Basic knowledge of English. Knowledge of basic principles of programming. Knowledge of basic protocols in telecommunications.							
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 network and mobile operating systems, express the basic terms and concepts of cloud computing, distinguish between different types of wireless communication networks and protocols, apply the concept of virtualization of computer systems, configure the network and mobile devices, analyse the possibilities of mobile applications and apply the network and mobile operating systems as well as tools for application development on mobile platforms, develop applications for network and mobile platforms, continuously monitor the progress in the development of network and mobile operating systems and their applications. 							
	Course content			ļ	L nours	A ho	\E ours	
	General characteristics and cla	ssification of operating	g systen	ns	2			
	Android operating system				2			
broken down in detail by weekly	Mobility in communications sys systems)	tems (GSM, UMTS, L	TE		2			
class schedule (syllabus)	Communication networks and p model, TCP / IP protocol)	protocols (multiplexing	, OSI		2			
	Computer languages and hiera and mobile operating systems	rchical structures of ne	etwork		2			
	Software middleware and basic mobile operating systems (mult	characteristics of net iprocessing)	work an	ld	2			

	Process management of network and systems (table of processes, routines	2				
	Network and Distributed Operating S Network Computing)	ystems (clustered and	2			
	Systems on a chip		2			
	Basic concepts of cloud computing		2			
	Basic concepts in mobile cloud comp	uting	2			
	Operating systems for the cloud computing environment The structures of operating systems and virtualization of operating systems					
	System calls and process threads for operating systems	network and mobile	2			
	Communication between processes a allocation of processors	and algorithms for the	2			
	List of laboratory or design exercises			LE hours		
	Exercise 1: Operating System Cisco IOS, back up the OS with the router and restore the OS to the router, the configuration level, the basic configuration of the router and switch					
		2				
Exercise 3: Setup NAT / PAT translation, access lists (ACLs) on th router				2		
	Exercise 4: configuration of static and dynamic data traffic routing					
	Exercise 5: Virtualization of computer systems					
	Exercise 6: Introduction - programmin applications for the operating system	g environment for develop Android	ing	2		
	Exercise 7: Use of the following tools LogCat, Toast, Activity lifecycle, Inten	to create applications: Ger t	yMotion,	2		
	Exercise 8: The application of next too Configuration change, ListView, Base	ols to create applications: Adapter		2		
	Exercise 9: Application of advanced fu BaseAdapter tools for creating applica	e 9: Application of advanced functionality such as ListView and dapter tools for creating applications				
	Exercise 10: The implementation of HTTP requests - communication of applications with the server					
	Exercise 11: Define application local settings and work with Android libraries (LIB's) and Spinner System					
	Exercise 12: Configuration of simple a the operating system Android with the AsyncHttpClient	applications on a mobile de help of tools: GSON and	vice uder	2		
	Compensation laboratory exercises			2		
	Presentation of developed application in the form of seminar work					
	⊠ lectures	□ independent assignme	nts			
	⊠ seminars and workshops	□ multimedia				
Format of instruction		⊠ laboratory				
	□ on line in entirety	\Box work with mentor				
	 □ partial e-learning □ field work 	□ (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, Submitted and presented seminar work, minimum 50% points at each mid-term or final exam (or correctional or commission exam). 							
Screening student	Class attendance	0,8	Research		Practical traini	ng		
work (name the proportion of ECTS	Experimental work		Report		Independent w	vork	2	
credits for each activity so that the total number of	Essay		Seminar essay	0,8	Laboratory exe	ercises	0,8	
ECTS credits is equal to the ECTS	Tests		Oral exam		Preparation for Laboratory exe	r ercises	0,5	
value of the course)	Written exam	0,1	Project		(Other)			
Grading and evaluating student work in class and at the final exam	During the semeste exam will be after 8 the 1st and 2nd of curricula which they 4th of the final (co curricula. Rating (%) = 0.1PL - PL – presence on th LA- grades from labo SW - seminar work (M1, M2- the 1st and percentage), The final grade is de percentage Rating 50% to 61% is suffic 62% to 74% good (3 75% to 87% of very 88% 100% Excellent Independently on res and 4 th final (correction the case of organiza curricula content. Ref (commission) exam Examinations: 1 st Final exam 3 rd Final (correctiona 4 th Final (correctiona 5 th Final (commission) in specific academic	Vitten exam 0,1 Project (Other) 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 he 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 the final (correctional) exam, students take exam of complete course curricula. Rating (%) = 0.1PL + 0.2SW + 0,2LA + 0.25 (M1 + M2) PL – presence on the lectures (expressed in percentage), A- grades from laboratory assessment (expressed in percentage), SW - seminar work grades (expressed in percentage), W1, M2- the 1st and 2nd mid-term exam grades or final exam grades (expressed in percentage), M1, M2- the 1st and 2nd mid-term exam grades or final exam grades (expressed in percentage), The final grade is determined as follows: Descentage Rating 20% to 61% is sufficient (2) 5% to 87% of very good (4) 38% 100% Excellent (5) nd 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. In the case of organization of commission exam, students take exam of entire curricula content. In the case of organization of commission exam, students take exam of final and correctional (commission) exam is a positive assessment of laboratory exercises. Examinations: 18" Final exam 18" Final exam 2nd final exam 2nd Final exam 2nd						
Required literature		Title)		Number of copies in	Availabi other n	lity via nedia	
(available in the library and via other media)	 Josip Lorincz, Ne systems, FESB S 2016. 	etwork a Split, inte	nd mobile opera ernal teaching te	ting xt,		e-lear port	ning al	

	 Josip Lorincz, Ante Dagelić: Laboratory Exercises for course network and mobile operating systems, FESB Split, internal teaching text, 2015. 	e-learning portal
Optional literature (at the time of submission of study programme proposal)	 Operating Systems Concepts Essentials, A. Silberschatz, P.B. Gagne, John Wiley and Sons, Inc., 2011 Operacijski sustavi, L. Budin, Element d.o.o., 2011 Internet 	Galvin, G.
Quality assurance methods that ensure the acquisition of exit competences	 Evaluation of results in accordance with the above learning outc Feedback from students via surveys Self-evaluation of teachers Institutional and non-institutional evaluations Feedback from graduated students about the relevance of the c 	ourse content
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	5				
Associate teachers	Anna Šušnjara, Teaching Assistant	Type of instruction (number of hours)LSAELEDE3001515						
Status of the course	Obligatory	Percentage of application of e-learning	0					
	COURSE	E DESCRIPTION						
Course objectives	 Training students for: Understanding and apmodeling, Formulating and solve modern numerical meth Permanent adopting a modeling, Applyingof numerical communications involvi 	 raining 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 						
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 pri Apply numerical method Apply numerical method Apply numerical method Compute frequeny res Method (BEM) Develop simple code numerical methods for 	nciples of engineering mo ods to determine transient ods to solve one-dimension ods to solve two-dimension esponse of transmission M) and Finite Element Me ponse of wire antennas b s and use commercial s solving problems in electro	deling, response nal static n lines thod (FE y means software onics and	of electric engineering engineering by means M) of Bounda packages communic	circuits g problems g problems of Finite ry Element based on cations			
	Course content			L hours	AE hours			
Course content	Introduction to numerical m Differential and integral ap and etechnology.	nodeling. Source and field proach to solve problems	concepts in science	s. e 2	1			
broken down in detail by weekly class schedule	Classification of numerical and time domain. Domai discretisation methods.	methods. Analysis in the n discretisation methods.	ferquenc .Boundar	y y 2	1			
(syllabus)	Overview of numerical m (FDM).Finite Element M Method (BEM).	nethods; Finite Difference ethod (FEM). Boundary	e Metho Elemer	d nt 2	1			
	Introduction to Finite Different	ence Method (FDM).		2	1			
	Finite Difference Method	Finite Difference Method (FDM): One-dimensional static 2						

	problems.								
	Finite Difference I problems.	Method	(FDM):	Two-di	imensio	onal static	2	1	
	Finite Difference dimensional problem	Time ns.	Domain	(FDTD)) met	nod: one-	2	1	
	Introduction to Finite	Eleme	nt method	d (FEM)			2	1	
	Finite Element Methe	od: One	-dimensi	onal stat	tic prob	lems.	2	1	
	Finite Element Methe	inite Element Method: Two-dimensional static problems.							
	Finite Element Meth problems.	nod in t	he time (domain:	One-d	imensional	2	1	
	Introduction to Boun	dary Ele	ement Me	ethod (Bl	EM).		2	1	
	Application of nun waveguides, electric electromagnetic radi	nerical c circuit ation.	methods s, anten	to tra nas, hui	ansmiss man ei	sion lines, kposure to	2	1	
	List of laboratory or o	design e	exercises					LE hours	
	Numerical integratior	n – trape	esoidal ru	le				2	
	Numerical integratior	n- Simps	son and G	Gauss qu	uadratu	re		2	
	Adaptive integration							2	
	Collocation method							2	
	Least Square Method	b						2	
	Finite Difference Met	hod						2	
	Finite Element Metho	bd						3	
Format of instruction	 seminars and work exercises on line in entirety partial e-learning field work 	rkshops		 □ inde □ mult ⊠ labo □ work □ 	pender imedia ratory with m (othe	nt assignme nentor er)	nts		
Student responsibilities	The presence on lect Performed all require	tures in ed labor	the amoratory exe	unt of at ercises.	least 7	0 % of the t	imes sche	eduled.	
Screening student	Class attendance	2	Researc	h		Practical tra	aining		
proportion of ECTS	Experimental work		Report			(Oth	ier)	2,2	
credits for each activity so that the total number of	Essay		Seminai essay	ſ		(Oth	ier)	0,2	
ECTS credits is	Tests	0,2	Oral exa	am		(Oth	ier)	0,2	
value of the course)	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 wee lecturing and the second one is after the next 6 weeks. Each midterm test (120 in duration) consists of 3 questions (each containing theoretical part and numerical problem) and 2 longer numerical problems. The requirement for par- grade is the positive assessment of laboratory exercises and 50 % points on midterm. Grade (in percentage) is formed according to the formula: Grade(%) = 0,5 (M1 + M2)						7 weeks of at (120 min and short or passing ts on each		
	where M1 and M2 and percentage score:	re the m	ndterm te	st result	s, and	s determine	ed through	n tollowing	

	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 obligeduration) in winter/fall examination period. Final testcontaining theoretical part and short numerical proproblems. The requirement for passing grade is 50 %according to the described procedure. The midterm asas written tests.	ed to pass fina consists of 4 blem) and 2 I % points. Final and final exam	l test (150 min in questions (each onger numerical grade is formed s are carried out
	Title	Number of copies in the library	Availability via other media
Required literature (available in the	 D.Poljak, Teorija elektromagnetskih polja s primjenama u inženjerstvu, Šk. knjiga Zagreb, 2014. 		
media)	 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 Wiley Interscience, New York 2007. Jović, V.: Uvod u inženjersko numeričko modelira Split, 1993. 	Electromagne	etic compatibility, Engineering,
Quality assurance methods that ensure the acquisition of exit competences	 Evaluation of results in accordance with the above Feedback from students via surveys Self-evaluation of teachers Institutional and non-institutional evaluations 	e learning outo	comes
Other (as the proposer wishes to add)			

OPERATING SYSTEMS - FELJ13 - Sven Gotovac, Ph.D., Full Professor

NAME OF THE COURSE	OPTICAL COMMUNICATION SYSTEMS							
Code	FELJ10	Year of study	1.					
Course teacher	Dinko Begušić, Ph.D., Full Professor	Credits (ECTS)	5	5				
	Maja Stella, Ph.D., Assistant Professor		L	S	AE	LE	DE	
Associate teachers	lvica Meštrović, dipl. ing. Marko Banović, dipl. ing. Josip Babić, mag. ing,.	(number of hours)	30	0	15	15	0	
Status of the course	Obligatory: 242 Elective: 241	Percentage of application of e-learning						
	COURSE	E DESCRIPTION						
Course objectives	 Training students for: understanding and applic communication systems a application of passive and collaborate in design, dev systems and networks, permanent adoption and communication systems a 	raining students for: understanding and application of basic concepts and technologies of optical communication systems and networks, application of passive and active components of optical systems and networks, collaborate in design, development and maintenance of optical communication systems and networks, permanent adoption and deepening of the knowledge in the area of optical						
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 the basic concepts using optical communicat identify the characteristic systems and networks, identify the characteristic networks, collaborate in design, de systems and networks, permanently adopti au communication systems a 	s and methods for signal p ion systems, as and apply passive and as and apply the technolo evelopment and maintena and deepen the knowled and networks.	orocess active ogies of ance of dge in	ing ar comp optic optic the	nd com ponent al com al com area	imunia s of a imunia imunia of a	cation optical cation cation optical	
	Course content				L hours	/ hc	\E ours	
	Signal transmission and pr Optical fibre characteristics	ocessing using photonic s s.	ystems.		2		1	
Course content	Analysis of linear time inva	riant systems.			2		1	
detail by weekly class schedule	Splicing of the optical fibers cables.	s. Optical connectors. Opti	cal		2		1	
(syllabus)	Linear and nonlinear effect	s. Soliton systems.			2		1	
	Passive element sin optica Directional couplers, isolate multiplexers.	l communication systems. ors, circulators, optical filte	ers,		2		1	
	Bragg grating, Mach-Zende	xh-Zender interferometer, Fabry-Perot filter. 2					1	

Active components in optical communication networks. Optical 2 1 amplifiers. EDFA amplifiers. Light sources. Light emittin diodes (LED). Laser diodes (LD). 2 1 Photonic detectors. Pin photodiodes. Avalanche photodiodes 2 1 Photonic switches. Modulators and demodulators. 2 1 Photonic switches. Modulators and demodulators. 2 1 Characteristics of optical reservers. Design of the physical layer of the optical transmission system. 2 1 Systems with time domain multiplexing. Wavelength domain multiplexing (WDM, DWDM). 2 1 Optical networks SDH/SONET. Optical layer. Access networks based on optical technologies: FTTx systems. Passive optical networks (PON). 2 1 List of laboratory or design exercises LE ho 2 2 Power measurements in fiber optic systems. 2 2 2 Measurements on PON networks. 2 2 2 Measurements on PON networks. 2 2 2 Student cercises independent assignments 2 Measurements on PON networks. 2 2 2 Student chearning 0 1 2 <									
Light sources. Light emittin diodes (LED). Laser diodes (LD). 2 1 Photonic detectors. Pin photodiodes. Avalanche photodiodes 2 1 Photonic switches. Modulators and demodulators. 2 1 Photonic switches. Modulators and demodulators. 2 1 Characteristics of optical receivers. Design of the physical layer of the optical transmission system. 2 1 Systems with time domain multiplexing. Wavelength domain multiplexing (WDM, DWDM). 2 1 Optical networks SDH/SONET. Optical layer. Access networks based on optical technologies: FTTx systems. Passive optical networks (PON). 2 1 List of laboratory or design exercises LE ho Fiber optic and cables. 2 2 Power measurements in fiber optic systems. 2 2 2 Optical splicing. 2 2 2 Optical splicing. 2 2 2 Measurements on WDM systems. 2 2 2 Measurements on PON networks. 2 2 2 Student responsibilities 2 1 1 Streening studert work (name the proportion of ECTS credits for each sativity so that the total number of ECTS credits is equal to the ECTS 1 Res		Active components i amplifiers. EDFA am	n optica plifiers.	l commu	nication	networ	ks. Optical	2	1
Photonic detectors. Pin photodiodes. Avalanche photodiodes 2 1 Photonic switches. Modulators and demodulators. 2 1 Characteristics of optical receivers. Design of the physical layer of the optical transmission system. 2 1 Systems with time domain multiplexing. Wavelength domain multiplexing (WDM, DWDM). 2 1 Optical networks SDH/SONET. Optical layer. Access networks based on optical technologies: FTTx systems. Passive optical networks (PON). 2 1 List of laboratory or design exercises LE ho Fiber optic and cables. 2 2 Power measurements in fiber optic systems. 2 2 Optical splicing. 2 2 Optical splicing. 2 2 Optical connectors and splitters. 2 2 Measurements on VDM systems. 2 2 Measurements and workshops independent assignments multimedia Student seminars and workshops independent assignments 2 Student responsibilities Class attendance 1,0 Research Practical training 4 Student responsibilities Essay - Seminar 1 1		Light sources. Light emittin diodes (LED). Laser diodes (LD).						2	1
Photonic switches. Modulators and demodulators. 2 1 Characteristics of optical receivers. Design of the physical layer of the optical transmission system. 2 1 Systems with time domain multiplexing. Wavelength domain multiplexing (WDM, DWDM). 2 1 Optical networks SDH/SONET. Optical layer. Access networks based on optical technologies: FTTx systems. Passive optical networks (PON). 2 1 List of laboratory or design exercises LE ho 2 1 Power measurements in fiber optic systems. 2 2 1 Optical splicing. 2 2 2 1 Optical splicing. 2 2 2 1 Measurements on VDN systems. 2 2 2 2 Measurements on PON networks. 2 2 2 2 Measurements on PON networks. 2 2 2 2 Student responsibilities 2 1 1 2 2 Student responsibilities Class attendance 1,0 Research - Practical training rotwork with mentor assignments essay - Ssay - Ssay - S 2 0 Student responsibilities Sereening student work - Report - Individual work - Report - Individ		Photonic detectors. Pin photodiodes. Avalanche photodiodes (APD).						2	1
Format of instruction Class attendance 1,0 Research 2 1 Student responsibilities Class attendance 1,0 Research 2 1 Student responsibilities Class attendance 1,0 Research 2 1		Photonic switches.	Nodulate	ors and d	emodul	ators.		2	1
Systems with time domain multiplexing. Wavelength domain multiplexing (WDM, DWDM). 2 1 Optical networks SDH/SONET. Optical layer. Access networks based on optical technologies: FTTx systems. Passive optical 2 1 List of laboratory or design exercises LE ho Fiber optic and cables. 2 Power measurements in fiber optic systems. 2 Optical splicing. 2 Optical connectors and splitters. 2 Measurements by optical reflectometer. 2 Measurements on PON networks. 2 I electures Independent assignments Seminars and workshops Independent assignments I electures Independent assignments I aboratory I usoratory I field work I aboratory Student Class attendance 1,0 responsibilities Class attendance 1,0 Screening student work for the total number of ECTS credits is each Seminar 0,5 Laboratory exercises 0 0 Tests 0,2 Oral exam Preparation for laboratory exercises 0 Credits is each 1 Preparation for laboratory exercises 0		Characteristics of op layer of the optical tr	otical rec	ceivers. D sion syste)esign c em.	of the ph	iysical	2	1
Optical networks SDH/SONET. Optical layer. Access networks based on optical technologies: FTTx systems. Passive optical a term of technologies: FTTx systems. Passive optical a term of technologies: TTx systems. Passive optical a term of technologies: PTTx systems. Passive optical splicing. 2 1 Format of instruction Fiber optic and cables. 2 2 Measurements on WDM systems. 2 2 Measurements on PON networks. 2 Measurements on PON networks. 2 Seminars and workshops independent assignments Seminars and workshops independent assignments Seminars and workshops independent assignments Student seminars and workshops independent assignments Student seminars and work shops independent assignments Student seminar seminar seminar Student cass attendance 1,0 Research Practical training Student cass attendance 1,0 Research Practical training 2 Student feld work Seminar 0,5 Laboratory exercises 0 Exay <td></td> <td>Systems with time d multiplexing (WDM,</td> <td>omain n DWDM)</td> <td>nultiplexir</td> <td>ng. Wav</td> <td>velength</td> <td>domain</td> <td>2</td> <td>1</td>		Systems with time d multiplexing (WDM,	omain n DWDM)	nultiplexir	ng. Wav	velength	domain	2	1
List of laboratory or design exercises LE ho Fiber optic and cables. 2 Power measurements in fiber optic systems. 2 Optical splicing. 2 Optical connectors and splitters. 2 Measurements on WDM systems. 2 Measurements by optical reflectometer. 2 Measurements on PON networks. 2 Measurements on PON networks. 2 States independent assignments Seminars and workshops independent assignments exercises work with mentor on line in entirety work with mentor partial e-learning (other) field work 2 Student Exsay reedits for each - activity so that the Exsay Cass attendance 1,0 Research - Tests 0,2 Oral exam - Preparation for Cass attendance exams take part. The midterm and final exams. The first midterm exam is after 7 week Individual work 2 Ectors credits is equal to the Ectros Vritten exam 0,1 Project - (Other)		Optical networks SD based on optical tec networks (PON).	H/SON hnologie	ET. Optic es: FTTx	al layer system	. Acces s. Pass	s networks sive optical	2	1
Fiber optic and cables. 2 Power measurements in fiber optic systems. 2 Optical splicing. 2 Optical connectors and splitters. 2 Measurements on WDM systems. 2 Measurements by optical reflectometer. 2 Measurements on PON networks. 2 Measurements on PON networks. 2 Seminar and workshops independent assignments seminars and workshops independent assignments on line in entirety partial e-learning field work (other) Student responsibilities Class attendance 1,0 Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is sequal to the ECTS value of the course) Class attendance 1,0 Research - Practical training - Tests 0,2 Oral exam - Preparation for laboratory exercises 0 Written exam 0,1 Project - (Other) - Student responsibilities Screening student work - Besninar exercises and unmerical problems. The duration of laboratory exercises 0 Crading and evalue to		List of laboratory or	design e	exercises					LE hours
Power measurements in fiber optic systems. 2 Optical splicing. 2 Optical connectors and splitters. 2 Measurements on WDM systems. 2 Measurements by optical reflectometer. 2 Measurements on PON networks. 2 Seminar and workshops independent assignments multimedia laboratory partial e-learning (other) field work (other) Student Class attendance 1,0 Research - Practical training gradits for each class attendance 1,0 activity so that the Essay - botal number of Essay - ECTS credits for each 0,2 Oral exam - aulu of the course) Written exam 0,1 Project - Written exam 0,1 Project - (Other)		Fiber optic and cable	es.						2
Optical splicing. 2 Optical connectors and splitters. 2 Measurements on WDM systems. 2 Measurements by optical reflectometer. 2 Measurements on PON networks. 2 Student responsibilities 0 Student responsibilities 2 Student responsibilities Experimental work - Report - Individual work 2 Experimental work / Descreting and work (name the proportion of ECTS credits is escay 0,5 La		Power measurement	s in fibe	r optic sy	stems.				2
Optical connectors and splitters. 2 Measurements on WDM systems. 2 Measurements by optical reflectometer. 2 Measurements on PON networks. 2 Student responsibilities 2 Stu		Optical splicing.							2
Measurements on WDM systems. 2 Measurements by optical reflectometer. 2 Measurements on PON networks. 2 Measurements on PON networks. 2 Seminars and workshops independent assignments exercises on line in entirety partial e-learning work with mentor field work (other) Student Class attendance 1,0 Research - Practical training proportion of ECTS Experimental work - Rectify so that the total number of ECTS credits is equal to the ECTS value of the course) Class attendance 1,0 Research - Preparation for laboratory exercises 0 Written exam 0,1 Project - (Other) 0 Written exam 0,1 Project - (Other) 0 Grading and evaluating student work in class and at There are two midterms and final exams. The first midterm exam is after 7 week lecturing and the second one is after the next 6 weeks. Each midterm and final iconsists of 10 theoretical questions and numerical problems. The duration of exams take part. The midterm and final exams are carried out as written tests. requirement for passing grade is the positive assessment of laboratory		Optical connectors a	nd splitt	ers.					2
Measurements by optical reflectometer. 2 Measurements on PON networks. 2 Measurements on PON networks. 2 Image: Seminars and workshops Independent assignments Seminars and workshops Image: Independent assignments Image: Seminars and workshops Image: Independent assignments Image: Seminar and Work Image: Independent assignments Student responsibilities Image: Independent assignments Screening student work (name the proportion of ECTS credits is equal to the ECTS value of the course) Class attendance 1,0 Research - Practical training - ECTS credits is equal to the ECTS value of the course) Tests 0,2 Oral exam - Preparation for laboratory exercises 0 Written exam 0,1 Project - (Other) - Grading and evaluating student work in class and at the seminar exercise and 50 % points on each midterm and final exams are carried out as written tests. The divers assessment of laboratory exercises in the seminar exercise and 50 % points on each midterm exam		Measurements on W	DM sys	tems.					2
Grading and evaluating student work in class and at the final exams 0,2 Grading and evaluating student work in class and at the final exams 0,1 Percent of the course) Written exam 0,1 Project - (Other) Calars and attraction of the course) Written exam 0,1 Project - (Other)		Measurements by op	otical ref	lectomete	ər.				2
Format of instruction Seminars and workshops independent assignments Student exercises Induitimedia independent assignments independent assignments independent assignments In		Measurements on Po	ON netw	orks.					2
Student responsibilitiesScreening 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 attendance1,0Research-Practical training-Essay-Report-Individual work2Tests0,2Oral exam-Preparation for laboratory exercises0Written exam0,1Project-(Other)There are two midterms and final exams. The first midterm exam is after 7 week lecturing and the second one is after the next 6 weeks. Each midterm and final consists of 10 theoretical questions and numerical problems. The duration of e texams take part. The midterm and final exams are carried out as written tests. requirement for passing grade is the positive assessment of laboratory exercise the seminar exercise and 50 % points on each midterm exam or the final exam	Format of instruction	 seminars and work seminars and work exercises on line in entirety partial e-learning field work 	rkshops		□ inde □ mul ⊠ labo □ wor □	epender timedia oratory k with n (othe	nt assignme nentor er)	nts	
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 attendance1,0Research-Practical training-Tests0,2Seminar essay0,5Laboratory exercises0Written exam0,1Project-Preparation for laboratory exercises0Written exam0,1Project-(Other)There are two midterms and final exams. The first midterm exam is after 7 week. lecturing and the second one is after the next 6 weeks. Each midterm and final exams students test is 2 school hour. In the final exams students that did not pass the midter exams take part. The midterm and final exams are carried out as written tests. requirement for passing grade is the positive assessment of laboratory exercise the seminar exercise and 50 % points on each midterm exam or the final exams the final exam	Student responsibilities								
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)Experimental work-Report-Individual work2Tests0,2Oral exam-Seminar essay0,5Laboratory exercises0Written exam0,1Project-(Other)0Written exam0,1Project-(Other)There are two midterms and final exams. The first midterm exam is after 7 weeks lecturing and the second one is after the next 6 weeks. Each midterm and final exams students that did not pass the midter exams take part. The midterm and final exams are carried out as written tests.Grading and evaluating student work in class and at the final examThe continuous knowledge assessment grade (in percentage) is formed accord	Screening student	Class attendance	1,0	Researc	ch	-	Practical tra	aining	-
credits for each activity so that the total number of ECTS credits is 	work (name the proportion of ECTS	Experimental work	-	Report		-	Individual v	vork	2,2
Cotal number of ECTS credits is equal to the ECTS value of the course)Tests0,2Oral exam-Preparation for 	credits for each activity so that the	Essay	-	Semina essay	r	0,5	Laboratory	exercises	s 0,5
value of the course)Written exam0,1Project-(Other)There are two midterms and final exams. The first midterm exam is after 7 week lecturing and the second one is after the next 6 weeks. Each midterm and final exams of 10 theoretical questions and numerical problems. The duration of exams take part. The midterm and final exams students that did not pass the midter 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 exercise the seminar exercise and 50 % points on each midterm exam or the final exams the continuous knowledge assessment grade (in percentage) is formed accord	ECTS credits is equal to the ECTS	Tests	0,2	Oral exa	am	-	Preparation laboratory	n for exercises	0,5
Grading and evaluating student work in class and at the final exam	value of the course)	Written exam	0,1	Project		-	(Oth	ner)	
to the formula: Grade(%) = 0,05 NP + 0,15 LV + 0,4 (M1 + M2) the activities in percentage: • NP - attendance at lectures,	Grading and evaluating student work in class and at the final exam	There are two midte lecturing and the sec consists of 10 theoret test is 2 school hou exams take part. The requirement for pass the seminar exercis The continuous kno to the formula: Grithe activities in perco- • NP - attenda	There are two midterms and final exams. The first midterm exam is after 7 weeks of ecturing 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 eace est 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 equirement for passing grade is the positive assessment of laboratory exercises he seminar exercise and 50 % points on each midterm exam or the final exam fhe continuous knowledge assessment grade (in percentage) is formed accordin to the formula: Grade(%) = 0,05 NP + 0,15 LV + 0,4 (M1 + M2) he activities in percentage:						

	 LV – laboratory assessment, 							
	• M1, M2 – test results.							
	The final grade is based on the grade of the continuous knowledge assessment grade and the oral part of the final exam. The students whose grade may be ormed without the need for the oral part of the final exam may not be obliged to attend the 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 bassing 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.							
Required literature (available in the	Title Number of copies in the library Availability via							
library and via other media)	 D.Begušić: Optical communication networks, handouts, FESB, 2016. 		e-learning portal					
Optional literature (at the time of submission of study programme proposal)	 Rajiv Ramaswami, Kumar Sivarajan: "Optical Net Perspective", (Second edition), Academic Press, 2 Peter Tomsu, Christian Schmutzer: "Next Genera The Convergence of IP Intelligence and Optical te 2002 IEEE Communications Magazine, Documents of standardization institutions ITU, E⁻ Scientific papers in the area of optical communication 	works: A Prac 2002. tion Optical Ne echnologies", F TSI, IEEE and ation networks	tical etworks, Prentice Hall, others,					
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	PROFESSIONAL TRAINING							
Code	FEXX06	Year of st	tudy	3				
Course teacher	Head of the professional training from the Faculty	Credits (E	ECTS)	5				
Associate teachers	Head of the professional training from the private institution	Type of ir (number o	L	S	AE	LE	DE	
Status of the course	Elective	Percentage application	ge of n of e-learning					
	COURSE	DESCRI	PTION					
Course objectives	 Training students for: consolidating theoretical complex engineering prise acquaintance with the constitution, solving practical probleming inclusion in the labour resulting technical reports 	al knowledg oblems organizatio ms, narket,	ge and practica n, work and bus	l skills i siness (n solvi of the r	ng hig eceivi	hly ng	
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 							
Course content broken down in detail by weekly class schedule (syllabus)	Professional training is the receiving institution in account the head of the professional professional training from t	independe ordance wit al training f he Faculty	ent work of the s th the plan and from the receivi	student prograi ng insti	perfor mme a tution a	rmed ir greed and th	n the betwe e head	en d of
Format of instruction	 □ lectures □ seminars and workshops □ exercises □ on line in entirety □ partial e-learning □ field work 							
Student responsibilities	Independent work							
Screening student	Class attendance Research Practical training						4	
proportion of ECTS	Experimental work	Report		Indepe	ndent	work	T	
credits for each activity so that the total number of	Essay	Seminar essay		Report	writing	9		1
ECTS credits is	Tests	Oral exa	ım		(Other	·)		
value of the course)	Written exam	Project			(Other)			

Grading and evaluating student work in class and at the final exam	Professional training is not evaluated. Student professional training in accordance with the Regulation to write a Professional training report. Professional the head of professional training from the receiving professional training from the Faculty.	s are oblige on on professi training repor ng institution a	ed to complete onal training and t is validated by and the head of
Required literature (available in the	Title	Number of copies in the library	Availability via other media
media)			
Optional literature (at the time of submission of study programme proposal)			
Quality assurance methods that ensure the acquisition of exit competences	 Questionnaire on professional training Self-evaluation of the head of professional training Student survey of the whole study programme 		
Other (as the proposer wishes to add)			

NAME OF THE COURSE	PROJECT MANAGEMENT								
Code	FETJ01 Year of study 2.								
Course teacher	lvica Veža, Ph.D., Full Professor	Credits (ECTS)	4						
Associate teachers	Marko Mladineo, Ph D	Type of instruction	L	S	AE	LE	DE		
		(number of hours)	30	0	0	15			
Status of the course	Obligatory	Deligatory Percentage of application of e-learning 0							
	COURSE	E DESCRIPTION							
Course objectives	Training students for: - planning and mana - calculating profitab	aging projects illity of the project and retu	ırn of in	vestm	ent (R	OI)			
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 customer requirements (VOC) formulate the main goals of the project and rank them develop the main project activities and the structure of distribution of work – (Work Breakdown Structure) plan the time (to determine the critical path) plan capacity (determine bottlenecks and balance activities) plan costs and risks apply adopted knowledge and skills from contents of completed course to sol a specific task 								
	Course content				L hours	/ hc	AE ours		
	Introduction and basic cond	cepts			2		0		
	The concept and definition	of project and project mar	nageme	nt	2		0		
	Projects - vision, strategy, shipbuilding industries)	goals (examples - automo	tive and	1	2		0		
Course content	The strategy and project management. Multi-project management.						0		
broken down in	Basics of organization. The	e project organizational str	ucture.		2		0		
detail by weekly class schedule (syllabus)	The phases of the project (selection, project planning, project)	initiation of project, projec project management and	t end of		2		0		
	Methods for project plannir	ng.			2		0		
	Quality management (plan control)	ning of improvement and c	quality		2		0		
	Cost management. Continu	uous Improvement - Kaize	n.		2		0		
	Risk management.				2		0		
	Psychological and social co Project manager.	omponent of project mana	gement		2		0		

	Teamwork.						2	0	
	Communication and motivation in the team. Methods for 2						0		
	List of laboratory or o	List of laboratory or design exercises							
	Introduction to the te	chnique	of netwo	rk plan	ning.			1	
	Basic concepts of ne	asic concepts of network planning technique							
	Analysis of time	nalysis of time							
	CPM method							1	
	PERT method	RT method							
	PRECEDENCE meth	nod						1	
	Cost analysis							1	
	Resource analysis							1	
	Introduction to the so	ftware -	Microso	ft Proje	ct			1	
	Introduction to busine	ess proc	ess man	ageme	nt			1	
	Basics of process dia	agrams						1	
	Mapping processes							1	
	Comparison of differe	ent proc	ess diag	ams				1	
Format of instruction	 ☑ lectures ☑ seminars and wor ☑ exercises □ on line in entirety □ partial e-learning □ field work 	 ☑ lectures ☑ seminars and workshops ☑ exercises ☑ on line in entirety ☑ partial e-learning ☑ independent assignments ☑ multimedia ☑ laboratory ☑ work with mentor ☑ (other) 							
Student responsibilities	The presence on lec Performed all require	tures in ed labor	the amo atory exe	unt of a ercises.	t least 7	0 % of the t	imes sche	duled.	
Screening student	Class attendance	1,0	Researc	h		Practical tra	aining		
work (name the proportion of ECTS	Experimental work		Report			Individual v	vork	1,0)
credits for each activity so that the	Essay		Semina essay			laboratory	exercises	0,5	;
ECTS credits is equal to the ECTS	Tests	0	Oral exa	am		Preparation laboratory	n for exercises		
value of the course)	Written exam		Project		1,5	(Oth	ner)		
Grading and evaluating student work in class and at the final exam	Written examProject1,5(Other)During the semester the stages of project management are introduced to studer parallel they attend lectures and laboratory exercises to develop their project. There project work team and the minimum number of students is two, maximum number three. During the course they determine the content of their project and main target Students develop the main activities of project and the structure of distribution of w (WBS). They plan the time for each activity and determine the critical path. Stude also plan capacities and determine bottlenecks and balance capacities. At the end th determine the costs, calculate project profitability (ROI) and analyze risks. On t students present their work which is evaluated (grade M).On the other side students have one test in the field of Network plann techniques (LV) at the end of the semester.• LV - grade of laboratory exercises, • M - points achieved from the project.						student it. There number ain target on of wo Studer e end the s. On te	ts, is is. rk st ey st ∩g	

	Title	Number of copies in the library	Availability via other media								
Required literature	Veža, I., Bilić, B., Gjeldum, N., Mladineo, M., "Upravljanje projektima", Fakultet elektrotehnike, strojarstva i brodogradnje, Split, 2011.		e-learning portal								
library and via other media)	Majstorović, V. Projektni menadžment, Sveučilište u Mostaru, Mostar, 2010.	5									
	5										
Optional literature (at the time of submission of study programme proposal)	"A Guide to the Project Management Body of Knowle Management Institute, Newtown Square, 2004. Wysocki, R. K., McGary, R., "Effective Project Manag Extreme", John Wiley & Sons, 2003.	dge, PMBOK gement: Traditi	Guide", Project onal, Adaptive,								
Quality assurance methods that ensure the acquisition of exit competences	 Evidence about class attendance The annual analysis of performance of the exist of the the exist of t	caminations	it the relevance								
Other (as the proposer wishes to add)											
NAME OF THE COURSE	RADARS	RADARS									
---	---	---	--	--	------------------------------	-------------------------------------	--------------------	--	--	--	--
Code	FELJ28	Year of study	1								
Course teacher	Zoran Blažević, Ph.D., Full Professor	Credits (ECTS)	5								
Associate teachers	Maja Škiljo, Ph.D.	Type of instruction (number of hours)	L 30	S 0	AE 0	LE 30	DE 0				
Status of the course	Elective	Percentage of application of e-learning	0								
	COURSE	E DESCRIPTION									
Course objectives	 explaining and increas operation principle, and calculating and estimat differentiating betweer and disadvantages visualization of possib radar operation considering and investi 	 explaining and increasing the knowledge about radiolocation principles, radar operation principle, and the role of all main radar subsystems. calculating and estimating the basic radar signal parameters differentiating between specific radar types and perceiving their advantages and disadvantages visualization of possibilities and characteristics of surveillance and targeting radar operation considering and investigating modern solutions in radar technology 									
Course enrolment requirements and entry competences required for the course	Finished the undergraduate study of Communications and Information Technology										
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: develop competencies i certain radar subsystem estimate and calculate recognize the relation b evaluate and perceive a consider and analyze c 	in individual and team wor ns radar target parameters etween certain tactical and advantages and disadvant haracteristics of surveillan	k in an d techr ages o ce and	alyzing hical ra f certa target	g and o dar re in rada	design quiren ar type dars	ing nents is				
	Course content					Lh	ours				
	Introduction to radar syster	ns.					1				
	Basic principles of radar sy	stems.					2				
	Parameters of radar signal						2				
	Radio wave propagation, ra	adar equation and maximu	ım ran	ge.			3				
	Radar cross section.						3				
broken down in	Estimation of target positio	n parameters by radar sig	nal.				2				
detail by weekly	Basic radar hardware.						2				
class schedule	Moving target indication (N	ITI) radar.					3				
(Synabus)	Doppler impulse radar.										
	Synthetic aperture radar (SAR).										
	Meteorological radar.						2				
	Ultra wideband (UWB) rada	ar.				2					
	Target tracking.						2				
	Clutter cancelation in radar	systems.					1				

List of laboratory exe	ercises					L	E hours
Transmission and ref network analyzer.	lection I	measurer	ments c	of device	es using vector		2
Radar principles- the	measu	rement of	target	distance	Э.		6
Numerical simulation	of targe	et radar c	ross se	ction.			2
The measurement of	bistatic	radar cro	oss sec	tion.			2
SAR radar concept- s	simulatio	on and m	easure	ments.			4
MTI radar concept- s	imulatio	n and me	easuren	nents.			2
UWB radar concept-	simulati	on and m	neasure	ements.			2
Group visit to HRM (0	Croatian	ı Navy) in	Lora.				5
Group visit to Naval centre of electronics (PCE) Split.							5
 lectures seminars and wor exercises on line in entirety partial e-learning field work 	□ independent assignments □ seminars and workshops □ exercises □ on line in entirety □ partial e-learning □ field work						
The presence on lec Performed all labora	ne presence on lectures in the amount of at least 70 % of the times scheduled. erformed all laboratory exercises required.						
Class attendance 1.5 Research				Practical trainir	ng		
Experimental work		Report		Individual work			
Essay		Seminar essay 2		Laboratory exe	ercises	1	
Tests	0,5	Oral exam			Preparation for laboratory exer	rcises	
Written exam		Project			(Other)		
There is one midterr lecturing and the s semester. The mid Seminar essay inclu- the results. The stud the presentation of t as written test. Grad the activities in perce • NP - attenda • LV – laborat • M - test resu • S- seminar e	 There is one midterm test and seminar essay. The midterm test is after 7 weeks of ecturing and the seminar essays are presented during the next part of the semester. The midterm test consists of theoretical questions and numerical. Seminar essay includes individual work and work in groups, and the presentation of he results. The students that did not pass the test take part In the final exams and he presentation of the seminar essay is obligatory. The midterm test is carried out as written test. Grade (in percentage) is formed according to the formula: Grade(%) = 0,1 NP + 0,1 LV + 0,4 (M + S) he activities in percentage: NP - attendance at lectures, LV – laboratory assessment, M - test results, S cominar oscay 						
	Title	•			Number of copies in the library	Availat other	oility via media
• M. Škiljo:: Radari	, predav	/anja				e-lea po	arning ortal
 Skolnik, M: Introc McGraw-Hill, 199 	duction t	o Radar	System	S,	1		
 Peebles, P. Z: "R Sons, 1998. 	adar Pr	inciples",	John V	Viley &	1		
	List of laboratory exe Transmission and ref network analyzer. Radar principles- the Numerical simulation The measurement of SAR radar concept- s MTI radar concept- s UWB radar concept- Group visit to HRM (0 Group visit to Naval of I lectures Seminars and wor exercises on line in entirety partial e-learning field work The presence on lect Performed all labora Class attendance Experimental work Essay Tests Written exam There is one midterr lecturing and the se semester. The mid Seminar essay inclu- the presentation of t as written test. Grad the activities in percer NP - attendar LV – laborat M. Škiljo:: Radari M. Škiljo:: Radari M. Škiljo:: Radari Sons, 1998.	List of laboratory exercises Transmission and reflection in network analyzer. Radar principles- the measure Numerical simulation of targe The measurement of bistatic SAR radar concept- simulatio UWB radar concept- simulatio UWB radar concept- simulatio Group visit to HRM (Croatian Group visit to Naval centre of Seminars and workshops a exercises on line in entirety partial e-learning field work The presence on lectures in Performed all laboratory exercises Class attendance Class	List of laboratory exercises Transmission and reflection measurement work analyzer. Radar principles- the measurement of Numerical simulation of target radar of Cardinal Simulation and measurement of bistatic radar of Cardinal Simulation and measurement of bistatic radar of Cardinal Simulation and measurement of principles is simulation and measurement of provide the results of the measurement of electron is seminars and workshops □ and line in entirety □ partial e-learning ⊠ field work The resence on lectures in the amore performed all laboratory exercises reclass attendance □ class attendance 1.5 Researce Class attendance 1.5 Resport Essay Seminar essay There is one midterm test and seminal ecturing and the seminar essays semester. The midterm test consi Seminar essay includes individual wore the results. The students that did not the presentation of the seminar essays as written test. Grade (%) = 0,1 the activities in percentage: NP - attendance at lectures, NP - attendance at lectures, NP - attendance at lectures, NP - attendance at lectures, S. Seminar essay Se seminar essay: Seminar essay Se seminar essay: Seminar essay Seminar essay includes individual wore the results. The studers that did not the presentation of the seminar essay	List of laboratory exercises Transmission and reflection measurements of network analyzer. Radar principles- the measurement of target Numerical simulation of target radar cross see The measurement of bistatic radar cross see SAR radar concept- simulation and measurem MTI radar concept- simulation and measurem MTI radar concept- simulation and measurem Group visit to HRM (Croatian Navy) in Lora. Group visit to Naval centre of electronics (PC lactures lacture lactures	List of laboratory exercises Transmission and reflection measurements of device network analyzer. Radar principles- the measurement of target distance Numerical simulation of target radar cross section. The measurement of bistatic radar cross section. SAR radar concept- simulation and measurements. MTI radar concept- simulation and measurements. Group visit to HRM (Croatian Navy) in Lora. Group visit to Naval centre of electronics (PCE) Split lectures seminars and workshops lectures numerical elearning nultimedia exercises nultion and measurements. Class attendance 1.5 Research Experimental work Seminar essay Class attendance 1.5 Research Experimental work Seminar essay Class attendance Class a	List of laboratory exercises Transmission and reflection measurements of devices using vector network analyzer. Radar principles- the measurement of target distance. Numerical simulation of target radar cross section. SAR radar concept- simulation and measurements. MTI radar concept- simulation and measurements. MWB radar concept- simulation and measurements. WWB radar concept- simulation and measurements. Group visit to Naval centre of electronics (PCE) Split. Seminare sad with the results for the amount of at least 70 % of the time Performed all laboratory exercises required. Class attendance I.5 Research	List of laboratory exercises Transmission and reflection measurements of devices using vector network analyzer. Radar principles- the measurement of target distance. Numerical simulation of target radar cross section. SAR radar concept- simulation and measurements. ATI radar concept simulatic and seminar essay. The midterm test i

Optional literature (at the time of submission of study programme proposal)	 Tait, P: "Introduction to Radar Target Recognition", IEE, 2005. Zentner, E.: Antene i radiosustavi, Graphis Zagreb, 2001.
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	RADIO COMMUNICATIO	RADIO COMMUNICATIONS									
Code	FELJ02	Year of study	1.								
Course teacher	Zoran Blažević, Ph.D., Full Professor	Credits (ECTS)	5								
Associate teachers	Maja Škiljo, Ph.D.	Type of instruction (number of hours)	L 30	S 0	AE 15	LE 15	DE 0				
Status of the course	Obligatory	Percentage of application of e-learning	0								
	COURSE	E DESCRIPTION									
Course objectives	 Training students for: understanding and appradio-propagation, radio-channel physical permanent adoption ar engineering. 	 Fraining students for: understanding and application of basic principles and mechanisms of Earth radio-propagation, radio-channel physical phenomena modelling, permanent adoption and deepening of knowledge in the field of radio engineering. 									
Course enrolment requirements and entry competences required for the course	inished the undergraduate study of Communications and Information Technology										
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: define the fundamental phenomena, the quantities and the laws of Earth radio-propagation, apply fundamental laws of radio-propagation and model basic radio-channels, calculate and estimate basic radio-channel parameters, apply channel models for radio-signal quality estimation apply basic methods of radio-channel measurements 										
	Course content				L hours	/ hc	\E ours				
	Introduction to Radio Communications. History perspective of radio engineering. SI units.						-				
	Radiowave propagation. So Atmosphere.	urface Waves. Division of			2		1				
	Radio-antenna parameters a	and effective isotropic radiat	ed pow	ər.	2		2				
	Free space radiowave prop	pagation. Radio-gain.			2		1				
Course content	Propagation by Troposphe	re			1		1				
detail by weekly	Effective Earth Radius Mod	del and Flat Earth Model.	Ducting.		3		1				
class schedule	Radio-horizon by refraction	 Influence of Earth curvat 	ure		2		1				
(syllabus)	Tropospheric loss by hydro	meteors and gasses			1		1				
	Propagation by lonosphere)			3		1				
	First midterm exam										
	Propagation by diffraction. Knife-Edge Model.	Fresnel wave theory on di	ffractior	٦.	4		1				
	Approximate methods for n	nultiple diffraction loss esti	mation		2		2				
	Geometrical Theory of Diffi	raction. Keller's law of diffr	action.		1		1				
	Propagation by reflection.	Fresnel reflection coefficien	nts.		4		1				

	Ground roughness ir	nfluence	e. Diverge	ence fac	ctor.				
	Interference by direct	t and g	round ref	lected w	vave. Po	wer law.	2	-	1
	Second midterm exa	am							
	List of laboratory exe	ercises						LE h	ours
	Introduction to labora	atory ins	truments	, device	s and o	ther equipm	nent	2	2
	Reflection parameter	rs meas	urements	6				2	4
	Transmission parame	eters me	easureme	ents				4	4
	Measurements of rac	dio-chan	nels by s	pectrun	n analys	er		3	3
	Software estimations	of diffra	action los	S				2	2
	⊠ lectures			□ in da			nto		
	□ seminars and wo	rkshops			ependen	it assignme	nis		
Format of instruction	⊠ exercises			⊡ mui					
Format of instruction	□ on line in entirety				Diatory	o o to r			
	□ partial e-learning			U wor	K with m	ientor			
	⊠ field work				(othe	er)			
Student	The presence on lec	tures in	the amo	unt of a	t least 7	0 % of the t	times sch	eduleo	J.
responsibilities	Performed all labora	tory exe	ercises re	quired.					
Screening student	Class attendance	2,0	Researc	ch		Practical tra	aining		
proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS	Experimental work		Report		Individual work			1.5	
	Essay		Seminar essay		Laboratory	Laboratory exercises		0,8	
	Tests	0,5	Oral exam		Preparation laboratory	n for exercises	5	0,2	
value of the course)	Written exam		Project		(Oth	ner)			
Grading and evaluating student work in class and at the final exam	There are two midted lecturing and the sector tests consist of theo the midterm exams carried out as writt assessment of labor final exam. Grade (in the activities in percen- NP - attenda LV – laborat M1, M2 – test	rms and cond on retical q take pa en tests atory ex n percer Grade(% entage: ance at l cory asso st result	I final exa e is after juestions rt In the s. The re- kercises hat age) is hat age) is hat age) is hat age) is hat age) is hat age) is hat age, $hat agehat age$, $hat agehat age$	ams. Th the ney and nu final exa equirem and 40 formed IP + 0,1	e first m kt 6 wee merical. ams. Th ent for % points accordir LV + 0,	idterm exar eks. Each m The studen e midterm passing gi s on each r ng to the for 4 (M1 + M2	m is after nidterm te nts that c and final rade is t nidterm e mula:	7 wee st and id not exam he po exam c	ks of final pass s are sitive or the
		Title	•			Number copies i the libra	of Ava n oth ry	labilit er me	y via dia
Required literature (available in the	 I. Zanchi, Z. Blaž predavanja, FES 	ević: Ra B	adiokomu	ınikacije) ,		e	learnir portal	ng
media)	Boithias, L.: Radi Oxford Academic	io Wave c 1987.	Propaga	ation, No	orth	1			
	Zentner, E.: Radi Zagreb, 1980.	iokomur	nikacije, Š	Školska	knjiga -	2			
Optional literature (at the time of submission of study programme	 Zentner, E.: Ante Parsons, J. D.: " Publishers - Long 	ene i rad The Mot don, GB	iosustavi pile Radio , 1992.	, Graph o Propa	is Zagre gation C	eb, 2001. Channel", Pe	entech P	ess	

proposal)	 Doble, J.: "Introduction to Radio Propagation for Fixed and Mobile Communications", Artech House Boston - London, GB, 1996.
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	RADIO FREQUENCY IDEI	NTIFICAT	ION TECHNOL	OGY				
Code	FELJ38	Year of st	tudy	3.				
Course teacher	Joško Radić, Ph.D., Associate Professor Petar Šolić, Ph.D., Assistant Professor	Credits (E	ECTS)	5				
Accesiote teachere		Type of ir	nstruction	L	S	AE	LE	DE
Associate teachers		(number	of hours)	30	0	0	30	0
Status of the course	Elective	Percenta applicatio	ge of on of e-learning	0				
	COURSE	DESCRI	PTION					
Course objectives	Fraining 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	lone						
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Describe architecture and Explain protocols used in Explain reasons of introd Choose appropriate RFIE Choose appropriate RFIE Project simple solution to 	 Students will be able to: Describe architecture and types of RFID systems Explain protocols used in RFID systems Explain reasons of introducing RFID systems with multiple readers Choose appropriate RFID system regarding to its application Choose appropriate RFID system regarding to its demands on the application 						
	Course content				1	L hours	l hc	_E ours
	RFID system architecture					3		2
	Types of RFID systems					2		2
Course content	Networking protocols in con multiple tags, decision trees	nmunicati and ALC	on of one reade DHA	r and		4		4
broken down in	CDMA and CSMA systems					2		2
detail by weekly	Mobility and energy efficien	cy of RFII	D systems			2		2
(syllabus)	Systems with large number	of reader	s and tags			3		3
	Problems in RFID systems	implemen	itation			2		2
	Enviroments appropriate for the usage of RFID systems					2		2
	RFID systems applications,	access c	ontrol and identi	fication		2		2
	Competitive technologies for identification and localization, bar-codes, wireless sensor networs					2		2
	⊠ lectures		□ independent	assign	ments	3		
Format of instruction	□ seminars and workshops	5	multimedia	-				
Format of Instruction	⊠ exercises		□ laboratory					
	□ on line in entirety		work with m	entor				

	partial e-learningfield work		[(othe	er)		
Student responsibilities	The presence on lect Performed all require	tures in ed labor	the amount atory exert	nt of at cises.	t least 7	0 % of the time	s schedu	led.
Screening student	Class attendance	0,8	Research	1		Practical traini	ng	
work (name the proportion of ECTS	Experimental work		Report			Individual work	(3
credits for each activity so that the	Essay		Seminar essay			Laboratory exe	ercises	0,5
ECTS credits is equal to the ECTS	Tests	0,1	Oral exan	n		Preparation for laboratory exe	r rcises	0,5
value of the course)	Written exam	0,1	Project			(Other)		
Grading and evaluating student work in class and at the final exam	During the semeste and final exams con not pass the midtern The midterm and fir passing grade is the on each midterm according to the form Grade (%) = 0,75 * (M1, M2 - points at the laboratory (with com The final evaluation percentage Rating 50% to 61% is suffic 62% to 74% good (3) 75% to 87% of very 88% 100% Excellent	er there are two mid-term exams and the final exams nsist of questions and tasks. In the final exams stud m exams take part. inal exams are carried out as written tests. The req ne positive assessment of laboratory exercises and exam or the final exam. Grade (in percentage mula: (0.5 * M1 + 0,5 * M2) + 0,25 * L; the mid-term expressed as a percentage, and L - po npleted all lab. Exercises) expressed as a percentage is determined as follows:					exam. M students and 50 % tage) is - points fi ntage.	lid-term that did nent for points formed
Required literature (available in the		Title)			Number of copies in the library	Availabi other r	lity via nedia
media)	Nastavni materijali z radiofrekvencije ider	a kolegi htifikacije	j Tehnolog e	jija			e-lear	ning
Optional literature (at the time of submission of study programme proposal)	M. Bolic, D. Simplot- challenges, edited b Computing, 2010.	Ryl, I. S ook, Wil	Stojmenovi ley Series	c, RFII in Wire	D Syste eless Co	ms: Research to mmunications	rends and and Mob	d ile
Quality assurance methods that ensure the acquisition of exit competences Other (as the proposer wishes to	 Evaluation of res Feedback from s Self-evaluation of Institutional and 	Evaluation of results in accordance with the above learning outcomes Feedback from students via surveys Self-evaluation of teachers Institutional and non-institutional evaluations						
add)								

NAME OF THE COURSE	RADIOFREQUENCY ELE	CTRONICS					
Code	FELJ07	Year of study	2.				
Course teacher	Ivan Marinović, Ph.D., Full Professor	Credits (ECTS)	5				
Associate teachers		Type of instruction (number of hours)	L 30	S	AE	LE 30	DE
Status of the course	Elective: 241, 242	Percentage of application of e-learning					
	COURSE	E DESCRIPTION					
Course objectives	Training students for: - analysis of simple RF of - doing measurements of	circuits on the circuits					
Course enrolment requirements and entry competences required for the course	Finished course Electronic	components and circuits					
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: understand principles of basic RF circuits do DC analysis of electronic circuits do AC analysis of electronic circuits do analysis in frequency domain make measurements of the basic RF parameters 						
	Course content					ہ hc	\E ours
	Impedance matching, RF filters 6						
	Oscillators				6		
	C-class power amplifiers				6		
Course content	Modulation				6		
detail by weekly	Superheterodyne receiver,	PLL-loop			6		
class schedule	List of laboratory or design	exercises				LEI	nours
(syllabus)	LP and HP filters						6
	Oscillator						6
	C-class power amplifier						6
	AM and FM modulators						6
	PLL-loop						6
Format of instruction	 □ lectures □ seminars and workshops □ independent assignments □ multimedia □ aboratory □ partial e-learning □ field work □ independent assignments □ multimedia □ work with mentor □ (other) 						
Student responsibilities	The presence on lectures a scheduled. Performed all re	and exercises in the amou equired laboratory exercis	int of at lises.	least	70% 0	f the ti	mes

Screening student	Class attendance	2	Research		Practical traini	ng			
proportion of ECTS	Experimental work		Report		Exercises		1		
credits for each activity so that the total number of	Essay		Seminar essay		Individual work	<	2		
ECTS credits is	Tests		Oral exam		(Other)				
value of the course)	Written exam	Project			(Other)				
Grading and evaluating student work in class and at the final exam	There are two midte lecturing and the se theoretical questions exams students that carried out as written grading is applied.	here are two midterms and final exams. The first midterm exam is after 7 we cturing and the second one is after next 6 weeks. Each midterm test cons eoretical questions and numerical problems as well as the final test. In the kams students that did not pass the midterm exams take part. The midtern arried out as written tests while the final exams are written and oral. The ab rading is applied.							
		Title					lity via nedia		
Required literature (available in the library and via other	 I. Modlic, B. Mod elektronika, mod frekvencije, Škols 	5							
media)	 I. Modlic, B. Mod elektronika, oscil knjiga 	5							
	M. Vujnović, Osc	ilatori, Š	Skolska knjiga		5				
Optional literature (at the time of	- P. Vizmuller, RF design guide, Systems, Circuits and Equations, Artech House								
submission of study programme proposal)	 Jon B. Hagen, Radio-Frequency Electronics, Circuits and Applications, Cambridge University Press 								
Quality assurance methods that ensure the acquisition of exit competences	 Evidence of students attendance Annual analysis of grades achieved Teachers self-evaluation Students feedback via questionnaires and surveys 								
Other (as the proposer wishes to add)									

NAME OF THE COURSE	SATELLITE POSITIONIN	SATELLITE POSITIONING SYSTEMS								
Code	FELJ25	Year of study	1.							
Course teacher	Zoran Blažević, Ph.D., Full Professor	Credits (ECTS)	5							
Accesicto topohoro	Maia Čkilia, Dh D	Type of instruction	L	S	AE	LE	DE			
Associate teachers	Maja Skiijo, Ph.D.,	(number of hours)	30	0	0	30	0			
Status of the course	Elective	Percentage of application of e-learning	0							
	COURSE	E DESCRIPTION								
Course objectives	 Training students for: understanding of basic principles of and problemacy of radio-positioning systems, applying and operating receiving radio-positioning equipment calculation and analysis of satellite positioning systems parameters 									
Course enrolment requirements and entry competences required for the course	Finished the undergraduate	Finished the undergraduate study of Communications and Information Technology								
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: define and explain radii calculate and estimate apply channel models apply standards to radii 	 Students will be able to: define and explain radio-positioning techniques, calculate and estimate basic radio-positioning system parameters, apply channel models to radio-propagation in satellite positioning systems apply standards to radio-positioning network design 								
	Course content			H	L nours	hc	AE ours			
	Introduction. GPS, GLONA	SS, GALILEO.			1					
	Position fix by using satellit	tes. GPS coordinate system	ms.		2					
	GPS measurements: pseu	do-range and delta-pseud	orange.		3					
	GPS equations. Analytic so	olution.			4					
Course content	GPS equation solution app linearization.	lying iterative techniques b	based c	on	2					
detail by weekly	Kalman filter.				2					
class schedule	Performances of standalor	e GPS. Pseudo-range err	ors.		3					
(syllabus)	Delusion of precision. DOP parameters.									
	Vertical accuracy for fixed		1							
	Horzontal accuracy for fixed satellite-user geometry.									
	Differential GPS. LAD-GPS	S			2					
	Error sources in DGPS sys	stem.			2					
	WADGPS.				2					
	Midterm exam									

	List of laboratory exe	ercises					L	E hours	
	Introduction to GPS r	eceiver	s, handlir	ng and a	applicati	ons		10	
	Application of GPS s and data analysis. Ap download.	oftware oplicatio	(Trimble on of Inter	and Vis net for	sual GPS DGPS c	6) for GPS plan orrections	ining	5	
	GPS signal quality ar	nd GPS	paramet	ers mea	asureme	nts		10	
	Measurements by GI	PS. Rou	ites meas	sureme	nts and s	saving.		5	
Format of instruction	 ☑ lectures ☑ seminars and wor ☑ exercises ☑ on line in entirety ☑ partial e-learning ☑ field work 	rkshops		⊠ inde □ mul ⊠ labo □ wor □	ependen timedia pratory k with m (othe	nt assignments nentor er)			
Student responsibilities	The presence on lec Performed all labora	ne presence on lectures in the amount of at least 70 % of the times scheduled. erformed all laboratory exercises required.							
Screening student	Class attendance	1.5	Researc	:h		Practical trainir	ng		
work (name the proportion of ECTS	Experimental work		Report			Individual work	ζ.	2	
credits for each activity so that the total number of ECTS credits is equal to the ECTS	Essay		Semina essay	ſ		Laboratory exercises		0,8	
	Tests	0,5	Oral exa	xam Preparat laborato		Preparation for laboratory exer	Preparation for aboratory exercises		
value of the course)	Written exam		Project			(Other)			
Grading and evaluating student work in class and at the final exam	There are one midter of theoretical question midterm exams tak carried out as writt assessment of labor exam, and the rest student. Grade (in po- the activities in perco- • NP - attenda • LV – laborat • M – test rest • S – seminar	erm and ons and e part I en tests ratory ex of the g ercentage Grade(entage: ance at I ory asse ults., y work r	one final numerica n the fin s. The ro xercises, grade dep ge) is forn %) = 0,1 lectures, essment,	exam. al proble al exar equirem 40 % p bends co ned acc NP + 0,	Both mi ems. The nent for points or on the se cording t 1 LV + (dterm test and e students that midterm and passing grade the midterm e eminary work p to the formula: 0,4 (M + S)	final tes did not final ex e is the exam or presente	t consist pass the ams are positive the final d by the	
		Title	9			Number of copies in the library	Availat other	oility via media	
Required literature	 Z. Blažević: Sust predavanja 	avi sate	litskog po	ozicioni	ranja,		e-lea po	arning ortal	
(available in the library and via other media)	 Kaplan, E. D.:"Un and Applications London, 1996 	nderstar ", Artecł	nding GP n House,	S Princ Boston	iples	1			
	 B. W. Parkinson, J. J. Spliker Jr., "Global Positioning System: Theory and Applications Volume I", American Institute of Aeronautic and Astronautics, 1996. 				1				

Optional literature (at the time of submission of study programme proposal)	* ICD-GPS-200, NAVSTAR GPS Space Segment/Navigation User Interfaces, ARINC Research Corporation
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	SIMULATION AND MEASUREMENT OF ELECTROMAGNETIC QUANTITIES						
Code	FELJ29	Year of study	2.				
Course teacher	Dragan Poljak, Ph.D., Full Professor Antonio Šarolić, Ph.D., Full Professor	Credits (ECTS)	5				
Associate teachers	Niko Ištuk, Teaching	Type of instruction	L	S	AE	LE	DE
Associate teachers	Assistant	(number of hours)	30			30	
Status of the course	Elective	Percentage of application of e-learning	0				
	COURSE	DESCRIPTION	-				
Course objectives	 Training students for: solving of electromagne solving of electromagne measurements 	etic problems by modelling etic problems using instrun	and usi nentatio	ing nu n for	umeric: electro	al met magn	hods etic
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: use the measurement instrumentation for electromagnetic measurements use the numerical methods for simulation of electromagnetic problems use the measurement methods for measuring important parameters of radio systems 						
	Course content		L hours	/ hc	AE ours		
	Overview of numerical met		2		0		
	Theory of transmission lines.	n.	2		0		
	Application of finite differen domain.	Э	2		0		
	Theory of antennas. Analys		2		0		
	Application of analytic and models.	numerical procedures in a	ntenna		2		0
Course content	Application of finite elemen domain.	t method in frequency and	l time		2		0
detail by weekly class schedule	Application of boundary ele	ement method in frequency	/ and tin	ne	2		0
(syllabus)	Instrumentation and enviro measurements.	nment for electromagnetic	;		2		0
	Measurements in controlle measurement setup. Cham measurements.	d environment: Componer bers for electromagnetic	its of the	9	2		0
	Measurements in controlled e	nvironment: Measurement pr	ocedures	S	2		0
	Measurements in uncontrolled measurement setup.	d environment: Components o	of the		2		0
	Measurements in uncontro procedures.	lled environment: Measure	ement		2		0
	Measurement errors, meas	surement uncertainty.			2		0

	List of laboratory or	design e	exercises				I	LE hours	
	Overview of numeric	al metho	ods in ele	ctroma	gnetics.			2	
	Theory of transmission	on lines.	. Analysis	in time	e and fre	quency domain	n.	2	
	Application of finite difference methods in frequency and time domain.							2	
	Theory of antennas.	Analysis	s in frequ	ency ar	nd time o	domain.		2	
	Application of analyti	c and n	umerical	procedu	ures in a	ntenna models		2	
	Application of finite e	plication of finite element method in frequency and time domain.							
	Application of bound	plication of boundary element method in frequency and time domain.							
	Instrumentation and	environ	ment for e	electron	nagnetic	measurements	s.	2	
	Measurements in con measurement setup.	leasurements in controlled environment: Components of the leasurement setup. Chambers for electromagnetic measurements.							
	Measurements in co	ntrolled	environm	ent: Me	easurem	ent procedures		2	
	Measurements in une measurement setup.	controlle	ed enviror	nment:	Compor	nents of the		2	
	Measurements in un	controlle	ed enviror	nment:	Measure	ement procedur	res.	2	
	Measurement errors,	, measu	rement u	ncertair	nty.			2	
	⊠ lectures			🖂 inde	ependen	it assignments			
Format of instruction	⊠ seminars and wo	rkshops		□ mul	Itimedia	it doolgrinterite			
	□ exercises ⊠ laboratory			oratory					
	□ on line in entirety			□ wor	k with m	nentor			
	□ partial e-learning □ (othe					er)			
	Student is required t	o ottono	the lectu	iros on	d audita		the ome	ount of at	
Student responsibilities	least 70% of the sch the amount of 100% laboratory exercises	of the s	Student is Schedule	require and to o	ed to atte	end the laborate all tasks asso	ory exer ciated v	rcises in vith	
Screening student	Class attendance	1	Researc	:h		Practical training		0,5	
proportion of ECTS	Experimental work	0,5	Report			Laboratory exe	ercises	0,5	
credits for each activity so that the total number of	Essay		Seminai essay	-	1	Individual work	(1	
ECTS credits is	Mid-exam		Oral exa	m		(Other)			
equal to the ECTS value of the course)	Written exam	0,5	Project			(Other)			
Grading and evaluating student work in class and at the final exam	Seminar presentatio	n or exa	am consis	sting of	written a	and practical ex	aminati	on	
Required literature		Title	9			Number of copies in the library	Availa other	bility via r media	
(available in the library and via other media)	 Dragan Poljak: " computational ele Wiley Interscience 	Advance ectroma ce, 2007	ed modeli gnetic co	ng in mpatibi	ility",				
	 Handbook of microwave measurements, Vol.I- III, Polytechnic Press, 1963. 								

Optional literature (at the time of submission of study programme proposal)	 Handbook of Electromagnetic Compatibility, ed. R. Perez, Academic Press, 1995. Poljak, D.: Electromagnetic Modelling of Wire Antenna Structures, WIT Press, Southampton-Boston, 2002.
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	SOFTWARE ENGINEERING IN TELECOMMUNICATIONS							
Code	FELJ18	Year of study	2.					
Course teacher	Dinko Begušić, Ph.D., Full Professor	Credits (ECTS)	5					
Associate teachers	Goran Škugor, dipl. ing. Jelena Mihovilović, dipl.ipg	Type of instruction (number of hours)	S 0	AE 0	LE 30	DE 0		
Status of the course	Obligatory: 242 Elective: 250	Percentage of application of e-learning						
	COURSE	DESCRIPTION						
	Training students for:							
	 evaluation and application in telecommunications, 	n of basic concepts and m	ethods	of soft	ware e	engine	ering	
Course objectives	 collaboration in design, de products in telecommunic 	evelopment and maintena	nce of s	oftwa	re syst	ems a	and	
	 permanent adoption and engineering methods and networks. 	deepening of the knowled software products in com	ge in the municat	e area tion sy	of sof stems	tware and		
Course enrolment requirements and entry competences required for the course	None							
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: define and apply basic contelecommunications, evaluate characteristics of telecommunications, collaborate in design, deversion products in telecommunications, evaluate and apply methods software, collaborate in telecommunications and equite methods of software, permanently adopt and engineering methods ar networks. 	ncepts and methods of so f software engineering pro relopment and maintenance ations, ods and tools for developm nications software develop vare engineering I deepen of the knowle and software products in	ftware e ocesses ce of sof nent of t oment p dge in comm	in ftware elecor roces the unicat	eering syster mmuni s and a area o ion sy	in cation apply of sof	d is ftware s and	
	Course content				L hours	/ hc	AE ours	
	Software product. Software	engineering body of know	wledge.		2		-	
	Software product life cycle	models. Waterfall model.	COTS.		2		-	
Course content	Basic process activities.				2		-	
detail by weekly class schedule	RUP process model. Graph Model driven engineering.	nical modelling language l	JML.		2		-	
(syllabus)	Agile methods. Application telecommunications.	of agile techniques in			2		-	
	Agile methods: SCRUM, K	ANBAN. 3			2		-	
	Characteristics of software	products for telecommuni	cations.		2		-	
	Telecommunications softw	are testing techniques.			2		-	

	Information systems management. TMN,		2	-					
	Software metrics and	d softwa	re quality	/.			2	-	
	Maintenance of the s	software	e product	s in tele	commu	nications.	2	-	
	Techniques for robut development.	st telecc	ommunica	ations s	oftware		2	-	
	Software projects ma	anagem	ent in tel	ecomm	unicatio	ns.	2	-	
	List of laboratory or	List of laboratory or design exercises							
	Introduction in labora	tory exc	ercises.					2	
	Project definition.							2	
	Requirements specif	ication.						2	
	Project development	cycles '	1-9.					18	
	Project presentations	6.						2	
Format of instruction	 ☑ lectures ☑ seminars and workshops ☑ exercises ☑ on line in entirety ☑ partial e-learning ☑ field work □ independent assignment ☑ multimedia ☑ aboratory ☑ work with mentor ☑ (other) 					nts			
Student responsibilities									
Screening student	Class attendance	1,0	Research - Practical tra		Practical training		-		
work (name the proportion of ECTS	Experimental work	-	Report		-	Individual v	vork	2,2	
credits for each activity so that the	Essay	-	Semina essay	-	-	Laboratory exercises		1,0	
ECTS credits is equal to the ECTS	Tests	0,2	Oral exa	am	-	Preparation for laboratory exercises		0,5	
value of the course)	Written exam	0,1	Project		-	(Other)			
Grading and evaluating student work in class and at the final exam	Written exam 0,1 Project - (Other) There are two midterms and final exams. The first midterm exam is after 7 weeks ecturing and the second one is after the next 6 weeks. Each midterm and final te consists of 10 theoretical questions and numerical problems. The duration of eatest is 2 school hour. In the final exams students that did not pass the midte exams take part. The midterm and final exams are carried out as written tests. T requirement for passing grade is the positive assessment of laboratory exercise 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 + 0,35 LV + 0,3 (M1 + M2) the activities in percentage: NP - attendance at lectures, LV - laboratory assessment, M1, M2 - test results.						7 weeks of d final test on of each e midterm tests. The exercises, inal exam. according assesment e may be obliged to		

	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.							
Required literature (available in the library and via other media)	Title	Number of copies in the library	Availability via other media					
	 D.Begušić: Software engineering in tele communications, handouts, FESB, 2016. 		e-learning portal					
Optional literature (at the time of submission of study programme proposal)	 G. Utas: Robust Communications Software, John W. Sommerville: Software Engineering, Addison Wesler Communications Magazine. Documents of standardization institutions ITU, ETS Scientific papers in the area of software engineering Antun Carić: Design of Telecommunications Software L. Rising: Design Patterns in Communications Software Robert S. Pressman: Software Engineering: A Practilia Inc., 2000. 	/iley & Sons, 2 y, UK, 2006. I, IEEE and oth g in telecommu re, 2003. vare, Cambrid ctitioner's Appr	2005 I DIEEE - hers. unications ge University roach, McGraw-					
Quality assurance methods that ensure the acquisition of exit competences	 Evaluation of results in accordance with the above Feedback from students via surveys Self-evaluation of teachers Institutional and non-institutional evaluations 	learning outco	omes					
Other (as the proposer wishes to add)								

NAME OF THE COURSE	SYSTEMS FOR WIRELESS TRANSMISSION OF ENERGY								
Code	FELJ36	Year of study	2						
Course teacher	Zoran Blažević, Ph.D., Full Professor	Credits (ECTS)	5						
Associate teachers	Maja Škiljo, Ph.D.	Type of instruction (number of hours)	S 0	AE 0	LE 30	DE 0			
Status of the course	Elective	Percentage of application of e-learning	0						
COURSE DESCRIPTION									
Course objectives	 Training students for: understanding of basic principles of and problemacy of systems for wireless transmission of energy, designing of radio system for near-field transmission of energy design of radio system for far-field power transmission 								
Course enrolment requirements and entry competences required for the course	Finished the undergraduate study of Communications and Information Technology.								
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: analyse power and energy transmission techniques, calculate and estimate wireless energy transmission system parameters, designing basic transmission system schemes for given service 								
	Course content				L hours	A hc	\E ours		
	Introduction. Historical pers transmission.		2						
	Principles and techniques f Transformers and resonan electrically small antennas.		4						
Course content	Antenna scattering matrix. Spherical Mode Theory-An transmission of energy sys	SS	4						
broken down in	Rectennas.				2				
detail by weekly class schedule	Near-field energy and power transformer.	er transmission. Resonant			4				
(syllabus)	Far-field power transfer.				4				
	Ground energy transfer by	far-field systems concept			3				
	Satellite energy transfer sy	stem concept			3				
	Norms and standards for w standard.	vireless energy transfer. Q	i		2				
	Electromagnetic Compatibility	of wireless energy transfer s	ystems.		2				
	Interference problem betwe and radio systems for wirel	een radio-communications less energy transfer.	system	IS	2				
	Midterm exam								

	List of laboratory exe	ercises						LE hours
	Measurements and a antennas	adjustme	ents of in	ductivel	y fed ele	ectrically small		8
	Measurements of tra Oscilloscope	nsfer pe	erformand	ces by S	Spectrum	n Analyser, and	lby	8
	Measurements of tra	nsfer pe	erformand	ces by \	/ector Ne	etwork Analyse	er	6
	Tesla Coil Measurem	nents.						8
Format of instruction	 ☑ lectures ☑ seminars and workshops ☑ exercises ☑ on line in entirety ☑ work with me 				it assignments nentor			
	\square field work				(othe	er)		
Student responsibilities	The presence on lec Performed all labora	tures in tory exe	the amo ercises re	unt of a quired.	t least 7	0 % of the time	s scheo	duled.
Screening student	Class attendance	1.5	Researc	ch		Practical trainin	ng	
work (name the proportion of FCTS	Experimental work		Report			Individual work	K	2
credits for each activity so that the total number of ECTS credits is equal to the ECTS	Essay		Semina essay	ar Laboratory exerc		Laboratory exercises		
	Tests	0,5	Oral exa	exam		Preparation for laboratory exercises		0,2
value of the course)	Written exam		Project			(Other)		
Grading and evaluating student work in class and at the final exam	There are one midte of theoretical question midterm exams take carried out as writt assessment of labor exam, and the rest student. Grade (in port the activities in perce • NP - attenda • LV – laborat • M – test rest • S – seminar	erm and ons and e part I en tests ratory ei of the g ercentage Grade(entage: ance at cory asse ults., y work r	one final numerica n the fin s. The ro xercises, grade dep ge) is forn %) = 0,1 lectures, essment, results ar	exam. al proble al exar equirem 40 % p bends c med acc NP + 0,	Both miners. The ems. The nent for points on on the se cording t 1 LV + 0	dterm test and e students that midterm and passing grade the midterm e eminary work p o the formula: 0,4 (M + S)	final te did not final ex e is the exam of presente	st consist a pass the cams are a positive r the final ad by the
		Title	•			Number of copies in the library	Availa othe	bility via r media
Required literature (available in the	 Ki Young Kim (ed Transfer-Principle Explorations", In 	ditor), "V es and I Tech, Ja	Vireless I Engineer anuary 20	Power ing)12.			e-le p	arning ortal
library and via other media)	 Volakis J., C. C. antennas: miniate applications", Ne 	Chen ar urizatior w York,	nd K. Fuji n techniq McGraw	imoto, " ues anc -Hill, 20	Small I)10.		e-le p	arning ortal
	 Special issue "So Wireless Power Magazine, Vol. 3 	olar Pov Transmi , No. 4,	ver Satell ssion", IE Decemb	ite and EEE Mic er 2002	crowave	1		

Optional literature (at the time of submission of study programme proposal)	 Lee J. and S. Nam, "Fundamental aspects of near-field coupling small antennas for wireless power transfer", IEEE Trans. Antennas Propag., Vol. 58, No. 12, 3442-3449, 2010. P. Sample, D. T. Meyer, J. R. Smith: Analysis, experimental results, and range adaptation of magnetically coupled resonators for wireless power transfer, IEEE Transactions on Industrial Electronics, Vol. 58, No. 2, 2010, p.p 544-554. N. Tesla, A. Marinčić: Colorado Springs Notes, Nolit, Beograd, 1978. Carol Gray Montgomery, Robert Henry Dicke and Edward M. Purcell, "Principles of microwave circuits", McGraw-Hill Book Company, Inc., USA, 1948.
Quality assurance methods that ensure the acquisition of exit competences Other (as the proposer wishes to add)	 Evaluation of results in accordance with the above learning outcomes Feedback from students via surveys Self-evaluation of teachers Institutional and non-institutional evaluations

NAME OF THE COURSE	TRANSMISSION SYSTEMS								
Code	FELJ03	Year of study	1.						
Course teacher	Maja Stella, Ph.D., Assistant Professor	Credits (ECTS)	5						
Associate teachers	Dinko Begušić, Ph.D., Full Professor	Type of instruction (number of hours)	L 30	S 0	AE 15	LE 15	DE 0		
Status of the course	Obligatory:242 Elective: 241, 250	Percentage of application of e-learning							
	COURSE	DESCRIPTION							
Course objectives	Training students for: - understanding and applic systems communication r - collaborate in design, dev communication networks, - permanent adoption and o	 Training students for: understanding and application of basic concepts and technologies of transmission systems communication networks, collaborate in design, development and maintenance of transmission systems and communication networks, permanent adoption and deepening of the knowledge in the area of transmission 							
Course enrolment requirements and entry competences required for the course	systems and communication networks.								
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	 Students will be able to: define and apply basic networks, identify the characteristic and communication netw collaborate in design, dev communication networks, permanently adopt and systems and communication 	concepts of transmission cs and apply the technolo orks, relopment and maintenanc deepen the knowledge ion networks.	syster ogies o ce of tra in the	ns an f trans Insmis e area	nd com smission ssion s a of tr	nmunin on sys ystem ransm	cation stems is and ission		
	Course content				L hours	h	AE ours		
	Model of the information ne	etwork.			2		-		
	Access to transmission me	dium.			2		-		
	Layered architecture of the transmission, PCM.	information network. Digit	al		2		-		
	Routing of the information	within the network.			2		-		
Course content broken down in detail by weakly	Transmission techniques a and network performance a	nd multiplexing. Quality of assessment.	service	•	2		-		
class schedule (syllabus)	Optical transmission syster WDM, OTDM.	ns. Optical multiplexing sy	stems		2		-		
	Plesiochronous digital hiera hierarchy (SDH).	archy (PDH). Synchronous	s digital		2		-		
	Transmission network arch	itectures. Synchronization			2		-		
	Asynchronous transfer mod	de (ATM).			2 -				
	Internet architecture and pr	otocols.			2		-		
	Carrier Ethernet.				2		-		
	Multiprotocol label switching (MPLS). 2								

	Fundamentals of telecommunication network management 2 (TMN, eTOM).									
	List of auditory exerc	cises						LE hours		
	Examples of technical specifications of transmission systems and communication networks.							7		
	Examples of profess systems and commu	ional pa inication	pers on i network	new tec s.	hnologi	es of transm	nission	6		
	List of laboratory or o	design e	exercises					LE hours		
	ransmission systems and equipment.									
	Synchronization in co	Synchronization in communication networks.								
	Routing protocols in I	Ethernet	t network	s.				2		
	Ethernet traffic transr	nission.						2		
	Configuration of the I	Ethernet	network					2		
	Platform CPP Cello.							2		
	Systems ENUM and	DNS.						2		
Format of instruction	 ☑ lectures □ seminars and workshops ☑ exercises □ on line in entirety □ partial e-learning □ field work □ independent assignments □ multimedia □ aboratory □ work with mentor □ (other) 									
Student responsibilities										
Screening student	Class attendance	1,0	Researc	:h	-	Practical training		Practical training		-
proportion of ECTS	Experimental work	-	Report		-	Individual v	vork	2,2		
credits for each activity so that the	Essay	-	Seminal essay	r	0,5	Laboratory	exercises	s 0,5		
ECTS credits is equal to the ECTS	Tests	0,2	Oral exa	am	-	Preparation for laboratory exercises		0,5		
value of the course)	Written exam	0,1	Project		-	(Oth	ier)			
Grading and evaluating student work in class and at the final exam	There are two midted lecturing and the sec consists of 10 theore test is 2 school hou exams take part. The requirement for pass the seminar exercis The continuous know to the formula: (Content the activities in percent • AV – auditor • LV – laborat • M1, M2 – test The final grade is b grade and the oral formed without the real attend the oral part of	Initial order of the order of the final grade is based on the grade of the final grade is based on the grade of the final exam. The students whose grade may ported without the need for the oral part of the final exam. The students whose grade may ported without the need for the oral part of the final exam. The students whose grade may ported without the need for the oral part of the final exam. The students whose grade may part of the final 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 exercises and submitted seminar exercises work. At the final exam the student writes the test from the area of the midterm exam(s) which has/have not been successfully passed before. At the make up exam the student writes the test from the test from the make up exam the student writes the test from the make up exam the student writes the test from the make up exam the student writes the test from the complete course.					
Required literature	Number of copies in the library	Availability via other media				
(available in the library and via other media)	D.Begušić: Selected topics in transmission systems handouts, FESB, 2016. (in Croatian)		e-learning portal			
	A.Bažant et al.: Basic network architectures, Element Zagreb, 2004. (in Croatian)	10				
Optional literature (at the time of submission of study programme proposal)	 IEEE Communications Magazine, Documents of standardization institutions ITU, ETS 	 - IEEE Communications Magazine, - Documents of standardization institutions ITU, ETSI, IEEE, IETF and others, 				
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	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 30	S 0	AE 15	LE 15	DE 0
Status of the course	Obligatory: 241, 242 Elective: 220, 250	Percentage of application of e-learning					
	COURSE	E 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 wireless 						
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 				NMT, ccess area l area ation		
	Course content				L hours	ہ hc	\E ours
broken down in detail by weekly	Basic characteristics of wir (feding, multipath propagat	eless communication char ion, Doppler effect).	nnels		2		1
class schedule (syllabus)	Digital signal processing an commnications.	nd diversity combining in w	vireless		2		1
	Multiple access techniques	and multiplexing (FDMA,	TDMA,		2		1

	CDMA, OFDMA).								
	Cellular systems. Interference. Coverage.					2		1	
	Mobile networks evo	lution. F	First gene	eration r	network	S.	2		1
	Second generation r	networks	6.				2		1
	GSM system. Netwo	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	+ (UMT	S, HSPA).			2		1
	Mobile networks 4G	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 e	exercises					LE	hours
	Configuration of IEE	E 802.1	1x based	netwo	rks.				2
	Throughput measure	ment in	IEEE 80)2.11x k	based n	etworks,			2
	Configura and throughput measurement in Bluetooth systems.					2			
	Signalling in GSM networks.					2			
	Signalling in UMST n	etworks	i.						2
	Signalling in LTE net	works.							2
	Synchronization in m	obile ne	tworks.						2
Format of instruction	 ☑ lectures ☑ seminars and workshops ☑ exercises ☑ on line in entirety ☑ partial e-learning ☑ field work 			nts					
Student responsibilities	DBegušić: Wireless and mobile communication networks, handouts Optional literature (at the time of submission of study programme proposal) IEEE Communications Magazine. I Documents of standardization institutions ITU, ETSI, IEEE and others. Scientific papers in the area of wireless and mobile communication networ								
Screening student	Class attendance	1,0	Researc	h	-	Practical tra	aining		-
work (name the proportion of ECTS	Experimental work	-	Report		-	Individual v	vork		2,2
credits for each activity so that the	Essay	-	Seminai essay		0,5	Laboratory	exercises	;	0,5
ECTS credits is equal to the ECTS	Tests	0,2	Oral exa	im	-	Preparation laboratory	n for exercises		0,5
value of the course)	Written exam	0,1	Project		-	(Oth	ner)		

Grading and evaluating student work in class and at the final exam	lecturing and the second one is atter the next 6 weeks. Each midterm and final ter- 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 midtern 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 accordin 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. The final grade is based on the grade of the continuous knowledge assessment grade and the oral part of the final exam. The students whose grade may b formed without the need for the oral part of the final exam may not be obliged the attend the oral part of the exam. There are two terms for the final exam and one additional term for the make u 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. / 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.				
Required literature (available in the	Title	Number of copies in the library	Availability via other media		
library and via other media)	D.Begušić: Wireless communication networks, handouts, FESB, 2016.		e-learning portal		
Optional literature (at the time of submission of study programme proposal)	 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. 				
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	WIRELESS SECURITY						
Code	FELK19	Year of study	2.				
Course teacher	Mario Čagalj, Ph.D., Full Professor	Credits (ECTS)	5				
Associate teachers	Toni Perkovć, Ph.D., Assistant Professor	Type of instruction (number of hours)	L 30	S 0	AE 0	LE 30	DE
Status of the course	Elective	Percentage of application of e-learning	0				
	COURSE	E DESCRIPTION					
Course objectives	 The main objectives of the provide students w wireless communic present students w communication cha enable students to protection of wirele 	 he main objectives of the course are: provide students with insight into basic features and aspects of protecting wireless communication channels present students with proven mechanisms for the protection of wireless communication channels enable students to implement appropriate security mechanisms for the 					
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 successfully mastering a course, students will be able to: Explain the key vulnerabilities of wireless communication channels Explain the essential difference between the vulnerability of classic wire and wireless channels Demonstrate and implement attacks (in the sense of penetration testing) on wireless technologies such as IEEE 802.11, 2G and 3G mobile networks and contactless cards DoS attacks on the physical level DoS attacks at the data level Attacks on privacy and confidentiality of data Critically assess the potential security risks of specific wireless communication technology and systems IEEE 802.11, 2G and 3G, NFC, GPS navigation system Recommend the use of appropriate protective mechanisms 						
	Course content			1	L hours	/ hc	AE ours
	Introduction to the security navigation systems	n and		1			
	Radio communication char	nnel			2		
Course content	Radio jamming attacks				2		
broken down in detail by weekly	Eavesdropping and relay a	ttacks			1		
class schedule (syllabus)	Signal interference protecti (FHSS and DSSS)	on: scattered spectrum tee	chnique	es	2		
	An overview of basic crypto	ographic primitives			2		
	WiFi network security (802 WPA2, 802.11i, anomalies	.11 architecture, WEP, WF , selfish behavior)	PA,		4		
	First midterm exam						
Mobile network security (GSM and UMTS, interference, 2				2			

	privacy, man-in-the-middle attacks)						
	Vulnerability of Wire	less Nav	vigation S	Systems	(GPS, Gallileo)	2	
	Security of Wireless Sensor Networks (Initialization, Establishment of Encryption Keys, Interference) User-friendly message authentication via radio channel (I- codes primitive)					4	
						2	
	Location privacy in n	nobile n	etworks			2	
	Second midterm exa	am				2	
	List of laboratory exe	ercises					LE hours
	Vulnerability of the ra via ARP spoofing atta	adio cha acks, wi	nnel (Dos retapping	S by inter and dat	rfering with the sig a analysis)	ınal, MitM	6
	Basic cryptographic p	orimitive	s (Crypto	ol2)			4
	Security of WiFi networks (punctuation of WEP and WPA / WPA2 AP, SSL stripping attack, failure in configuration of EAP-TTLS authentication method)				2, false	10	
	Anomaly in performa	nce with	IEEE 80)2.11 sta	ndards		2
	Security of Wireless	Sensor	Networks	(Xbee a	nd Arduino Platfor	rms)	4
	Location privacy in ce	ellular n	etworks				4
Format of instruction	 ➢ lectures ☐ seminars and workshops ☐ exercises ☐ on line in entirety ☐ partial e-learning ☐ field work 			nts			
Student responsibilities	The presence on lec Performed all require	tures in ed labor	the amo atory exe	unt of at crcises.	least 70 % of the t	imes sche	duled.
Screening student	Class attendance	0,7	Researc	:h	Practical tra	aining	
work (name the proportion of ECTS	Experimental work		Report		Individual v	vork	2
credits for each activity so that the total number of	Essay		Semina essay		Laboratory	exercises	2
ECTS credits is	Tests	0,2	Oral exa	ım			
equal to the ECTS value of the course)	Written exam	0,1	Project		(Oth	ner)	
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 wee lecturing and the second one is after the next 6 weeks. Students are also req to submit a written report on their work on the laboratory assignments. The final grade is formed as follows: Grade = Round[0,05 P + 0,15 LV + 0,30 M1 + 0,50 M2] where: P – is a grade based on attendance at lectures, LV – a grade earned during laboratory exercises, M1, M2 – test results. NOTE: If a student fails a given task (P, LV, M1, M2), the corresponding grade set to 0 in the above formula 				7 weeks of o required		

Required literature (available in the	Title	Availability via other media		
media)	Lecture notes and presentations		e-learning portal	
Optional literature (at the time of submission of study programme proposal)	 Buttyan L., Hubaux JP.: Security and Cooperation in Wireless Networks: Thwarting Malicious and Selfish Behavior in the Age of Ubiquitous Computing, Cambridge University Press, 2007. Stallings W.: Cryptography and Network Security, Principles and Practice, Prentice Hall, 2005. Menezes J., van Oorschot P. C., Vanstone S. A.: Handbook of AppliedCryptography, CRC Press, 1996. 			
Quality assurance methods that ensure the acquisition of exit competences Other (as the	 Evaluation of results in accordance with the above learning outcomes Feedback from students via surveys Self-evaluation of teachers Institutional and non-institutional evaluations 			
proposer wishes to add)				

NAME OF THE COURSE	DIPLOMA THESIS								
Code	FEXX02 Year of study 2								
Course teacher	Credits (ECTS) 30								
Associate teachers		Type of i (number	nstruction of hours)	1	L	S	AE	LE	DE
Status of the course	Mandatory	Percenta application	ge of on of e-lea	arning					
	COURS	SE DESCRI	PTION						
Course objectives	 Training students for: consolidating theoretic complex engineering being independent in applying scientific-resting writing and presenting 	 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									
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 								
Course content broken down in detail by weekly class schedule (syllabus)	Diploma thesis is the inde task and instructions give research methodology an	ependent we n by the su d ethical pr	ork of the pervisor, a inciples.	studen and ac	nt produ cording	uced a g to the	ccordii scien	ng to t tific	he
Format of instruction	 lectures seminars and workshops exercises on line in entirety partial e-learning field work independer independer independer independer wultimedia laboratory work with r (oth 			pendent media atory with m (othe	ent assignments a / mentor her)				
Student responsibilities	Independent work								
Screening student	Class attendance	Researc	ch 🔤		Practic	al trair	ning	T	
proportion of ECTS	Experimental work	Report			Individ	ual wo	rk		30
credits for each activity so that the total number of	Essay	Semina essay	r			(Other)		
ECTS credits is	Tests	Oral exa	am			(Other)		
value of the course)	Written exam	Project				(Other)		

Grading and evaluating student work in class and at the final exam	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.				
	Title	Number of copies in the library	Availability via other media		
Required literature (available in the library and via other media)	 Etički kodeks Fakulteta elektrotehnike, strojarstva i brodogradnje u Splitu 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. 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. 		Web site of the Faculty		
Optional literature (at the time of submission of study programme proposal)					
Quality assurance methods that ensure the acquisition of exit competences	 Self-evaluation of teachers Student survey of the whole study programme 				
Other (as the proposer wishes to add)					

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	
FELJ12	Algorithms	Matko Šarić, Ph.D., Assistant Professor Ante Topić, Teaching Assistant
FELJ37	Analysis methods in fusion technology	Dragan Poljak, Ph.D., Full Professor Anna Šušnjara, Teaching Assistant
FELJ21	Antenna systems	Antonio Šarolić, Ph.D., Full Professor Niko Ištuk, Teaching Assistant
FELJ33	Antennas	Antonio Šarolić, Ph.D., Full Professor Niko Ištuk, Teaching Assistant
FENj01	Application of analytical methods in electromagnetic compatibility	Silvestar Šesnić, Ph.D., Assistant Professor
FELH11	Artificial intelligence	Darko Stipaničev, Ph.D., Full Professor Ljiljana Šerić, Ph.D., Assistant Professor Toni Jakovčević, Ph.D., Assistant Professor
FELJ24	Bioelectromagnetics	Antonio Šarolić, Ph.D., Full Professor Niko Ištuk, Teaching Assistant
FELK10	Cryptography and network security	Mario Čagalj, Ph.D., Full Professor Toni Perkovć, Ph.D., Assistant Professor
FELK13	Data compression	Matko Šarić, Ph.D., Assistant Professor Ante Topić, Teaching Assistant
FELJ01	Digital telecommunications	Joško Radić, Ph.D., Associate Professor Petar Šolić, Ph.D., Assistant Professor

FELH33	Digital television and video	Mladen Russo, Ph.D., Assistant Professor Nikola Rožić, Ph.D., Professor Emeritus
FELH32	Electroacoustics	Ivo Mateljan, Ph.D., Full Professor
FELH25	Electromagnetic compatibility	Dragan Poljak. Ph.D., Full Professor Antonio Šarolić, Ph.D., Full Professor Niko Ištuk, Teaching Assistant
FELJ26	Electromagnetic ecology and dosimetry	Dragan Poljak, Ph.D., Full Professor Anna Šušnjara, Teaching Assistant
FELH03	Electromagnetic waves	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
FELJ19	Information systems	Mladen Russo; Ph.D., Assistant Professor
FELJ11	IP Communications	Mladen Russo, 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
FELJ22	Measurements in wireless systems	Zoran Blažević, Ph.D., Full Professor Maja Škiljo, Ph.D.
FELJ34	Microwave electronics	Ivan Marinović, Ph.D., Full Professor
FELJ27	Microwave solid-state circuits	Ivan Marinović, Ph.D., Full Professor
FELJ14	Mobile communications	Zoran Blažević, Ph.D., Full Professor Maja Škiljo, Ph.D.
FELJ20	Multimedia systems	Mladen Russo, Ph.D., Assistant Professor Jelena Čulić, Teaching Assistant Martina Bašić, Teaching Assistant
FELJ35	Network and mobile operating systems	Josip Lörincz, Ph.D., Assistant professor Dinko Begušić, Ph.D., Full Professor Ante Dagelć, Teaching Assistant
FELJ17	Numerical methods in communications	Dragan Poljak, Ph.D., Full Professor Vicko Dorić, Ph.D., Associate Professor Anna Šušnjara, Teaching Assistant
FELJ13	Operating systems	Sven Gotovac, Ph.D., Full Professor
FELJ10	Optical communication systems	Dinko Begušić, Ph.D., Full Professor Maja Stella, Ph.D., Assistant Professor Ivica Meštrović, Teaching Assistant Marko Banović, Teaching Assistant Josip Babić, Teaching Assistant
FEXX06	Professional Training	
FETJ01	Project management	Ivica Veža, Ph.D., Full Professor Marko Mladineo, Ph.D.
FELJ28	Radars	Zoran Blažević, Ph.D., Full Professor Maja Škiljo, Ph.D.
FELJ02	Radio communications	Zoran Blažević, Ph.D., Full Professor Maja Škiljo, Ph.D.

FELJ38	Radio frequency identification technology	Joško Radić, Ph.D., Associate Professor Petar Šolić, Ph.D., Assistant Professor
FELJ07	Radiofrequency electronics	Ivan Marinović, Ph.D., Full Professor
FELJ25	Satellite positioning systems	Zoran Blažević, Ph.D., Full Professor Maja Škiljo, Ph.D.
FELJ29	Simulation and measurement of electromagnetic quantities	Dragan Poljak. Ph.D., Full Professor Antonio Šarolić, Ph.D., Full Professor Niko Ištuk, Teaching Assistant
FELJ18	Software engineering in telecommunications	Dinko Begušić, Ph.D., Full Professor Goran Škugor, Teaching Assistant Jelena Mihovilović, Teaching Assistant
FELJ36	Systems for wireless transmission of energy	Zoran Blažević, Ph.D., Full Professor Maja Škiljo, Ph.D.
FELJ03	Transmission systems	Maja Stella, Ph.D., Assistant Professor Dinko Begušić, 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
FELK19	Wireless security	Mario Čagalj, Ph.D., Full Professor Toni Perkovć, Ph.D., Assistant Professor
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	Network and mobile operation systems Optical communication systems Software engineering in telecommunications Transmission systems Wireless communication networks
GENERAL INFORMATION ON COU	IRSE 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 EMP	PLOYMENT
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 T	RAINING
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 COURS	E
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)
	1) Regusić: "Wireless communication networks " handouts
Authorship of university/faculty textbooks in the field of the course	 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
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)	 D.Begušić: "Whereas communication networks", 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. 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.

	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.
	Advanced networking technologies and systems, project FESB
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	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	Zoran Blažević, Ph.D., Full Professor
The course he/she teaches in the proposed study programme	Measurements in Wireless Systems Mobile Communications Radars Radio Communications Satellite Positioning Systems Systems for Wireless Transmission of Energy
GENERAL INFORMATION ON COU	RSE TEACHER
Address	Tolstojeva 47, 21000 Split, HR
Telephone number	+385 21 305676
E-mail address	<u>zblaz@fesb.hr</u>
Personal web page	
Year of birth	1968
Scientist ID	238956
Research or art rank, and date of last rank appointment	Scientific Adviser, 20/06/2016
Research-and-teaching, art-and- teaching or teaching rank, and date of last rank appointment	Senior Full Professor, 16/07/2016
Area and field of election into research or art rank	Technical Sciences, Field Electrical Engineering
INFORMATION ON CURRENT EMP	LOYMENT
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	14/02/2006
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Radio-channel modelling, antennas, microwaves
Function	
INFORMATION ON EDUCATION - H	lighest degree earned
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	30/05/2005
INFORMATION ON ADDITIONAL TR	AINING
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 COURS	E
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)	 Šolić, Petar; Blažević, Zoran; Škiljo, Maja; Patrono, Luigi. Impact of Tag Responsiveness on Gen2 RFID Throughput. // IEEE communications letters. 20 (2016) , 11; 2181-2184 Šolić, Petar; Maras, Josip; Radić, Joško; Blažević, Zoran. Comparing Theoretical and Experimental Results in Gen2 RFID Throughput. // leee transactions on automation science and engineering. 14 (2016) , 1; 349-357 Škiljo, Maja; Blažević, Zoran. Spherical helices for resonant wireless power transfer. // International Journal of Antennas and Propagation. 2013 (2013) ; 426574-1-426574-12 Škiljo, Maja; Blažević, Zoran; Poljak, Dragan. Interaction Between Human and Near Field of Wireless Power Transfer System. // Progress In Electromagnetics Research C. 67 (2016) ; 1-10 Blažević, Zoran; Škiljo, Maja; Poljak, Dragan. Comparison of Generalized Telegrapher Equations Approach and Circuit Model for Wireless Power Transfer // Proceedings of Softcom 2016 Split, 2016. 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)	 Propagation factors in radio-networks planning, project MZOS 023-0361566-1613, 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)	4,8/5

First and last name and title of teacher	Mario Čagalj, Ph.D., Full Professor
The course he/she teaches in the proposed study programme	Cryptography and network security Wireless security
GENERAL INFORMATION ON COL	JRSE TEACHER
Address	B. Kašića 18, 21312 Podstrana
Telephone number	021 305 663 (posao)
E-mail address	mario.cagalj@fesb.hr
Personal web page	http://www.fesb.hr/~mcagalj/
Year of birth	10.12.1975.
Scientist ID	282821
Research or art rank, and date of last rank appointment	Scientific Adviser, 2016
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, Computer Science and Computing
INFORMATION ON CURRENT EMP	PLOYMENT
Institution where employed	FESB
Date of employment	2006
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Information security, applied cryptography, computer and communication networks
Function	-
INFORMATION ON EDUCATION -	Highest degree earned
Degree	PhD
Institution	Swiss Federal Institute of Technology Lausanne (EPFL)
Place	Lausanne, Switzerland
Date	16.01.2006.
INFORMATION ON ADDITIONAL T	RAINING
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 COURS	BE THE TRANSPORT
Earlier experience as course teacher of similar courses (name title of course, study programme	1. Cryptography and Network Security, (FELK10, 250), graduate study, FESB
where it is/was offered and level	2. Wireless Security (FELK19, 250), graduate study, FESB

of study programme)	
Authorship of university/faculty textbooks in the field of the course	Notes for laboratory exercises for the course "Cryptography and Network Security"
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	 Čagalj, Mario; Perković, Toni; Bugarić, Marin. Timing Attacks on Cognitive Authentication Schemes. // IEEE transactions on information forensics and security. 10 (2015), 3; 584-596 (članak, znanstveni). Čagalj, Mario; Perković, Toni; Bugarić, Marin; Li, Shujun. Fortune cookies and smartphones: Weakly unrelayable channels to counter relay attacks. // Pervasive and Mobile Computing. 20 (2015); 64-81 (članak, znanstveni).
	3. Kovačević, Tonko; Perković, Toni; Čagalj, Mario. Flashing displays : User-friendly solution for bootstrapping secure associations between multiple constrained wireless devices. // Security and Communication Networks. 9 (2015), 10; 1050-1071 (članak, znanstveni).
	 Perković, Toni; Čagalj, Mario; Mastelić, Toni; Saxena, Nitesh; Begušić, Dinko. Secure Initialization of Multiple Constrained Wireless Devices for an Unaided User. // IEEE transactions on mobile computing. 11 (2012), 2; 337-351 (članak, znanstveni).
	 5. Perković, Toni; Bugarić, Marin; Čagalj, Mario. Optimizing Decision Tree Attack on CAS Scheme. // Advances in Electrical and Computer Engineering. 16 (2016), 2; 69-74 (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)	 EU FP7 projekt "EPISECC: Establish Pan-European Information Space to Enhance Security of Citizens" (2014 - 2017)
at most)	 Stručni projekt s Ericsson Nikola Tesla dd, "Zaštitni mehanizmi u novoj generaciji M2M sustava (N-M2M-Sec)", (2010 - 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	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 EMP	LOYMENT
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 - H	lighest 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 COURS	Ē
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	 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 works at most)	 D.Čavka, D. Poljak, V. Dorić, R. Goić, Transient analysis of grounding systems for wind turbines, Renewable energy, 43, 2012 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 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. 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 20112012.
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 EV	ALUATION
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 COU	RSE 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 EMP	LOYMENT
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 - H	lighest degree earned
Degree	PhD
Institution	University of Zagreb
Place	Croatia, Zagreb
Date	30.11.2003.
INFORMATION ON ADDITIONAL TR	AINING
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 COURS	E
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)	 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. 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. 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. 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 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	Operating 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-	Senior Full Professor/2009.	
teaching or teaching rank, and date of last rank appointment		
Area and field of election into research or art rank	Technical Sciences, Field Electrical engineering	
INFORMATION ON CURRENT EMP	LOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and	
Date of employment	December, 1983	
Name of position (professor.	Professor	
researcher, associate teacher, etc.)		
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 - H	lighest degree earned	
Degree	PhD	
Degree Institution	PhD Tehnical University Berlin, Germany	
Degree Institution Place	PhD Tehnical University Berlin, Germany Berlin, Germany	
Degree Institution Place Date	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994.	
Degree Institution Place Date	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994.	
Degree Institution Place Date INFORMATION ON ADDITIONAL TR	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. CAINING Erom 2004	
Institution Place Date INFORMATION ON ADDITIONAL TR Year Place	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. CERN, Genève, Switzerland	
INFORMATION ON EDUCATION – T Degree Institution Place Date INFORMATION ON ADDITIONAL TR Year Place Institution	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. RAINING From 2004. CERN, Genève, Switzerland Genève, Switzerland	
Degree Institution Place Date INFORMATION ON ADDITIONAL TR Year Place Institution Field of training	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. CAINING From 2004. CERN, Genève, Switzerland Genève, Switzerland Distributed Computer Architecture	
Degree Institution Place Date INFORMATION ON ADDITIONAL TR Year Place Institution Field of training MOTHER TONGUE AND FOREIGN	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. CAINING From 2004. CERN, Genève, Switzerland Genève, Switzerland Distributed Computer Architecture	
INFORMATION ON EDUCATION OF Degree Institution Place Date INFORMATION ON ADDITIONAL TR Year Place Institution Field of training MOTHER TONGUE AND FOREIGN Mother tongue	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. CAINING From 2004. CERN, Genève, Switzerland Genève, Switzerland Distributed Computer Architecture LANGUAGES Croatian	
INFORMATION ON EDUCATION – T Degree Institution Place Date INFORMATION ON ADDITIONAL TR Year Place Institution Field of training MOTHER TONGUE AND FOREIGN Mother tongue Foreign language and command of	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. CAINING From 2004. CERN, Genève, Switzerland Genève, Switzerland Distributed Computer Architecture LANGUAGES Croatian English 4	
INFORMATION ON EDUCATION IT Degree Institution Place Date INFORMATION ON ADDITIONAL TR Year Place Institution Field of training MOTHER TONGUE AND FOREIGN Mother tongue Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. CAINING From 2004. CERN, Genève, Switzerland Genève, Switzerland Distributed Computer Architecture LANGUAGES Croatian English 4	
INFORMATION ON EDUCATION IT Degree Institution Place Date INFORMATION ON ADDITIONAL TR Year Place Institution Field of training MOTHER TONGUE AND FOREIGN Mother tongue Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language and command of	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. CAINING From 2004. CERN, Genève, Switzerland Genève, Switzerland Distributed Computer Architecture LANGUAGES Croatian English 4 German 4	
INFORMATION ON EDUCATION – T Degree Institution Place Date INFORMATION ON ADDITIONAL TR Year Place Institution Field of training MOTHER TONGUE AND FOREIGN Mother tongue 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	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. CAINING From 2004. CERN, Genève, Switzerland Genève, Switzerland Distributed Computer Architecture LANGUAGES Croatian English 4 German 4	
INFORMATION ON EDUCATION IT Degree Institution Place Date INFORMATION ON ADDITIONAL TR Year Place Institution Field of training MOTHER TONGUE AND FOREIGN Mother tongue Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent)	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. CAINING From 2004. CERN, Genève, Switzerland Genève, Switzerland Distributed Computer Architecture LANGUAGES Croatian English 4 German 4	
INFORMATION ON EDUCATION – T Degree Institution Place Date INFORMATION ON ADDITIONAL TR Year Place Institution Field of training MOTHER TONGUE AND FOREIGN Mother tongue Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language and command of	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. CAINING From 2004. CERN, Genève, Switzerland Genève, Switzerland Distributed Computer Architecture LANGUAGES Croatian English 4 German 4 Italian 3	
INFORMATION ON EDUCATION – T Degree Institution Place Date INFORMATION ON ADDITIONAL TR Year Place Institution Field of training MOTHER TONGUE AND FOREIGN Mother tongue Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent)	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. CAINING From 2004. CERN, Genève, Switzerland Genève, Switzerland Distributed Computer Architecture LANGUAGES Croatian English 4 German 4	
INFORMATION ON EDUCATION – T Degree Institution Place Date INFORMATION ON ADDITIONAL TR Year Place Institution Field of training MOTHER TONGUE AND FOREIGN Mother tongue 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) Foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent)	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. CAINING From 2004. CERN, Genève, Switzerland Genève, Switzerland Distributed Computer Architecture LANGUAGES Croatian English 4 German 4 Italian 3	
INFORMATION ON EDUCATION – T Degree Institution Place Date INFORMATION ON ADDITIONAL TR Year Place Institution Field of training MOTHER TONGUE AND FOREIGN Mother tongue 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) Foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent) COMPETENCES FOR THE COURS	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. AINING From 2004. CERN, Genève, Switzerland Genève, Switzerland Distributed Computer Architecture LANGUAGES Croatian English 4 German 4 Italian 3 E Digital circuits	
INFORMATION ON EDUCATION – T Degree Institution Place Date INFORMATION ON ADDITIONAL TR Year Place Institution Field of training MOTHER TONGUE AND FOREIGN Mother tongue 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) Foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent) COMPETENCES FOR THE COURS Earlier experience as course teacher of similar courses (name	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. CAINING From 2004. CERN, Genève, Switzerland Genève, Switzerland Distributed Computer Architecture LANGUAGES Croatian English 4 German 4 Italian 3 Digital circuits Impulse electronics	
INFORMATION ON EDUCATION – T Degree Institution Place Date INFORMATION ON ADDITIONAL TR Year Place Institution Field of training MOTHER TONGUE AND FOREIGN Mother tongue 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) Foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent) COMPETENCES FOR THE COURS Earlier experience as course teacher of similar courses (name title of course, study programme	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. CAINING From 2004. CERN, Genève, Switzerland Genève, Switzerland Distributed Computer Architecture LANGUAGES Croatian English 4 German 4 Italian 3 Digital circuits Impulse electronics	
INFORMATION ON EDUCATION – T Degree Institution Place Date INFORMATION ON ADDITIONAL TR Year Place Institution Field of training MOTHER TONGUE AND FOREIGN Mother tongue Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent) Foreign language on a scale from 2 (sufficient) to 5 (excellent) COMPETENCES FOR THE COURS Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of	PhD Tehnical University Berlin, Germany Berlin, Germany 24.5.1994. CAINING From 2004. CERN, Genève, Switzerland Genève, Switzerland Distributed Computer Architecture LANGUAGES Croatian English 4 German 4 Italian 3 E Digital circuits Impulse electronics	

Authorship of university/faculty textbooks in the field of the course	Elektronički sklopovi, P.Slapničar, S. Gotovac, FESB, Split 2000. 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)	 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. 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)	 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. 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	Josip Lörincz, Ph.D., Assistant Professor	
The course he/she teaches in the proposed study programme	Local and access networks Network and mobile operating systems	
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 EMP	PLOYMENT	
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 T	RAINING	
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 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)		
COMPETENCES FOR THE COURS	E		
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: Local and access 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
station technologies". Computer communications (ISSN:
(140-3664) Volume (issue): 50 (2014) n n : 10-28
6 L 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. LOHINGZ, I. DUIE, "Renewable energy sources for power supply of base station sites". International Journal of
Supply of Dase station sites, international Journal of Rusiness Data Communications and Netwrking (LIRDCN)
Svezak: 9 hroi: 3 2013 n n \cdot 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. Begusić, "Heuristic Algorithms for
Optimization of Energy Consumption in Wireless Access
IVERWORKS, NOIL HANSACTIONS ON INTERNET AND INFORMATION
Systems (ISSN: 1970-7277), VOIUME: 5, ISSUE: 5, 2011.,
μ.μ. 314-340 13 Lorinez Δ Canone D Requisié "Ontimized Natwork
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:
	 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), 0609.09.2015, Boston, SAD, p.p.: 1-5 (ISSN: 978-1-4799-8090-1) Luca Chiaraviglio, Josip Lorincz, Paolo Monti, "Towards Sustainable and Reliable Networks with LIFETEL", Proceedings of the IEEE Conference on Computer Communications - INFOCOM 2015, 26.41.5.2015, Hong Kong, China, p.p.: 39-40, (ISSN: 978-1-4673-7131-5) 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), 2529.5.2015., Opatija, Croatia, p.p.: 621-626., (ISSN: 978-953-233-083- 0) 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. 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), 17-19. 9. 2014, Split, Croatia, p.p.: 1-5, (ISSN: 978- 953-290-051-4)7 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), 1820.09.2013, Primošten, Croatia, Proceedings of
	Telecommunications and Computer Networks (SoftCOM
Professional and scholarly articles	Book:
published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	 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
	Participation in international scientific projects as project coordinator:
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	 Green networking (HZZ- Groatian 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) 					
	Participation in dor participant: Modernisir implement (MODOC) resources	nestic ed ng doctor ation of C – EU IPA developn	ucation p al educat Croatian c A progran nent	projects a ion throu qualification BGUE (s project gh on frame 04 06, Hu	work Iman
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?	In the frame of the Modernisir implement (MODOC) resources Participation in wo methodological-ps competences.	program ng doctor ation of (– EU IPA developn rkshop de ychologic	me: al educat Croatian c A progran nent edicated t al-didact	ion throu qualification n BGUE (to the dev ic-pedage	gh on frame 04 06, Hu velopmen ogical	work Iman It of
PRIZES AND AWARDS, STUDENT	EVALUATION					
Prizes and awards for teaching and scholarly/artistic work	 Yearly award of and promotion Award of Facuering ar scientific and r Award "Vera Jengineering (A Award of Facuering ar successful scientific and r 	of Okrug of of science ad naval a esearch i ohanides cademia lty of elece ad naval a entific nov	County for ce in 2013 ctrical engarchitectur results in " for 2012 Scientiar ctrical engarchitectur vices in 2	or scientif gineering ure (FESE 2013. 2. of Croa rum Tehn gineering ure (FESE 011.	ic/researc , mechan 3) for the atian Acac icarum C , mechan 3) to the r	ch work ical notable demy of roatica) ical nost
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)	Evaluation organi engineering, mech (FESB). Note on grading s on scale 1-5 Course/average grade Network and mobile operating systems Local and access	izer: Univ anical en scale: glo Global index 2011/12 4,3	versity of gineering bal index Global index 2012/13 3,3 4,4	Split, Fac g and nav c evaluati Global index 2013/14 3,9 4,00	culty of el ral archite ng overal Global index 2014/15 4,5 4,2	ectrical ecture Il course Global index 2015/16 4,1
	Electrotechnical materials and technologies	4,7	/	4,6	/	4,5

First and last name and title of teacher	Ivan Marinović, Ph.D., Full Professor	
The course he/she teaches in the proposed study programme	Microwave electronics Microwave solid-state circuits Radiofrequency electronics	
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 EMP	PLOYMENT	
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	Italian (4)	

(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)	Microwave electronics, Graduate study programme, Radiocommunications, Graduate 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)	 I. Marinović, D. Čoko, Inter-Floor Wide Band Radio Channel Measurements and Simulation Applying Saleh- Valenzuela Model, Automatika – Journal for Control, Measurement, Electronics, Computing and Communications, 61(2015), 1, 91-99. D. Čoko, I. Marinović, Experimental Verification of a Deterministic UWB Channel Model for Single Room Propagation Scenarios, International journal on communications, antennas and propagation, 4 (2014), 2, 37- 43. D. Čoko, Z. Blažević, Ivan Marinović, Effects of Bandwidth on Estimation of UWB Channel Parameters, Ultra Wideband Communications: Novel Trends - Antennas and Propagation, Mohammad A. Matin (ur.), Rijeka: InTech, 2011., 97-116. I. Marinović, I. Zanchi, Z. Blažević, Enhanced Procedure for Double Knife-Edge Diffraction Path-Loss Assessment, International Review of Electrical Engineering, 5 (2010). 	
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	
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 EMP	LOYMENT	
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 - H	lighest degree earned	
Degree	PdD	
Institution	University of Zagreb, Faculty of Electrical Engineering	
Place	Zagreb, Croatia	
Date	1992.	
INFORMATION ON ADDITIONAL TR	AINING	
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 COURS	E	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of	Programming, OOP, Electronic circuit	

study programme)	
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)	 Sikora, Marjan; Mateljan, Ivo.: A Method for Speeding up Beam-tracing Simulation Using Thread-level Parallelization. <i>Ingineering with computers</i>. 30, 2014. Sikora M., Mateljan I., Bogunovic, N.: <i>Beam Tracing with</i> <i>Refraction,</i> Archives of Acoustics Vol.37, 2012. Mateljan I., Sikora M.: <i>Estimation of loudspeaker drivers</i> <i>parameters</i>, Proc. of 5th Congress of the Alps Adria Acoustics Association Zadar, 2012. 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?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT I	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	Dragan Poljak, Ph.D., Full Professor	
The course he/she teaches in the proposed study programme	Analysis methods in fusion technology Electromagnetic Compatibility Electromagnetic Ecology and Dosimetry Electromagnetic Waves Numerical Methods in Communications Simulation and measurement of electromagnetic quantities	
GENERAL INFORMATION ON COU	RSE 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 TR	AINING	
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 COURS	E
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	 D.Poljak, Teorija elektromagnetskih polja s primjenama u inženjerstvu, Šk. knjiga Zagreb, 2014. D.Poljak i dr., Modeliranje žičanih antena primjenom računala, Kigen Zagreb 2009. 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)	 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. 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. 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. 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. 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	Digital Telecommunications Radio frequency identification technology	
GENERAL INFORMATION ON COU	RSE 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 - H	lighest 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 COURS	E
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)	 Šolić, Petar; Radić, Joško; Rožić, Nikola. Energy Efficient Tag Estimation Method for ALOHA-based RFID systems. // IEEE sensors journal. 14 (2014), 10; 3637-3647. 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. 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. 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)	 Look into the Future. 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	Digital television and video Information systems IP Communications Multimedia systems
GENERAL INFORMATION ON COU	RSE 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 - H	lighest 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 COURS	E
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	Maja Stella, Ph.D., Assistant Professor	
The course he/she teaches in the proposed study programme	Transmission systems	
GENERAL INFORMATION ON COU	RSE TEACHER	
Address	Spinčićeva 2D, Split	
Telephone number	091/4305 664	
E-mail address	mstella@fesb.hr	
Personal web page		
Year of birth	1976	
Scientist ID	248924	
Research or art rank, and date of last rank appointment	Scientific associate, 06.06.2013.	
Research-and-teaching, art-and- teaching or teaching rank, and date of last rank appointment	Assistant professor, 16.09.2014.	
Area and field of election into research or art rank	Technical sciences, electrical engineering	
INFORMATION ON CURRENT EMP	LOYMENT	
Institution where employed	FESB, Split	
Date of employment	25.09.2001.	
Name of position (professor, researcher, associate teacher, etc.)	Assistant professor	
Field of research	Signal processing, localization, pattern recognition	
Function		
INFORMATION ON EDUCATION - H	lighest degree earned	
Degree	Ph.D.	
Institution	FESB	
Place	Split	
Date	20.05.2011.	
INFORMATION ON ADDITIONAL TR	AINING	
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)	 Stella, Maja; Russo, Mladen; Begušić, Dinko. Fingerprinting based localization in heterogeneous wireless networks. // Expert systems with applications. 41 (2014) , 15; 6738-6747. Stella, Maja; Russo, Mladen; Šarić, Matko. RBF Network Design for Indoor Positioning Based on WLAN and GSM. // International Journal of Circuits, Systems and Signal Processing. 8 (2014), 116-122. Stella, Maja; Russo, Mladen; Begušić, Dinko. GSM-Based Approach for Indoor Localization // World Academy of Science, Engineering and Technology. 2013. 195-199. Stella, Maja; Russo, Mladen; Begušić, Dinko. RF Localization in Indoor Environment. // Radioengineering. 21 (2012) , 2; 557-567. 	
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. Advanced heterogeneous network technologies, MZOS, project leader Dinko Begušić, 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	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	Darko Stipaničev, Ph.D., Full Professor	
The course he/she teaches in the proposed study programme	Artificial Intelligence	
GENERAL INFORMATION ON COU	RSE 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 - H	lighest degree earned	
Degree	PhD	
Institution	Electrotechnical Faculty University of Zagreb	
Place	Zagreb	
Date	1987	
INFORMATION ON ADDITIONAL TR	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 COURS	E
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. <u>http://laris.fesb.hr/digitalno_vodjenje</u>
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	 D.Stipaničev, J.Božičević, Fuzzy Feedforward and Composite Control, Transaction Inst. Measurement and Control (UK), 8(2), 1986, pp. 67-75 D.Stipaničev, Vođenje i zaštita vjetroelektrana u autonomnom elektro-energetskom sistemu, Sunčana energija, 8(2), 1987, pp.91-96 D.Stipaničev, Diskretno vođenje složenih sustava adaptivnim, nelinearnim PID regulatorima, Elektrotehnika, 34(3-4), 1991, pp.153-161 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 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)	 Project Vision based intelligent observers (ViO) (2012 – 2016) 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	Matko Šarić, Ph.D., Assistant Professor
The course he/she teaches in the proposed study programme	Algorithms Data compression
GENERAL INFORMATION ON COU	RSE TEACHER
Address	Pojišanska 25, 21000 Split
Telephone number	0914305633
E-mail address	msaric@fesb.hr
Personal web page	
Year of birth	1980
Scientist ID	272954
Research or art rank, and date of last rank appointment	Assistant research scientist, 16.6.2011.
Research-and-teaching, art-and- teaching or teaching rank, and date of last rank appointment	Assistant professor, September 2014.
Area and field of election into research or art rank	Computer science, information processing
INFORMATION ON CURRENT EMP	LOYMENT
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, University of Split (FESB Split)
Date of employment	1.6.2004.
Name of position (professor, researcher, associate teacher, etc.)	Assistant professor
Field of research	Computer vision
Function	
INFORMATION ON EDUCATION - H	lighest degree earned
Degree	Ph.D. in Electrical Engineering and Information Technology, FESB (Split)
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, University of Split (FESB Split)
Place	Split
Date	13.10.2010.
INFORMATION ON ADDITIONAL TR	AINING
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 COURS	E
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	 Multimedia systems, graduate study of electrical engineering Algorithms, graduate study Signals and systems, undergraduate study of electrical engineering and information technology Algorithms, undergraduate study of computer science
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)	 Šarić, Matko; Dujmić, Hrvoje; Russo, Mladen. Scene Text Extraction in IHLS Color Space Using Support Vector Machine. // Information Technology And Control. 44 (2015) , 1; 20-29 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 Šarić, Matko; Stella, Maja; Šolić, Petar. Scene Text Extraction using K-means Clustering in HSI Color Space: Influence of Color Distance Measure. // INTERNATIONAL JOURNAL OF CIRCUITS, SYSTEMS AND SIGNAL PROCESSING. 7 (2013) , 5; 294-301 Šarić, Matko; Stella, Maja; Šolić, Petar. Extraction of Scene Text in HSI Color Space using K-means Clustering with Chromatic and Intensity Distance // Recent advances in information sciences - Proceedings of the 5th European conference of compute science (ECCS'13). 2013. 136-141 Dujmić, Hrvoje; Šarić, Matko; Radić, Joško. Scene text extraction using modified cylindrical distance // Recent Researches in Neural Networks, Fuzzy Systems, Evolutionary Computing and Automation (Proceedings of 12th WSEAS conference on Automation & Information). Brasov, 2011. 213-218
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)	 MZOŠ project "ICT systems and services based on information integration" (20072012.) HRZZ project "ELISE: Easy Living in Smart Environments" (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?	
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	Antonio Šarolić, Ph.D., Full Professor
The course he/she teaches in the proposed study programme	Antennas Antenna systems Electromagnetic compatibility Bioelectromagnetics Maritime radiocommunications Simulation and measurement of electromagnetic quantities
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 EMP	LOYMENT
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and
inelialen mere empleyed	Naval Architecture
Date of employment	Naval Architecture 1.1.2006.
Date of employment Name of position (professor, researcher, associate teacher, etc.)	Naval Architecture 1.1.2006. Full Profesor
Date of employment Name of position (professor, researcher, associate teacher, etc.) Field of research	Naval Architecture 1.1.2006. Full Profesor Applied electromagnetics, wireless communications
Date of employment Name of position (professor, researcher, associate teacher, etc.) Field of research Function	Naval Architecture 1.1.2006. Full Profesor Applied electromagnetics, wireless communications Head of Chair for Applied Electromagnetic Fields
Date of employment Name of position (professor, researcher, associate teacher, etc.) Field of research Function INFORMATION ON EDUCATION – H	Naval Architecture 1.1.2006. Full Profesor Applied electromagnetics, wireless communications Head of Chair for Applied Electromagnetic Fields Highest degree earned
Date of employment Name of position (professor, researcher, associate teacher, etc.) Field of research Function INFORMATION ON EDUCATION – H Degree	Naval Architecture 1.1.2006. Full Profesor Applied electromagnetics, wireless communications Head of Chair for Applied Electromagnetic Fields Highest degree earned PhD
Date of employment Name of position (professor, researcher, associate teacher, etc.) Field of research Function INFORMATION ON EDUCATION – H Degree Institution	Naval Architecture 1.1.2006. Full Profesor Applied electromagnetics, wireless communications Head of Chair for Applied Electromagnetic Fields Highest degree earned PhD FER, University of Zagreb
Date of employment Name of position (professor, researcher, associate teacher, etc.) Field of research Function INFORMATION ON EDUCATION – H Degree Institution Place	Naval Architecture 1.1.2006. Full Profesor Applied electromagnetics, wireless communications Head of Chair for Applied Electromagnetic Fields Highest degree earned PhD FER, University of Zagreb Zagreb
Date of employment Name of position (professor, researcher, associate teacher, etc.) Field of research Function INFORMATION ON EDUCATION – H Degree Institution Place Date	Naval Architecture 1.1.2006. Full Profesor Applied electromagnetics, wireless communications Head of Chair for Applied Electromagnetic Fields Highest degree earned PhD FER, University of Zagreb Zagreb 2004.
Date of employment Name of position (professor, researcher, associate teacher, etc.) Field of research Function INFORMATION ON EDUCATION – H Degree Institution Place Date MOTHER TONGUE AND FOREIGN	Naval Architecture 1.1.2006. Full Profesor Applied electromagnetics, wireless communications Head of Chair for Applied Electromagnetic Fields Highest degree earned PhD FER, University of Zagreb Zagreb 2004.
Date of employment Name of position (professor, researcher, associate teacher, etc.) Field of research Function INFORMATION ON EDUCATION – H Degree Institution Place Date MOTHER TONGUE AND FOREIGN Mother tongue	Naval Architecture 1.1.2006. Full Profesor Applied electromagnetics, wireless communications Head of Chair for Applied Electromagnetic Fields Highest degree earned PhD FER, University of Zagreb Zagreb 2004. LANGUAGES Croatian
Date of employment Name of position (professor, researcher, associate teacher, etc.) Field of research Function INFORMATION ON EDUCATION – H Degree Institution Place Date MOTHER TONGUE AND FOREIGN Mother tongue Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Naval Architecture 1.1.2006. Full Profesor Applied electromagnetics, wireless communications Head of Chair for Applied Electromagnetic Fields Highest degree earned PhD FER, University of Zagreb 2004. LANGUAGES Croatian English, 5

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	
	Senić, Damir; Holloway, Christopher L.; Ladbury, John M.; Koopko, Calen H.; Šarelić, Antonio	
	Absorption Characteristics and SAR of a Lossy Sphere inside a Reverberation Chamber // Proceedings of EMC Europe 2014 Gothenburg. IEEE, 2014. 962-967	
	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-	
Professional, science and artistic projects in the field of the course	Completed projects:	
carried out in the last five years (5 at most)	 Principal investigator of research project MZOS 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 COUL	RSE 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 - H	lighest 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 COURSI	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	 Course 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 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 in which the subject is taught: Electrical Engineering and Information Technology 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 in which the subject is taught: Electrical Engineering and Information Technology The level of the study programme in which the subject is taught:
Authorship of university/faculty textbooks in the field of the course	 Stipaničev Darko, Šerić Ljiljana. Artificial intelligence. Split, FESB - Internal script, 2012. 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)	 Doko Alen, Štula Maja, Šerić Ljiljana. Improved sentence retrieval using local context and sentence length. Information processing & management, 49 (2013), 6, 1301-1312. Šerić Ljiljana, Stipaničev Darko, Štula Maja. Engineering of holonic multi agent intelligent forest fire monitoring system. Al communications, 26 (2013), 3; 303-316. 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. 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. 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	Silvestar Šesnić, Ph.D., Assistant Professor
The course he/she teaches in the proposed study programme	Application of analytical methods in electromagnetic compatibility
GENERAL INFORMATION ON COURSE TEACHER	
Address	Stepinčeva 65, 21000 Split
Telephone number	+385914305814
E-mail address	ssesnic@fesb.hr
Personal web page	-
Year of birth	1979.
Scientist ID	272965
Research or art rank, and date of last rank appointment	Research associate, 14.02.2013.
Research-and-teaching, art-and- teaching or teaching rank, and date of last rank appointment	Assistant Professor, 06.2014.
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	01.01.200.5
Name of position (professor, researcher, associate teacher, etc.)	Assistant Professor
Field of research	Research and higher education
Function	-
INFORMATION ON EDUCATION - H	lighest degree earned
Degree	PhD
Institution	Faculty of electrical Engineering, Mechanical Engineering and Naval Architecture, University of Split
Place	Split, Croatia
Date	04.11.2010.
INFORMATION ON ADDITIONAL TR	RAINING
Year	2013.
Place	Clermont Ferrand, France
Institution	Polytech' Clermont Ferrand, Blaise Pascal University
Field of training	Electromagnetic compatibility
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

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 2, Electrical engineering and information technology, Undergraduate programme
Authorship of university/faculty	-
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	 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 (2016); 1-11 Poljak, Dragan; Šesnić, Silvestar; Cavka, 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 Šesnić, Silvestar; Garma, Tonko; Poljak, Dragan; Tkachenko, Sergey V. Comparison of the antenna model and experimental analysis of an impulse impedance of the horizontal grounding electrode. // Electric power systems research. 125 (2015); 159-163 Šesnić, Silvestar; Poljak, Dragan. Antenna model of the horizontal grounding electrode for transient impedance calculation: Analytical versus Boundary Element Method. // Engineering analysis with boundary elements. 37 (2013), 6; 909-913 Šesnić, Silvestar; Poljak, Dragan; Tkachenko, Sergey V. Analytical Modeling of a Transient Current Flowing Along the Horizontal Grounding Electrode. // IEEE transactions on electromagnetic compatibility. 55 (2013), 6; 1132-1139
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)	 ITER Physics Work Package – Code Development for Integrated Modelling, EURATOM, Horizon 2020 Civil Engineering Applications of Ground Penetrating Radar, COST EMI study of PLC services, Bilateral agreement Cogito, Croatia, France Modelling and environmental aspects of ELF electromagnetic fields, MZOŠ
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)	University of Split, 4.3, Fundamentals of Electrical Engineering 2

First and last name and title of teacher	Petar Šolić, Ph.D., Assistant Professor
The course he/she teaches in the proposed study programme	Radio frequency identification technology
GENERAL INFORMATION ON COU	RSE 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 EMP	LOYMENT
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 - H	lighest degree earned
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	04/06/2014
INFORMATION ON ADDITIONAL TR	RAINING
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	Ivica Veža, Ph.D., Full Professor	
The course he/she teaches in the proposed study programme	Project Management	
GENERAL INFORMATION ON COURSE TEACHER		
Address	Odeska 13, 21000 Split, HR	
Telephone number	+385 21 305933	
E-mail address	iveza@fesb.hr	
Personal web page		
Year of birth	1951.	
Scientist ID	095643	
Research or art rank, and date of last rank appointment	Scientific Adviser - Mechanical Engineering, 08.03.2001. Scientific Adviser – Fundamental Technical Science 05.07.2006.	
Research-and-teaching, art-and- teaching or teaching rank, and date of last rank appointment	Senior Full Professor, 23.01.1998.	
Area and field of election into research or art rank	Technical Sciences, Field Industrial engineering	
INFORMATION ON CURRENT EMPLOYMENT		
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture	
Date of employment	1/1/1981	
Name of position (professor, researcher, associate teacher, etc.)	Professor	
Field of research	Plant Layout, Organization, Production Engineering	
Function	Head of Chair of Inudstrial Engineering	
INFORMATION ON EDUCATION - H	Highest degree earned	
Degree	PhD	
Institution	Faculty of Mechanical Engineering and Naval Architecture	
Place	Zagreb	
Date	9/11/2001	
INFORMATION ON ADDITIONAL TRAINING		
Year	1983/84	
Place	Stuttgart, Germany	
Institution	University of Stuttgart, Fraunhofer – Institut fuer Produktiontechnik und Automatisierung	
Field of training	Plant Layout, Simulation	
INFORMATION ON ADDITIONAL TR	RAINING	
Year	1991	
Place	Berlin, Germany	
Institution	Technical University of Berlin, Fraunhofer IPK	
Field of training	Design of Assembly 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 (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Germany (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURS	E
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Economics and Production Organisation, Undergraduate study programme,
Authorship of university/faculty textbooks in the field of the course	Veža, Ivica: Bilić, Boženko; Gjeldum, Nikola; Mladineo, Marko: "Upravljanje projektima", Fakultet elektrotehnike, strojarstva i brodogradnje, Split, 2011.
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	 Perić, Tunjo; Babić, Zoran; Veža, Ivica: Vendor selection and supply quantities determination in a bakery by AHP and fuzzy multi-criteria programming. International journal of computer integrated manufacturing. 26 (2013), 9; 816-829 Veža, Ivica; Mladineo, Marko: SUSTAINABILITY THROUGH PRODUCTION NETWORKS. Management and Production Engineering Review. 4 (2013), 4; 33-39 Gjeldum, Nikola; Bilić, Boženko; Veža, Ivica. Investigation and modelling of process parameters and workpiece dimensions influence on material removal rate in CWEDT process. International journal of computer integrated manufacturing. 28 (2015), 7; 715-728 Takakuwa, Soemon; Veža, Ivica: Technology Transfer and World Competitiveness. Procedia Engineering. 69 (2014); 121-127 Banduka, Nikola; Veža, Ivica; Bilić, Boženko: An integrated lean approach to Process Failure Mode and Effect Analysis (PFMEA): A case study from automotive industry. Advances in Production Engineering & Management. 11 (2016), 4; 355-365
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	 Gečevska, Valentina; Čuš, Franci; Chiabert, Paolo; Veža, Ivica: LINKING LEAN PRODUCTION WITH PRODUCT LIFECYCLE MANAGEMENT FOR SUSTAINABLE BUSINESS ENVIRONMENT, DEVELOPMENT OF INTELLIGENT AND INNOVATIVE TOOLS FOR PRODUCTION PROCESS ENGINEERING AND SUSTAINABLE MANAGEMENT, Čuš, F.; Gečevska, V. (Ed.). Maribor, Slovenija: Faculty of Mechanical engineering, Maribor, 2013. 19-39. Čelar, Stipe; Turić, Mili; Dragičević, Srdjana; Veža, Ivica. Digital Learning Factory at FESB – University of Split , ZBORNIK RADOVA YU INFO 2016, 2016. 001-006 Veža, Ivica; Gjeldum, Nikola; Mladineo, Marko: Logistics Personal Excellence by Continuous Self-Assessment (LOPEC): Pilot Implementation - Case Studies. Conference Proceedings - MTSM 2014, Split, 2014. 39-46

	 Stojkić, Željko; Veža, Ivica; Bošnjak, Igor. CONCEPT OF INFORMATION SYSTEM IMPLEMENTATION (CRM AND ERP) WITHIN INDUSTRY 4.0, Proceedings of the 26th DAAAM International Symposium, Vienna, DAAAM International, 2016. 912-919 	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	 2008 – 2013 Project TEMPUS-2008-IT-JPCR 144 959, Master Study Program in Product Lifecycle Management with Sustainable Production 2011-2014 LEONARDO DA VINCI Project "LOPEC - Logistics personnel excellence by continuous self- assessment", FESB Split, University of Reutlingen 2013-2016 Network of Innovative Learning Factories NIL, "System - Learning Factory", FESB, Split, University of Reutlingen 2012 2016 Knew how Evchance on the Concentration and 	
	 2013-2016 Know-how Exchange on the Consequences and Challenges of the Integration of Key Enabling Technologies in European Manufacturing for the Danube Region, Fraunhofer Institute for Systems and Innovation Research ISI – Karlsruhe 2014-2018 Innovative Smart Enterprise, INSENT, Croatian Science Foundation, Zagreb 	
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)	4,9/5	

3.4. Optimal number of students

The admission quote for the first year of studies is 60.

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

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.		
Documentation on which the quality assurance system of the constituent part of the University is based:		
 Regulations on the quality enhancement system of FESB Quality Assurance Handbook of the constituent part 		
 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. 		
Evaluation of the work of teachers and part-time teachers	 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. 	
Monitoring of grading and harmonization of grading with anticipated learning outcomes	Committee for study programmes in Graduate university study in Information and Communication Technology is monitoring the harmonisation of grading and learning outcomes. 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) 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) 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: <u>https://www.fesb.hr</u> Visits to the faculty are organised for high-school students from Split and the wider region Participation at University fairs Public media presentations