U N I V E R S I T Y   O F   S P L I T

FACULTY OF ELECTRICAL ENGINEERING, MECHANICAL ENGINEERING AND NAVAL ARCHITECTURE

DETAILED PROPOSAL OF THE STUDY PROGRAMME

UNDERGRADUATE UNIVERSITY STUDY IN ELECTRICAL ENGINEERING AND INFORMATION TECHNOLOGY

SPLIT, July 2017

CONTENT

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	ELECTRICAL ENGINEERING AND INFORMATION TECHNOLOGY		
Provider of the study programme	FAKULTET ELEKTROTEHNIKE, STROJARSTVA I BRODOGRADNJE		
Other participants	FACULTY OF ELECTRICAL ENGINEERING, MECHANICAL ENGINEERING AND NAVAL ARCHITECTURE		
Type of study programme	Vocational study programme ☐	University study programme ☒	
Level of study programme	Undergraduate ☒	Graduate ☐	Integrated ☐
	Postgraduate ☐	Postgraduate specialist ☐	Graduate specialist ☐
Academic/vocational title earned at completion of study	University Bachelor in Electrical Engineering and Information Technology; univ. bacc. ing. el.		

1. INTRODUCTION

1.1. Reasons for starting the study programme

Electrical engineering is a field of science and engineering that encompasses the research and application of electrical phenomena. Similar to other branches of engineering, electrical engineering serves as a link between mathematics, physics and other natural sciences on one part, and on the other part, their practical applications. Widely diverse forms of practical applications of electrical engineering can be in the general sense divided into two basic groups: applications related to electrical energy and applications related to information.

The area of electrical engineering and information technology has become exceptionally wide and interdisciplinary, and there is virtually no human activity in which this area of engineering does not contribute, significantly fostering their development. One of the main features of the field of electrical engineering and information technology is its rapid development. The demands of the developed society for electrical energy are continually growing, creating constant demand for development of devices for energy conversion and seeking new and environmentally acceptable systems for distribution of electrical energy. Striking development of the electronic computers technology enabled their application in nearly all areas of human activity. 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. State-of-the-art computer technology enables major breakthroughs in the quality of automated control in the processing industry, control of vessels and aircrafts, complex robots and modern medical devices. 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 goal of the proposed university undergraduate study programme in Electrical Engineering and Information Technology is to educate professional staff in the area of electrical engineering and information technology, to meet the demands of the industry, higher education institutions, governmental and other public institutions.

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

One of the basic tasks of the Faculty is the education of young professionals who will use their knowledge, skills and abilities to become stakeholders in the economic and general development of local and wider community. Having been training leading professionals for more than 55 years, the Faculty successfully accomplished its task, providing necessary human resources to participate in the development of economy sectors based on different branches of engineering. The Faculty trained professionals who significantly contributed to economic development in the region, thus supporting the region to initiate and successfully develop high-tech based production activities with its own human resources potential. Successful development of the Dalmatian region power system was facilitated by the efforts of power engineering professionals trained at FESB. Of special importance is the influence FSB had on development of IT sector in the region. Early developments started back in 1966, with the purchase of the first computer funded by local enterprises and establishment of the Computer Centre at FESB. This was the first computer purchased in town and the first installed computer at a higher education institution in Croatia, representing a major breakthrough which allowed for gaining valuable experience, not only in teaching and research activities at the Faculty, but also in IT education and can be considered as the starting point in development of IT sector in the region. Professionals trained at FESB are the founders of a number of ICT companies in the Split-Dalmatia County and town of Split.

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

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.

1.5. Financing

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

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

During the implementation of the university undergraduate study programme in Electrical Engineering and Information Technology, the Faculty is actively pursuing the process of development in higher education on global level, and especially in Europe. When developing the new curriculum, special attention was given to consolidating the curriculum and course contents with other renowned foreign higher education institutions. The educational systems in the field of electrical engineering and information technology differ a lot, both worldwide and in Europe, and there are practically no countries with identical educational systems. The former applies to almost all components of education: type and organisation of studies, fields of study, duration of studies, titles and degrees awarded at individual institutions, names of higher education institutions, etc. 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 electrical engineering. In addition, the programme includes a number of non-engineering courses. The study programme proposal is consolidated with the recommendations given in the framework of the ERASMUS project THEIERE (Towards the Harmonisation of Electrical and Information Engineering Education in Europe, http://www.eaeeie.org/theiere/). Based on the analysis of the study programmes in Electrical Engineering and Information Technology at 87 European universities, a proposal was prepared for organisation of the study programme in Electrical Engineering and Information Technology and the ratio of each of the mentioned components. The proposal for the programme is consolidated with the recommendations of associations SEFI (European Society for Engineering Education) and CESAER (Conference of European Schools for Advanced Engineering Education and Research). The organisation of the proposed study programme is comparable with related study programmes at renowned European universities, e.g.:

- Techniche Univerzität Wien/ Engineering University Vienna, Austria
  http://www.tuwien.ac.at/informationen_fuer/studierende
- Eidgenössische Technische Hochschule (ETH)/ Swiss Federal Institute of Technology in Zürich, Switzerland
  https://www.ethz.ch/de/studium.html

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

Undergraduate university study programme in Electrical Engineering and Information Technology enables vertical and horizontal mobility of students. In terms of vertical mobility, the undergraduate university study programme in Electrical Engineering and Information Technology can primarily be followed by the graduate university study programmes in Automation and Systems, Electronic Engineering and Computer Engineering, Electrical Engineering and Communication and Information Technology. For students who enrol one of the listed graduate programmes after the undergraduate programme, these two cycles represent integral five-year educational programme which provides a comprehensive quality education in the field of electrical engineering and information technology. Vertical mobility is enabled also for other graduate study programmes. In terms of horizontal mobility, the undergraduate university study programme in Electrical Engineering and Information Technology is open for mobility of students of related studies at all Croatian universities, including the Faculty of Electrical Engineering and Computing at the University of Zagreb, Faculty of Engineering at the University of Rijeka and the Faculty of Electrical Engineering at the University of Osijek. Students have the opportunity to complete a part of the study programme at a similar institution in Croatia or abroad. The comparability of the study programme with similar study programmes enables the students to fulfil a part of their course requirements at other higher education institutions 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

Undergraduate university study programme in Electrical Engineering and Information Technology conforms with the Strategy of the University of Split 2015-2020. 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.

Undergraduate university study programme in Electrical Engineering and Information 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 with 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 electrical engineering is one of STEM disciplinary program areas.

1.9. Current experiences in equivalent or similar study programmes

FESB has extensive experience in delivering courses at similar programmes. Faculty of Electrical Engineering in Split was established in 1960, implementing a 2nd level study programme in electrical engineering, with programme duration of 8 semesters. After the integration with the studies in mechanical engineering and naval architecture, the Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture (FESB) was established in 1971. Since 1974 the Faculty has been a constituent part of the University of Split.

Continuous work at developing the curricula resulted in establishing a number of study programmes at undergraduate and graduate level. At the undergraduate study programmes in Electrical Engineering the programme is implemented in the following fields of study: Power Engineering and Electronic Engineering. The first three semesters of the study programme are identical for both fields of study, and the following semesters provide specialist courses with elective disciplines of study. The disciplines of study in Power Engineering are: Electric Drives and Facilities and Power Engineering Systems, and in Electronic Engineering: Automation and Systems, Electronic Communication Systems, Applied Electronic Engineering and Computer Technology.

In 1979 vocational study programmes were established at the Faculty (former level VI study programme) which are implemented since, with a pause during years 1998-2001.

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

2. DESCRIPTION OF THE STUDY PROGRAMME

2.1. General information

Scientific/artistic area of the study programme	Engineering sciences
Duration of the study programme	3 years
The minimum number of ECTS required for completion of study	180
Enrolment requirements and admission procedure	Completed 4-year high school programme and state graduation exam. Rankings are formed based on the grade point average achieved in high school and the state exam results in the fields of mathematics and physics. Students of related undergraduate studies may also be admitted, with at least 30 ECTS credit recognition.

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 undergraduate university study programme in *Electrical Engineering and Information Technology*. The learning outcomes are aligned with the Croatian Qualification Framework Act and are listed as common learning outcomes for all 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 complex problems in the field of electrical engineering and information technology.
2. To apply fundamental engineering principles in in the field of electrical engineering and information technology.
3. To consolidate the theoretical knowledge and practical skills in solving problems in the field of in the field of electrical engineering and information technology.

4. To analyse different assumptions, approaches and procedures related to practical problems in the field of in the field of electrical engineering and information technology.
5. To select appropriate analytical methods, modelling procedures and computer equipment in the analysis of systems with expected independent and purposeful functioning, with special emphasis on electrical engineering systems.
6. To design experiments by applying scientific principles in the field of electrical engineering and information technology.
7. To recognise the possibilities and limitations of applied techniques and methods.

SKILLS

8. To apply the techniques, skills and advanced engineering tools necessary in the engineering work.
9. To design experiments by applying scientific principles in the field of electrical engineering and information technology.
10. To conduct experiments and measurements and analyse and interpret collected data and measurement results.
11. To apply the knowledge of engineering and skills of effective problem solving of engineering problems, both independently and as a part of team.
12. To prepare design documents and technical reports, using modern technologies.
13. To use the literature, databases and other sources of information.
14. To give public oral presentation, to prepare written reports and present project results, in Croatian and English language.

INDEPENDENCE

15. To actively participate in and manage projects in the area of engineering, from the preparation stage to completion.
16. To continuously acquire knowledge of new methods and technologies.

RESPONSIBILITY

17. To demonstrate awareness of the influences of engineering processes on the individual, society and environment.
18. To demonstrate professional and ethical responsibility in unforeseen conditions.
19. To demonstrate awareness on health, safety and legal issues related to the individuals and social groups.
20. To recognise the need for participating in life-long learning and acquiring the knowledge about new technologies.

ADDITIONAL LEARNING OUTCOMES FOR THE FIELD OF STUDY AUTOMATION AND SYSTEMS

1. To provide creative solutions for development, design, implementation and analysis of automated systems.

2. To plan the development, production, testing, safety, maintenance and monitoring of various automated systems in general, as well as accompanying measurement equipment and execution devices.
3. To apply appropriate programming tools in the analysis and design of continuous and discrete automated systems and apply programming tools in Internet environment used to expand the options for solving tasks.
4. To calculate basic information on behaviour of automated systems in temporal and frequency domain, as well as assessment of stable functioning.
5. To manage projects in the field of automation of simple systems, from preparation to implementation.

ADDITIONAL LEARNING OUTCOMES FOR THE FIELD OF STUDY ELECTRONIC ENGINEERING AND COMPUTER ENGINEERING

1. To provide creative solutions for development, design and implementation of programming solutions and computer-based networking systems.
2. To select appropriate analytical methods, modelling procedures and computer equipment in the analysis of analogue and digital electronic circuits.
3. To plan the development, construction, safety, maintenance and monitoring of computer networks and computer-based networking systems.
4. To apply appropriate hardware solutions and programming tools for the development of computer systems and software support.
5. To design a simple micro-computer system for measurement and processing of physical properties.
6. To manage development projects for simple computer systems, from preparation to implementation.

ADDITIONAL LEARNING OUTCOMES FOR THE FIELD OF STUDY ELECTRICAL ENGINEERING

1. To provide creative solutions for development, design, implementation and analysis of power engineering components, electrical machines and power electronics devices.
2. To plan the development, production, testing, safety, maintenance and monitoring of power engineering systems, electrical machines and power electronics devices.
3. To apply appropriate programming tools in the analysis and design of power engineering components, electrical machines and power electronics devices.
4. To calculate energy ratios in systems conventional and renewable energy sources systems.
5. To select electrical machines for electro-mechanic conversion of energy.
6. To select transformers, overhead lines and switching equipment for transmission and distribution of electrical power.

ADDITIONAL LEARNING OUTCOMES FOR THE FIELD OF STUDY COMMUNICATION AND INFORMATION TECHNOLOGY

1. To provide creative solutions for development, design, implementation and analysis of information and communication systems, information and communication networks and networking services.

2. To plan the development, production, testing, safety, maintenance and monitoring of information and communication systems, information and communication networks and networking services.
3. To participate in the development and maintenance of software and hardware components in information and communication systems, information and communication networks, including the wireless and optical communication networks and the internet.
4. To participate in development and maintenance of programming solutions for services based on information and communication systems, information and communication networks, including wireless and optical communication networks and the internet.
5. To apply mathematical methods in analysis and synthesis of information and communication systems in temporal and frequency area.
6. To manage development projects for simple information and communication systems, information and communication networks and networking services, from preparation to implementation.

2.3. Employment possibilities

Following the completion of studies, the acquired knowledge enables the students to find employment in the industry, electric power industry, software and ICT companies, education, service industry, etc. There is virtually no working environment in which experts with completed undergraduate university degree in Electrical Engineering and Information Technology could not find employment and the labour market demand for this profile of experts are very high. This is especially relevant in this moment, with social and economic changes driving the development of new, small and medium technologically advanced enterprises that could serve as the new driving force for economic development. At the undergraduate university study programme in Electrical Engineering and Information Technology, students acquire competencies for work in various fields of power engineering, electromechanical engineering, automation, computing and information and communication technologies. Following the completion of studies, graduates can demonstrate skills in testing, maintenance, monitoring and application of circuits and devices in production, automated, power engineering, information and communication systems and the use of corresponding programming tools and physical components. The special importance of this study programme, with regard to the labour market, is that it represents the first stage of the comprehensive two-cycle educational process which results in producing a fully educated expert capable of solving the most complex engineering tasks and participating in scientific research. 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 undergraduate university study programme in Electrical Engineering, graduates may continue their studies at the corresponding university graduate study programme: Automation and Systems, Electronic Engineering and Computer Engineering, Electrical Engineering, Communication and Information

Technology or at any other related graduate study programme, in accordance with the admission requirements of that study programme.

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

2.6. Structure of the study

The study programme is structured per semesters, lasting 6 semesters, two in each academic year. Each semester corresponds to 30 ECTS credits. During the first two years of the studies, the students acquire fundamental knowledge in mathematics and natural sciences and fundamental knowledge in electrical engineering and information technology and the programme is implemented jointly for all students of this undergraduate university study. When students enrol in the third year, they choose one of the following fields of study:

- Automation and Systems,
- Electronic Engineering and Computer Engineering,
- Electrical Engineering,
- Communication and Information Technology.

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

2.7. Guiding and tutoring through the study system

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

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

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

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

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

2.10. Criteria and conditions for transferring the ECTS credits

Transfer or recognition of ECTS credits between related undergraduate 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 applying for the final thesis is acquired 120 ECTS credits.	
Procedure of evaluation of final/diploma exam and evaluation and defence of final/diploma thesis	The final thesis is evaluated by the mentor (supervisor) and the defence of the final thesis is conducted orally, in the presence of the mentor and students who also defend their final thesis with the same mentor.	

2.12. List of mandatory and elective courses

List of courses								
Year of study: 1.								
Semester: I.								
STATUS	CODE	COURSE	HOURS IN SEMESTER					ECTS
			L	S	AE	LE	DE	
Mandatory	FEMX01	Mathematics 1	45	0	45	0	0	7
	FENA01	Fundamentals of Electrical Engineering 1	45	0	30	0	0	7
	FELA01	Computers and Programming	30	0	0	30	0	6
	FELA08	Engineering Graphics and Presentation	15	0	0	30	0	4
	FEOA03	Communication skills	0	30	0	0	0	3
	FEOA04	English language 1	0	30	0	0	0	3
	Total		135	60	75	60	0	30
	L = lectures, S = seminars, AE = auditory excercise, LE = laboratory excercise, DE = design excercise							
	No elective courses							

List of courses								
Year of study: 1.								
Semester: II.								
STATUS	CODE	COURSE	HOURS IN SEMESTER					ECTS
			L	S	AE	LE	DE	
Mandatory	FEMX02	Mathematics 2	45	0	45	0	0	7
	FEMA01	Physics 1	45	0	30	15	0	7
	FENA02	Fundamentals of Electrical Engineering 2	30	0	30	15	0	6
	FELA04	Programming	30	0	0	30	0	6
	FEOA05	English language 2	0	30	0	0	0	4
	Total		150	30	105	60	0	30
	L = lectures, S = seminars, AE = auditory excercise, LE = laboratory excercise, DE = design excercise							
	No elective courses							

List of courses									
Year of study: 2.									
Semester: III.									
STATUS	CODE	COURSE	HOURS IN SEMESTER					ECTS
			L	S	AE	LE	DE	
Mandatory	FEMX03	Mathematics 3	30	0	30	0	0	5
	FEMA02	Physics 2	45	0	30	15	0	7
	FELA03	Electronic Devices and Circuits	30	0	30	15	0	6
	FENA03	Electrical Measurements	45	0	0	30	0	6
	FETA01	Economics and Production Organization	30	0	0	0	0	3
	FEOA06	English Language 3	0	30	0	0	0	3
	Total		180	30	90	60	0	30
	L = lectures, S = seminars, AE = auditory excercise, LE = laboratory excercise, DE = design excercise							
	No elective courses							

List of courses								
Year of study: 2.								
Semester: IV.								
STATUS	CODE	COURSE	HOURS IN SEMESTER					ECTS
			L	S	AE	LE	DE	
Mandatory	FEMX04	Probability and Statistics	30	0	30	0	0	5
	FELA05	Digital Electronics	45	0	15	15	0	6
	FELA09	Systems Theory	45	0	0	15	0	5
	FELA07	Information and Communications	45	0	15	0	0	5
	FENA04	Fundamentals Of Power Engineering	45	0	0	15	0	5
	FELA02	Electrotechnical Materials and Technology	30	0	0	15	0	4
	Total		240	0	60	60	0	30
	L = lectures, S = seminars, AE = auditory excercise, LE = laboratory excercise, DE = design excercise							
	No elective courses							

Specialisation: Control and Systems

List of courses									
Year of study: 3.									
Semester: V.									
STATUS	CODE	COURSE	HOURS IN SEMESTER					ECTS
			L	S	AE	LE	DE	
Mandatory	FELA19	Automatic Control 1	45	0	0	15	0	5
	FELA10	Electonic Circuits	30	0	15	15	0	5
	FELA11	Network Analyis	30	0	15	15	0	5
	FELA12	Simulation Modelling	45	0	0	15	0	5
	FELA13	Object Oriented Programming	30	0	0	30	0	5
		Elective Course 1.						
	Total		180	0	30	90	0	25
Elective*	FELA14	Internet Programming	30	0	0	30	0	5
	FELA15	Numerical Methods in Electrcal Engineering	30	0	15	15	0	5
	FELA60	Computer Methods in Biomechanics	15	0	0	45	0	5
	FELA17	Computer Architectures	30	0	0	30	0	5
	FESA01	Engineering Mechanics	30	0	15	0	0	5
	FELA40	Computer and Data Security	30	0	0	30	0	5
	FELA30	Communication Systems and Protocols	30	0	0	30	0	5
	L = lectures, S = seminars, AE = auditory excercise, LE = laboratory excercise, DE = design excercise							
	* **Elective courses are selected from the proposed list of elective courses for this field of study. One elective course is selected.**							

List of courses									
Year of study: 3.									
Semester: VI.									
STATUS	CODE	COURSE	HOURS IN SEMESTER					ECTS
			L	S	AE	LE	DE	
Mandatory	FELA18	Pulse and Digital Circuits	30	0	15	15	0	4
	FELA38	Automatic Control 2	30	0	15	15	0	5
	FELA20	Digital Instrumentation 1	30	0	0	15	0	5
		Elective Course 1.						
	FEXX01	Final Thesis						12
	Total		90	0	30	45	0	26
Elective*	FELA24	Sensors And Actuators	30	0	0	15	0	4
	FELA23	Elemens of Industrial Automation	30	0	0	30	0	5
	FELA29	Digital Signal Processing	30	0	15	15	0	5
	FELA43	Wireless Sensor Networks	30	0	0	30	0	5
	FELB08	Databases	30	0	0	30	0	6
	FEXX06	Professional Training	0	0	0	0	0	5
	L = lectures, S = seminars, AE = auditory excercise, LE = laboratory excercise, DE = design excercise							
	* **Elective courses are selected from the proposed list of elective courses for this field of study. One elective course is selected.**							

Specialisation: Electronics and Computer Engineering

List of courses									
Year of study: 3.									
Semester: V.									
STATUS	CODE	COURSE	HOURS IN SEMESTER					ECTS
			L	S	AE	LE	DE	
Mandatory	FELA28	Computer Networks	45	0	0	15	0	5
	FELA10	Electonic Circuits	30	0	15	15	0	5
	FELA11	Network Analyis	30	0	15	15	0	5
	FELA17	Computer Architectures	30	0	0	30	0	5
	FELA13	Object Oriented Programming	30	0	0	30	0	5
		Elective Course 1.						5
	Total		165	0	30	105	0	25
Elective*	FELA12	Simulation Modelling	45	0	0	15	0	5
	FELA14	Internet Programming	30	0	0	30	0	5
	FELA30	Communication Systems and Protocols	30	0	0	30	0	5
	FELA19	Automatic Control 1	45	0	0	15	0	5
	L = lectures, S = seminars, AE = auditory excercise, LE = laboratory excercise, DE = design excercise							
	* **Elective courses are selected from the proposed list or from the lists of mandatory and elective courses for the winter semester in fields of study Control and Systems and Communication and Information Technology in this study programme and the undergraduate study in Computing. Mandatory courses in the undergraduate study programme in Computing which significantly overlap with the content of the mandatory courses in the graduate study in Electronics and Computer Engineering cannot be selected as elective courses. The total number of ECTS credits per semester must be at least 30. One course is selected.**							

List of courses									
Year of study: 3.									
Semester: VI.									
STATUS	CODE	COURSE	HOURS IN SEMESTER					ECTS
			L	S	AE	LE	DE	
Mandatory	FELA18	Pulse and Digital Circuits	30	0	15	15	0	4
	FELA27	Operating systems	45	0	0	15	0	5
	FELA20	Digital Instrumentation 1	30	0	0	15	0	5
		Elective Course 1.						
	FEXX01	Final Thesis						12
	Total		105	0	15	45	0	26
Elective*	FELA29	Digital Signal Processing	30	0	15	15	0	5
	FELA26	Databases	30	0	0	30	0	5
	FEXX06	Professional Training	0	0	0	0	0	5
	L = lectures, S = seminars, AE = auditory excercise, LE = laboratory excercise, DE = design excercise							
	*** Elective courses are selected from the proposed list or from the lists of mandatory and elective courses for the summer semester in fields of study Control and Systems and Communication and Information Technology in this study programme and the undergraduate study in Computing. Mandatory courses in the undergraduate study programme in Computing which significantly overlap with the content of the mandatory courses in the graduate study in Electronics and Computer Engineering cannot be selected as elective courses. The total number of ECTS credits per semester must be at least 30. One course is selected.**							

Specialisation: Electrical Engineering

List of courses									
Year of study: 3.									
Semester: V.									
STATUS	CODE	COURSE	HOURS IN SEMESTER					ECTS
			L	S	AE	LE	DE	
Mandatory	FENA06	Electrical Networks	45	0	0	15	0	6
	FENA07	Electrical Machines	45	0	15	15	0	7
	FENA08	Elements of Electrical Power Switchgears	45	0	0	15	0	6
	FENA09	Power Electronics	30	0	0	30	0	6
	FENA10	Control Engineering	45	0	0	15	0	5
	Total		210	0	15	90	0	30
	L = lectures, S = seminars, AE = auditory excercise, LE = laboratory excercise, DE = design excercise							
	No elective courses							

List of courses								
Year of study: 3.								
Semester: VI.								
STATUS	CODE	COURSE	HOURS IN SEMESTER					ECTS
			L	S	AE	LE	DE	
Mandatory	FENA11	Electrical Drives	30	0	15	15	0	5
	FELA23	Elements of Industrial Automation	30	0	0	30	0	5
		Elective Course 1.						
		Elective Course 2.						
	FEXX01	Final Thesis						12
	Total		60	0	15	45	0	22
Elective*	FENA13	Electrical Installations and Lighting	30	0	0	15	0	4
	FENA14	Electrical Safety	30	0	0	15	0	4
	FENA15	Electrical Distribution Networks	30	0	0	15	0	4
	FENA16	Control of Power Electronics Systems	30	0	0	15	0	4
	FENA17	Electronic Converters for Power Supplies	30	0	0	15	0	4
	FENA18	Maintenance and Testing of Electrical Power Equipment	30	0	0	15	0	4
	FENA20	Marine Electrical Engineering	30	0	0	15	0	4
	FENA22	Instrumentation and Testing In Work Environment	30	0	0	15	0	4
	FENA23	Instrumentation for Smart Grid	30	0	0	15	0	4
	FEXX06	Professional Training	0	0	0	0	0	5
	L = lectures, S = seminars, AE = auditory excercise, LE = laboratory excercise, DE = design excercise							
	* **Elective courses are selected from the proposed list of elective courses for this field of study. Two elective courses are selected.**							

Specialisation: Communication and Information Technology

List of courses								
Year of study 3.								
Semester: V.								
STATUS	CODE	PREDMET	HOURS IN SEMESTER					ECTS
			L	S	AE	LE	DE	
Mandatory	FELA33	Information Theory	30	0	0	30	0	5
	FELA30	Communication Systems and Protocols	30	0	0	30	0	5
	FELA13	Object Oriented Programming	30	0	0	30	0	5
	FELA17	Computer Architectures	30	0	0	30	0	5
	FELA11	Network Analyis	30	0	15	15	0	5
		Elective Course 1.						
	Total		150	0	30	120	0	25
Elective *	FELA40	Computer and Data Security	30	0	0	30	0	5
	FELA14	Internet Programming	30	0	0	30	0	5
	FELA34	Semiconductor Electronic Components	30	0	0	30	0	5
	FELA15	Numerical Methods in Electrcal Engineering	30	0	15	15	0	5
	FELA10	Electonic Circuits	30	0	15	15	0	5
	FELA12	Simulation Modelling	45	0	0	15	0	5
	FELA19	Automatic Control 1	45	0	0	15	0	5
	L = lectures, S = seminars, AE = auditory excercise, LE = laboratory excercise, DE = design excercise							
	*** Elective courses are selected from the proposed list or from the lists of mandatory and elective courses for the winter semester in field of study Electronics and Computer Engineering (112) of this study programme and the undergraduate study in Computing (120). The total number of ECTS credits per semester must be at least 30. One course is selected.**							

List of courses								
Year of study: 3.								
Semester: VI.								
STATUS	CODE	COURSE	HOURS IN SEMESTER					ECTS
			L	S	AE	LE	DE	
Mandatory	FELA32	Electromagnetic Fields	30	0	15	15	0	5
	FELA29	Digital Signal Processing	30	0	15	15	0	5
	FELA18	Pulse and Digital Circuits	30	0	15	15	0	4
		Elective Course 1.						
	FEXX01	Final Thesis						12
	Total		90	0	30	60	0	26
Elective*	FELA43	Wireless Sensor Networks	30	0	0	30	0	5
	FELA26	Databases	30	0	0	30	0	5
	FELA46	Introduction to Wireless Communications	30	0	0	30	0	5
	FELA47	Computer Based Analysis of Electric Circuits and Transmission Lines	30	0	15	15	0	5
	FEXX06	Professional Training	0	0	0	0	0	5
	L = lectures, S = seminars, AE = auditory excercise, LE = laboratory excercise, DE = design excercise							
	*** Elective courses are selected from the proposed list or from the lists of mandatory and elective courses for the summer semester in field of study Electronics and Computer Engineering (112) of this study programme and the undergraduate study in Computing (120). The total number of ECTS credits per semester must be at least 30. One course is selected.**							

2.13. Course description

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">AUTOMATIC CONTROL 1</td></tr>
<tr><td>Code</td><td>FELA19</td><td>Year of study</td><td colspan="5">3</td></tr>
<tr><td>Course teacher</td><td>Mojmil Cecić, Ph.D., Full Professor</td><td>Credits (ECTS)</td><td colspan="5">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Marija Jukić, mag. ing.</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>45</td><td>0</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- understanding and application of basic principles and laws of the automatic control,
- analyse the automatic control systems in the time and frequency domain,
- application the computer in the analysis and synthesis of control systems,
- permanent adoption and deepening of knowledge in the field of automatic control.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">System Theory (passed the exam)</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- define the basic concepts of analyses in time and frequency domain,
- carry out analyse of the control systems in time and frequency domain,
- describe the systems with differential equation,
- determine stability of the control systems,
- calculate the parameters of regulators,
- designe systems in the state space.</td></tr>
</table>

Course content broken down in detail by weekly class schedule (syllabus)		
Course content	L or S hours	AE hours
Introduction to the feedback control systems	2	
Mathematical modeling of control systems elements by transfer function	4	
Mathematical modeling in state space, Phase and physical state variables	4	
The performance of feedback control system	5	
Time and frequency response	4	
The stability of linear feedback systems	4	
The root locus method	5	
P, PI, PD, PID controllers	3	
Phase lead and phase lag compensator	3	
The design of feedback control systems	5	
List of laboratory or design exercises		LE or DE hours
Phase lead and phase lag design using MATLAB		2
P, PI, PD, PID design using MATLAB		2
System stability using control design software		2
The root locus using MATLAB		1
The fundamentals of LabView		2
Modeling and simulation using LabView		2
Frequency analyses using LabView		2

Format of instruction		
	☒ lectures	☒ independent assignments
	☐ seminars and workshops	☐ multimedia
	☐ exercises	☒ laboratory
	☐ *on line* in entirety	☐ work with mentor

<table>
<tr><td></td><td colspan="3">☐ partial e-learning
☐ field work</td><td colspan="3">☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">The presence on lectures in the amount of at least 70 % of the times scheduled.
Performed all required laboratory exercises.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>2,0</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work</td><td>2,5</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>0,2</td><td>(Other)</td><td></td></tr>
<tr><td>Tests</td><td>0,2</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>0,1</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">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.

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 [%] =0,25*L+0.375* (M1 + M2)
where L is laboratory assessment and M1 and M2 are the results of the midterm exams in percentage.
Each midterm test consists of 10 theoretical questions and numerical problems and final test also consists of 10 theoretical questions and numerical problems divided into two groups (the first and the second part). The requirement for passing grade is 50% of the total number of questions. The students who did not pass the midterm exams take part in the final exam. The midterm and final exams are carried out as written tests. Finally grade is determined as follows:
from 50% to 62.5% - dovoljan (2)
from 62.5% to 75% - dobar (3)
from 75% to 87.5% - vrlodobar (4)
from 87.5% to 100% - izvrstan (5)
Midterm and final exams are held in the terms provided by the time table.</td></tr>
<tr><td rowspan="4">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">Zanchi, V.: Automatika 1, FESB – Split, 1989.</td><td>5</td><td></td></tr>
<tr><td colspan="4">R. C. Dorf, R. H. Bishop, Modern Control Systems, Addison-Wesley Publishing Company, Inc. New York, USA, 1995.</td><td>1</td><td></td></tr>
<tr><td colspan="4">The Math Works: Control System Toolbox, Geting Started, Version 5, The MathWorks Inc., Natic, 2000.</td><td>1</td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">- John Van de Vegte: Feedback Contrl System, Prentice Hall Inc. 1986.
- J. Travis, J. Kring: LabVIEW for everyone: Graphical programming made easy and fun, Prentice Hall Inc., 2007.
- V. Zanchi, Simulacija, FESB – Split, 1996.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Evaluation of results in accordance with the above learning outcomes
- Feedback from students via surveys
- Self-evaluation of teachers
- Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

NAME OF THE COURSE	**AUTOMATIC CONTROL 2**							
Code	FELA38	Year of study	3					
Course teacher	Darko Stipaničev, Ph.D., Full Professor	Credits (ECTS)	5					
Associate teachers	Josip Musić, Ph.D., Assistant Professor Ivo Stančić, Ph.D., Assistant Professor	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30		15	15		
Status of the course	Obligatory	Percentage of application of e-learning	80					

COURSE DESCRIPTION

Course objectives	The acquisition of basic knowledge about the processes of analysis and design of digital control.
Course enrolment requirements and entry competences required for the course	Completed course Automatic control1 .
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to successfully mastering the subject: 1. Recognising the difference between continuous and discrete signals and systems. 2. Explain the sampling procedure and the A / D converter, as well as the process of recovering and D / A converter. 3. Model discrete systems using equations difference, Z-transformation and impulse transfer function. 4. Analyse discrete system as follows: Stability. Analysis of transient response, accuracy and error steady state. 5. Design a discrete controller using discretization of continuous controllers. 6. Design a discrete controller by Dahlin method. 7. Realise the impulse transfer function of a discrete controller.

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

Course content	L or S hours	AE hours
Introduction to digital control, continuous and discrete signals and systems, sampling and recovery, A / D and D / A	4	0
Modeling of discrete systems - difference equations, Z transform	4	4
Impulse transfer function and equivalent impulse transfer function	2	2
Analysis of discrete control systems in the time domain - transients.	2	4
Analysis of discrete control systems - the steady-state error. Analysis of discrete control system - stability.	4	4
Design of discrete controllers - discretization of continuous controllers	4	4
Discrete PID controller	2	4
Discrete controller design by Dahlin method	2	4
Realization of digital control- conversion of impulse transfer function in the difference equation	2	0

Format of instruction	☒ ☒ lectures ☐ seminars and workshops ☒ ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ ☒ independent assignments ☒ ☒ multimedia ☒ ☒ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

	Class attendance	1,5	Research		Practical training	

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)*	Experimental work		Report		Individual work	
	Essay		Seminar essay		Laboratory exercises	0,5
	Tests		Oral exam		Preparation for laboratory exercises	
	Written exam	**3**	Project		(Other)	

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

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	D.Stipaničev, J.Marasović, Digitalno vođenje on-line, on-line (Web) udžbenik, MZT – Informatički projekt, 2004. http://laris.fesb.hr/digitalno_vodjenje		e-learning portal

Optional literature (at the time of submission of study programme proposal)	- Kuljača, Lj.; Vukić, Z.: Automatsko upravljanje sistemima, Školska knjiga, Zagreb, 1985. 2004. - J.A.Borrie, Modern Control Systems – A Manual of Design Methods, Prentice Hall Int., 2000 - D.Ibrahim, Microcontroller Based Applied Digital Control, J.Willey & S.2006
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	**COMPUTER AND DATA SECURITY**		
Code	FELA40	Year of study	3.
Course teacher	Mario Čagalj, Ph.D., Full Professor	Credits (ECTS)	5
Associate teachers		Type of instruction (number of hours)	L: 30, S: 0, AE: 0, LE: 30, DE:
Status of the course	Elective	Percentage of application of e-learning	0

Type of instruction (number of hours)	L	S	AE	LE	DE
	30	0	0	30	

COURSE DESCRIPTION

Course objectives	Introduce students to: - fundamentals of computer and data security, - critical thinking on security issues in computer 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: - define the basic concepts of computer security such as authentication, access control, data confidentiality, system and data integrity - analyse vulnerabilities of password-based authentication systems, - suggest basic protection measures.

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

Course content	L hours	AE hours
Introduction to computer security.	2	
Basic cryptographic primitives (encryption and authentication)	4	
User authentication (passwords, security tokens, biometry, attacks)	2	
User authentication on Windows and Unix-like operating systems	2	
Attacks on passwords (brute-force, dictionary, rainbow tables)	2	
Access control (Windows, Unix-like OS)	4	
First midterm exam		
Malware (viruses, computer worms, botnets)	2	
Protection against malware (AV software)	2	
Denial-of-Service (DoS) and Distributed DoS (DDoS) attacks	2	
Software security (buffer overflow attacks)	2	
Risk assessment and management	2	
Second midterm exam		

List of laboratory exercises	LE hours
Intro to computer security using Cryptool	4
User authentication and access control	6
Malicious software (keyloggers)	6
Malicious software (man-in-the-browser attacks)	4
DoS attacks	4
Software security (buffer overflow attacks)	2

Format of instruction	☒ lectures ☐ seminars and workshops ☐ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia ☒ laboratory ☐ work with mentor ☒ (other)
Student responsibilities	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

<table>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0,7</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work</td><td>2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Laboratory exercises</td><td>2</td></tr>
<tr><td>Tests</td><td>0,2</td><td>Oral exam</td><td></td><td></td><td></td></tr>
<tr><td>Written exam</td><td>0,1</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">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 laboratory assignments; these are also graded.

The final grade is formed as follows:
Grade = Round[0,05 P + 0,15 LV + 0,35 M1 + 0,45 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.</td></tr>
<tr><td rowspan="2">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">Lecture notes and presentations</td><td></td><td>e-learning portal</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">• Stallings W., Borwn L.: Computer Security, Principles and Practice, Pearson Prentice Hall, 2008.
• Gollmann D.: Computer Security, 2nd Edition, Wiley, 2005.
• Pfleeger C. P., Pfleeger S. L. : Security in Computing, 4th Edition, Prentice Hall, 2006.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Evaluation of results in accordance with the above learning outcomes
- Feedback from students via surveys
- Self-evaluation of teachers
- Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="6">COMPUTERS AND PROGRAMMING</td></tr>
<tr><td>Code</td><td>FELA01</td><td>Year of study</td><td colspan="5">1.</td></tr>
<tr><td>Course teacher</td><td>Mirjana Bonković, Ph.D., Full Professor
Ranko Goić, Ph.D., Full Professor</td><td>Credits (ECTS)</td><td colspan="5">6</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td>0</td><td>0</td><td>30</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students:
- to develop an understanding of basic computer architecture
- to understand numbering systems and data presentation
- to be familiar with concept of data presentaiton in the computer's memory,
- to understand semantic structures that build the program code,
- to understand techniques of programming in C</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7"></td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- Define areas of computing and the role of the algorithm as the basis of computers' functionality
- Describe the principles of storing various data types in the computer memory and illustrate the process with concrete examples
- Define and apply the role of the operators, the meaning and the way of expression coding
- Implement the basic semantic structures: assignment, branching, and repeatition (loops) for simple problem solving
- Define the algoriths and software solutions for given problems using C language.</td></tr>
<tr><td rowspan="18">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Course content</td><td>L or S hours</td></tr>
<tr><td colspan="6">Introduction: History of computing.</td><td>2</td></tr>
<tr><td colspan="6">Number systems. The binary representation of data.</td><td>2</td></tr>
<tr><td colspan="6">Development of the programming languages. The notion of abstraction. The concept of the algorithm.</td><td>2</td></tr>
<tr><td colspan="6">Storing the integer and the real numbers, characters and instructions. Data types, constants, variables.</td><td>4</td></tr>
<tr><td colspan="6">Arithmetic, logical, relational and bitwise expressions and operators.</td><td>2</td></tr>
<tr><td colspan="6">Sequential execution, branching and looping.</td><td>4</td></tr>
<tr><td colspan="6">Sequences. Debugging techniques.</td><td>2</td></tr>
<tr><td colspan="6">Using Arrays.</td><td>2</td></tr>
<tr><td colspan="6">Using functions. The block structure of the program. Modules.</td><td>4</td></tr>
<tr><td colspan="6">Development of the algorithm. Problem solving techniques. Flowchart. Gradually improving. A simple numerical examples.</td><td>2</td></tr>
<tr><td colspan="6">Programming of the frequently used algorithms: sorting, matrix multiplication, rearranging the spreadsheet elements</td><td>4</td></tr>
<tr><td colspan="6">List of laboratory or design exercises</td><td>LE or DE hours</td></tr>
<tr><td colspan="6">The binary representation of data. Data formats.</td><td>4</td></tr>
<tr><td colspan="6">The basic structure of C programs.</td><td>4</td></tr>
<tr><td colspan="6">Expressions. Operators.</td><td>4</td></tr>
<tr><td colspan="6">The basic programming structures: sequence, iteration, loop. Simple examples.</td><td>4</td></tr>
<tr><td colspan="6">Arryas.</td><td>4</td></tr>
</table>

	Functions in C.	4
	Typical examples.	6

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

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	2	Research		Practical training	
	Experimental work		Report		Individual work	2
	Essay		Seminar essay	0	Laboratory exercises	0,8
	Tests	0,2	Oral exam		Preparation for laboratory exercises	0,8
	Written exam	**0,2**	Project		(Other)	

Grading and evaluating student work in class and at the final exam	During the semester there are two midterm exams. The first midterm exam is after 7 weeks of lectures and the second one is after 13 weeks of lectures (in a form of presentation and defense of the project assignment). Each midterm test (as well as the final test) is carried out in a written format with duration of 90 minutes. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on average midterm exam ((M1 + M2)/2) or the final exam. Students are allowed to have at least 45% of total points on each midterm exams, as long as the final midterm average is at least 50% of total points. Grade (in percentage) is formed according to the formula: Grade(%) = 0,2L + 0,4M1 + 0,4M2 where: • L – laboratory assessment, • M1, M2 – midterm test results. According to Article 65. of Faculty's Bylaw, student is required to participate in all teaching activities attending at least 70% of lectures, and 100% of laboratory exercises. If student does not meet these criteria, she or he won't be able to take part in the final exam, and will be required to enroll in the course the next year.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	M. Bonković, R. Goić i ost.: Introduction to computers and programming (internal book In croatian), 2010		e-learning
	Ivo Mateljan: Programming with C language, internal book in Croatian, FESB, 2005	5	e-learning

Optional literature (at the time of submission of study programme proposal)	- J. Glenn Brookshear: Computer Science: An Overview, Addison Wesley, 2004 - Tannenbaum, S. Structured Computer Organisation., Prentice-Hall, Englewood Cliffs, N.J., 1990.
Quality assurance methods that ensure the acquisition of exit competences	- Keeping records of student attendance. - Annual analysis of course statistics in terms of midterm and finals exams. - Feedback from students via surveys. - Teacher self-evaluation. - Feedback from graduated students (or senior students) on course content relevance. - Periodic institutional evolution of course teachers.
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">COMMUNICATION SKILLS</td></tr>
<tr><td>Code</td><td>FEOA03</td><td>Year of study</td><td colspan="5">1</td></tr>
<tr><td>Course teacher</td><td>Mirjana M. Kovač
Ph.D., Assistant Professor</td><td>Credits (ECTS)</td><td colspan="5">3</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td colspan="2">E</td><td>F</td></tr>
<tr><td>0</td><td>30</td><td colspan="2">0</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Mandatory</td><td>Percentage of application of e-learning</td><td colspan="5"></td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">• understand the basic concepts related to verbal and nonverbal communication, as well as the factors that influence these concepts;
• develop the skills of presentation planning, presentation structure, and presentation performance in the Croatian language;
• develop pragmatic language competence;
• adopt the basic principles of written communication.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
1. describe the theories and models of communication;
2. employ active listening techniques;
3. demonstrate questioning skills;
4. give a technical presentation;
5. critically evaluate their own communication skills;
6. recognize disfluent speech;
7. negotiate and demonstrate the skills of assertive communication.</td></tr>
<tr><td rowspan="14">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Course content</td><td>L/S</td></tr>
<tr><td colspan="6">Definitions of communication; Overview of the theory of communication; Cross-cultural communication</td><td>0/2</td></tr>
<tr><td colspan="6">Verbal and nonverbal communication</td><td>0/2</td></tr>
<tr><td colspan="6">Questioning as a communication skill</td><td>0/2</td></tr>
<tr><td colspan="6">Active listening and Barriers to active listening</td><td>0/2</td></tr>
<tr><td colspan="6">Persuasion skills</td><td>0/2</td></tr>
<tr><td colspan="6">Written communication; Project reports</td><td>0/2</td></tr>
<tr><td colspan="6">Presentation skills (systematic guide)</td><td>0/2</td></tr>
<tr><td colspan="6">Technical presentation</td><td>0/2</td></tr>
<tr><td colspan="6">Technical presentation and peer evaluation</td><td>0/2</td></tr>
<tr><td colspan="6">Assertive communication and Critical thinking</td><td>0/2</td></tr>
<tr><td colspan="6">Public speaking skills</td><td>0/2</td></tr>
<tr><td colspan="6">Types of speech disfluencies</td><td>0/2</td></tr>
<tr><td colspan="6">Group and Team communication</td><td>0/2</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☐ lectures
☒ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="4">☒ independent assignments
☐ multimedia
☐ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="7">Active participation in all activities: lectures, consultations, searching the literature, individual work.</td></tr>
<tr><td>Screening student work (name the</td><td>Class attendance</td><td>1,1</td><td>Research</td><td></td><td>Practical training</td><td colspan="2"></td></tr>
</table>

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 work	1,1
	Essay		Seminar essay	0,5	(Other)	
	Midterm exam	0,2	Oral exam		(Other)	
	Written exam	0,1	Project		(Other)	

Grading and evaluating student work in class and at the final exam	The final grade is determined as the average of: • assessment of oral presentation and peer assessment of oral presentation; • assessment of written communication skills, written and oral assessment. There are two midterm exams and two examination periods. The first midterm exam is after 7 weeks of lecturing, and the second one is after the next 6 weeks. The lowest passing point is 50% in each midterm exam. The students who do not pass the midterm exams write the exams. The final grade for the course is calculated as a percentage of points earned. The final grade is determined applying the absolute ECTS grading system in accordance with the Rules of the Studying System of the University of Split. At the end of the semester the grades are averaged to form a grade Point Average, according to this scale: 50% - 61% - sufficient (2), 62% - 74%- good (3), 75% - 87% - very good (4), 88% - 100% - excellent (5). Students who fail the two exams in the first examination period take the exam in the autumn final examination period. The final exam consists of the material covered in both midterm exams.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	- Kovač, M.M., Sirković, N.: Presentation, Writing and Interpersonal Communication Skills. FESB, 2014.	20	

Optional literature (at the time of submission of study programme proposal)	Davies, J. W.: Communication skills: A Guide for Engineering and Applied Science Students. Pearson: Prentice Hall, 2001 Harris, T. E., Sherblom, J.C.: Small Group and Team Communication. Pearson Education/Allyn & Bacon, 2010.Press/Wiley, 2003
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	**COMMUNICATION SYSTEMS AND PROTOCOLS**						
Code	FELA30	Year of study	3.				
Course teacher	Matko Šarić, Ph.D., Assistant Professor	Credits (ECTS)	5				
Associate teachers	Tomislav Odrljin, dipl.ing.	Type of instruction (number of hours)	L	S	AE	LE	DE
			30	0	0	30	0
Status of the course	Obligatory	Percentage of application of e-learning	0				

COURSE DESCRIPTION			
Course objectives	Training students for: - adopting theoretical knowledge of communication systems - understanding and application of analog and digital modulation in communication systems		
Course enrolment requirements and entry competences required for the course	Passed exam Information and communication		
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - describe the basic properties of signals in communication systems - describe and apply analog and digital modulations - explain OFDM systems and spread spectrum systems - define a communication protocol and OSI model of communication system		
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L or S hours	AE hours
	Introduction. Model of the communication system. The quality of transmission. The quality of service. Digital and analog systems.	2	0
	The signals in communications and their basic features.	2	0
	Modulation. Amplitude modulation. Types of amplitude modulation. Digital amplitude modulation.	2	0
	The frequency and phase modulation. FM systems.Frequency multiplexing.	2	0
	Demodulation of the FM signal. FSK modulation.	2	0
	Phase shift keying. QPSK. QAM.	2	0
	OFDM systems	2	0
	Pulse Systems. Time multiplexing.	2	0
	PCM. Nonlinear quantization.	2	0
	A and μ law. Decoding of the PCM signal.	2	0
	Differential PCM	2	0
	DM. Systems with spread spectrum.	2	0
	The communication protocol. OSI model.	2	0
	List of laboratory or design exercises		LE or DE hours
	The voice signal		2
	Spectrum of FM signal		2
	FSK modulation		2
	QPSK modulation		2
	PCM		2
	DM and ADM Systems		2
Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia ☒ laboratory ☐ work with mentor ☐ (other)	

<table>
<tr><td>Student responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1,5</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work</td><td>2,2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Laboratory exercises</td><td>0,5</td></tr>
<tr><td>Tests</td><td>0,2</td><td>Oral exam</td><td></td><td>Preparation for laboratory exercises</td><td>0,5</td></tr>
<tr><td>Written exam</td><td>0,1</td><td>Project</td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. 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(%) = 0,25 LV + 0,75 (M1 + M2)/2
the activities in percentage:
• LV – laboratory assessment,
• M1, M2 – test results.

The final grade is defined in the next way:

50% do 63% sufficient (2)
64% do 77% good (3)
78% do 91% very good (4)
92% do 100% excellent (5)</td></tr>
<tr><td rowspan="2">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">Rožić, N.: Komunikacijski sustavi, skripta u rukopisu, Split 2005.</td><td></td><td>e-learning portal</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">M.Schwartz: Telecommunication Networks: Protocols, Modeling and Analysis, Addison Wesley

A.Bažant i drugi: Osnovne arhitekture mreža, Zagreb, 2003.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Evaluation of results in accordance with the above learning outcomes
- Feedback from students via surveys
- Self-evaluation of teachers
- Feedback from students who have already obtained BsC degree</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

NAME OF THE COURSE	**COMPUTER ARCHITECTURES**						
Code	FELA17	Year of study	3				
Course teacher	Sven Gotovac, Ph.D. Full Professor	Credits (ECTS)	5				
Associate teachers	Dunja Gotovac, Assistant	Type of instruction (number of hours)	L	S	AE	LE	DE
			30			30	
Status of the course	Obligatory	Percentage of application of e-learning	0				

COURSE DESCRIPTION

Course objectives	Training students for: 1. Understand digital computer architecture. 2. Define difference between different computer architecture on assembler level. 3. Understand computer architecture on the digital circuits level. 4. Understand and apply different computer architecture according to the application problem.
Course enrolment requirements and entry competences required for the course	C programming language Digital electronics and circuits
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: 1. Understand difference between computer architecture from the Instruction Set Point of view (ISA) 2. Identify the properties and performance of different architectures at the level of logic circuits 3. Select and apply the appropriate computer architecture according to the problem being solved. 4. Evaluate the impact of architecture on a software solution (advantages and disadvantages).

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

Course content	L or S hours	AE hours
Introduction. Different views on the computer.	2	
Data and instructions. Classification of Computers and Their Instructions, Instruction set. Instruction format. Addressing Modes. CISC. RISC.	2	
Instruction level processor design (Instruction Set Architecture)	2	
Arithmetical and Logical instructions, Instruction for Data Transfer.	2	
Flow control instructions, Translation from C to assembler and then to binary code.	2	
Processor design on digital circuits level. Single bus microarchitecture.	2	
Data Path Implementation, Logic Design for the 1-Bus Microarchitecture.	2	
Control Unit design, 2-Bus and 3-Bus Microarchitecture	2	
Pipeline architecture.	2	
Instruction-Level Parallelism – Problems and Solutions	2	
Memory System Design, Memory System Components, Two-Level Memory Hierarchy.	2	
Cache, Associative cache, Direct Mapped Cache, 2-way Cache.	2	
U/I system design.	2	

	List of laboratory or design exercises	LE or DE hours
	ARM Architecture - Introduction.	2
	ARM Instruction Set Architecture, Registers, Memory, Stack.	2
	Atmel Studio IDE. Program Structure	2
	Instruction Set, Arithmetical and Logical Instructions, Dana Transfer Instructions, Branch Control Instructions	8
	Procedures	2
	Program Examples	10
	Problems for Exercise and Test	4

Format of instruction	☒ lectures ☐ seminars and workshops ☐ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☒ independent assignments ☒ multimedia ☒ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance	2	Research		Practical training		
Experimental work		Report		Laboratory exercises	2	
Essay		Seminar essay		Preparation for laboratory exercises		
Tests	0,4	Oral exam		Self-study	0,5	
Written exam	0,1	Project				

Grading and evaluating student work in class and at the final exam	There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. Each midterm test lasts 60 minutes and consists of 5 to 7 theoretical questions and numerical problems and final tests consist of 6 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(%) = 0,33 LV + 0,33 (M1 + M2) the activities in percentage: • LV – laboratory assessment, • M1, M2 – test results. The final grade will be determined after the first test term by applying a relative ECTS grading system in accordance with the Regulations on the study and study system of the University of Split. The group of students who passed the exam is divided into four groups: 15% of the best gets the grade A (excellent), 35% of the following B (very good), the next 35% rating C (good), and the last 15% rating D, E). A group of students who did not pass the exam gains FX score (additional work is required), or F (significant additional work is required). In accordance with the Rulebook for Exam, only two exam periods are organized in the exam period after the completion of classes. According to Article 65 of the Statute of the Faculty, the student is obliged to participate in all forms of teaching and attend: lectures at least 70% of teaching hours and laboratory exercises 100% of teaching hours. If you do not meet these conditions, the student will not be able to access the exam

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Heuring, V.P., Joredan, H.F.: Computer Systems Design and Architecture, 2rd edition, AddisonWesley, 2003	2	Electronic copy On e-learning

	S.Gotovac Authorized lectures from the Digital Computer Architecture		On e-learning
Optional literature (at the time of submission of study programme proposal)	Hennesy & Patterson, "Computer Architecture: A Quantitative Approach", 5rd edition, Morgan Kaufmann, 2011		
Quality assurance methods that ensure the acquisition of exit competences	1. Class attendance records. 2. Evaluation of results in accordance with the above learning outcomes 3. Feedback from students via surveys 4. Self-evaluation of teachers 5. Feedback from students who have already graduated. 6. Institutional and non-institutional evaluations		
Other (as the proposer wishes to add)			

NAME OF THE COURSE	**COMPUTER BASED ANALYSIS OF ELECTRIC CIRCUITS AND TRANSMISSION LINES**							
Code	FELA47	Year of study	3					
Course teacher	Dragan Poljak, Ph.D., Full Professor	Credits (ECTS)	5					
Associate teachers	Anna Šušnjara	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30	0	15	15		
Status of the course	Optional	Percentage of application of e-learning	0					

COURSE DESCRIPTION

Course objectives	Training students for: - Understanding and apply fundamental principles and laws of electric circuits and transmission lines, - Solve electric circuits via numerical methods, - Solve transmission lines via numerical methods - Permanent adopting and fostering the knowledge in electric circuits and transmission lines.
Course enrolment requirements and entry competences required for the course	Fundamental of Electrical Engineering 1 and 2
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - Calculate frequency response of electric circuits by means of numerical methods, - Calculate transient response of electric circuits by means of numerical methods, - Calculate frequency response of transmission lines by means of numerical methods, - Calculate transient response of transmission lines by means of numerical methods, - Apply numerical models of networks and lines to electronic components, devices and in tellecomunications - Use commercial software packages for the analysis and synthesis of practical problems pertaining to electric circuits and transmission lines.

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

Course content	L or S hours	AE hours
Fundamentals of matrix analysis of electric circuits.	2	1
Method of contours and method of nodes.	2	1
Fundamentals of circuits analysis via linear integral transforms and superposition integrals.	2	1
Fundamentals of circuits analysis via state variables.	2	1
Basic procedures of nonlinear circuits analysis.	2	1
Analysis of transients via numerical methods.	2	1
Application of Runge-Kutta i linearnih multi-step procedures.	2	1
Fundamentals of transmission line theory.	2	1
Analysis of transmission lines via numerical methods in frequency domain and time domain.	2	1
Transient analysis of transmission lines via numerical methods.	2	1
Analysis of electromagnetic field coupling to transmission lines via numerical methods.	2	1
Application of finite differece method and finite element method.	2	1
Applications of numerical models of circuits and lines in electronic components and devices, tellecommunications and electromagnetic compatibility. Analysis of power lines and grounding systems.	2	1

	List of laboratory or design exercises	LE or DE hours
	Determination of transient response of RL-circuit by means of finite difference method.	2
	Determination of transient response of RL-circuit by means of finite element method.	2
	Determination of transient response of RLC-circuit by means of finite element method.	3
	Analysis of simple electric circuits by means of finite element method.	2
	Determination of the frequency response of a single wire transmission line by means of finite difference method.	2
	Determination of the frequency response of a single wire transmission line by means of finite element method.	2
	Determination of the transient response of a single wire transmission line by means of finite difference method.	2

Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia ☒ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	2	Research		Practical training	
	Experimental work		Report		(Other)	2,2
	Essay		Seminar essay		(Other)	0,2
	Tests	0,2	Oral exam		(Other)	0,2
	Written exam	0,2	Project		(Other)	

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

There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. Each midterm test (120 min in duration) consists of 3 questions (each containing theoretical part and short numerical problem) and 2 longer numerical problems. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on each midterm. Grade (in percentage) is formed according to the formula:

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

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

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

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

Required literature (available in the	**Title**	**Number of copies in the library**	**Availability via other media**

library and via other media)	S. Turk, L. Budin: *Analiza i projektiranje računalom*, Šk. knjiga, Zagreb, 1989.		
	D.Poljak, *Teorija elektromagnetskih polja s primjenama u inženjerstvu*, Šk. knjiga Zagreb, 2014.		
Optional literature (at the time of submission of study programme proposal)	1. D. Poljak, *Advanced Modeling in Computational Electromagnetic compatibility*, Wiley Interscience, New York 2007. 2. Dorf R. C., Svoboda J. A.: Introduction to Electric Circuits, 7th Edition, Wiley 2006. 3. F.M. tesche, M.V. Ianoz, T.Karlsson: EMC Analysis Methods and Computational Models, John Wiley and Sons, 1997.		
Quality assurance methods that ensure the acquisition of exit competences	- Evaluation of results in accordance with the above learning outcomes - Feedback from students via surveys - Self-evaluation of teachers - Institutional and non-institutional evaluations		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="8">COMPUTER METHODS IN BIOMECHANICS</td></tr>
<tr><td>Code</td><td>FELA60</td><td>Year of study</td><td colspan="5">3.</td></tr>
<tr><td>Course teacher</td><td>Vladan Papić, Ph.D., Full Professor
Josip Musić, Ph.D., Assistant Professor</td><td>Credits (ECTS)</td><td colspan="5">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Ivo Stančić, Ph.D., Assistant Professor</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>15</td><td>0</td><td>0</td><td>45</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Elective</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- understanding and applying basic principles of biomechanics.
- data acquisition during human movement based on the state-of-the-art measurement technologies.
- analyze collected data using computer methods.
- create human motion animation using state-of-the-art 3D rendering/animation tools.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- define basic principles, quantities and physical laws used in biomechanics.
- illustrate human motion data acquisition based on cameras and inertial sensors.
- apply basic biomechanics principles on calculation of kinematic quantities.
- analyze calculated kinematic data.
- design human model in 3D animation tool
- create 3D animation based on calculated/measured kinematic data.</td></tr>
<tr><td rowspan="18">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Course content</td><td>L or S hours</td></tr>
<tr><td colspan="6">Gait analysis: terminology and measurements.</td><td>2</td></tr>
<tr><td colspan="6">Measuring gait parameters.</td><td>1</td></tr>
<tr><td colspan="6">Kinematics.</td><td>3</td></tr>
<tr><td colspan="6">Kinetics.</td><td>3</td></tr>
<tr><td colspan="6">Electromyography during human gait.</td><td>2</td></tr>
<tr><td colspan="6">Complex configuration and body balance.</td><td>2</td></tr>
<tr><td colspan="6">List of laboratory or design exercises</td><td>LE or DE hours</td></tr>
<tr><td colspan="6">Modern methods for anthropometric parameter identification: application of computers.</td><td>3</td></tr>
<tr><td colspan="6">Measuring ground reaction forces during gait and standing: automatic computer analysis.</td><td>3</td></tr>
<tr><td colspan="6">Evaluation of gait and balance: defining quality parameters.</td><td>6</td></tr>
<tr><td colspan="6">Calculating human center of mass position.</td><td>3</td></tr>
<tr><td colspan="6">Experimental identification of human body segment kinematics during gait using video based approach in 3D.</td><td>6</td></tr>
<tr><td colspan="6">Experimental identification of human body segment kinematics in sports using video based approach in 3D.</td><td>6</td></tr>
<tr><td colspan="6">Inverse kinematics in muscle activity identification: application of computers.</td><td>3</td></tr>
<tr><td colspan="6">Animation tools: overview.</td><td>3</td></tr>
<tr><td colspan="6">Animation: practical work with application example and with inclusion of sensor measurements for increased fidelity.</td><td>12</td></tr>
<tr><td colspan="7"></td></tr>
<tr><td>Format of instruction</td><td colspan="2">☒ lectures</td><td colspan="5">☒ independent assignments</td></tr>
</table>

<table>
<tr><td></td><td colspan="4">☐ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">☒ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="7">The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0,5</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Laboratory exercises</td><td>1,5</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>2</td><td>Individual work</td><td>0,7</td></tr>
<tr><td>Tests</td><td>0,2</td><td>Oral exam</td><td></td><td></td><td></td></tr>
<tr><td>Written exam</td><td>0,1</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="7">During the semester there are two midterm exams according to teaching calendar or project assignments will be handed out depending on student preferences. Midterm consists of both theoretical questions and numerical problems. The midterms consist of 4 questions while final exam test consists of 6 questions divided into two groups. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on average midterm exam ((M1 + M2)/2) or the final exam. Students are allowed to have at least 45% of total points on each midterm exams, as long as the final midterm average is at least 50% of total points.
In determining the final grade (in percentages) each midterm contributes with 30% (or project assignment with 60%), while laboratory exercises contribute with 40%.
Final grade (based on percentages) is formed as follows:
Percentage Grade
50% do 62% sufficient (2)
63% do 74% good (3)
75% do 86% very good (4)
87% do 100% excellent (5)
In case student does not complete midterms or project exams he/she needs to take the final exam in which case it contributes with 60% toward final grade, and laboratory exercises again with 40%.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td colspan="2">Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">Winter D.A.: The Biomechanics and Motor Control of Human Gait, University of Waterloo Press, Waterloo, 1991.</td><td colspan="2">1</td><td>teacher</td></tr>
<tr><td colspan="4">Chris Totten , Game Character Creation, Sybex, 2012.</td><td colspan="2"></td><td>teacher/internet</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="7">/</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="7">- Keeping records of student attendance.
- Annual analysis of course statistics in terms of midterm and finals exams.
- Feedback from students via surveys.
- Teacher self-evaluation.
- Feedback from graduated students (or senior students) on course content relevance.</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="7">/</td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="6">COMPUTER NETWORKS</td></tr>
<tr><td>Code</td><td>FELA28</td><td>Year of study</td><td colspan="5">3</td></tr>
<tr><td>Course teacher</td><td>Julije Ožegović, Ph.D., Full Professor</td><td>Credits (ECTS)</td><td colspan="5">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Vesna Pekić, Ph.D.,
Ante Kristic, Ph.D.</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>45</td><td>0</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- Course provides fundamental knowledge of computer networks as computer engineering core.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- argue fundamental terms and architecture of computer networks
- present and compare ISO/OSI and TCP/IP protocol stacks
- justify usage of TCP/IP protocol stack on application layer
- evaluate usage of TCP and UDP protocols on transport layer
- organize functionality of IP protocol, IP addressing and IP routing
- plan LAN protocols and their functionality on physical and data layers
- plan WAN protocols and their functionality on physical and data layers
- organize addressing on physical, data, network and transport layers</td></tr>
</table>

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

Course content	L or S hours	AE hours
Development of data communications networks. Basic characteristics. Switching methods.	3	0
Importance of standardization. Open systems. Network elements. Channels, nodes, terminals.	3	0
Computer and terminal network architecture. Hierarchical layered structures. ISO model.	3	0
Protocols. Protocol mechanism: synchronization, addressing, flow control and error control.	3	0
Quality of service. Traffic and congestion control, flow control.	3	0
Physical level: DTE-DCE interface, RS232, X.24. Modem connections, intelligent modems. Signal codes.	3	0
Local networks. Access methods. Ethernet.	3	0
Wireless local networks. Digital subscriber networks: ISDN, xDSL. ATM.	3	0
Data level: Error control. Cyclic codes.	3	0
Character and bit oriented protocols. Frame-relay networks.	3	0
Local networks: MAC, LLC. ATM networks. Ethernet. Wireless local networks.	3	0
Network level: Packet networks. Traffic routing. Algorithms Bellman-Ford and Dijkstra.	3	0
Internet. IP protocol (v4, v6), addressing, intranet, routing. Routing protocols OSPF and RIP	3	0
Transport level: TCP and UDP Internet protocols. TCP protocol flow control.	3	0
Queuing systems. M/M/1 system Little formula.	3	0

List of laboratory or design exercises	LE or DE hours
DTE DCE interface.	2
Modem - data transfer using analogue telephone channel.	2

<table>
<tr><td rowspan="6"></td><td colspan="6">Local network Ethenet.</td><td>2</td></tr>
<tr><td colspan="6">Connecting computer to Internet subnetwork.</td><td>2</td></tr>
<tr><td colspan="6">Connecting subnetwork to public Internet.</td><td>2</td></tr>
<tr><td colspan="6">Virtual local networks.</td><td>2</td></tr>
<tr><td colspan="6">Wireless local networks</td><td>2</td></tr>
<tr><td colspan="6"></td><td></td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="4">☒ independent assignments
☐ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="7">Attend all forms of teaching, pass ingress and egress tests, perform 100% laboratory exercises, pass preliminary exams or full exam (numeric and theory).</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1,5</td><td>Research</td><td></td><td>Practical training</td><td colspan="2">0,5</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Auditory exercises</td><td colspan="2"></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Individual learning</td><td colspan="2">3</td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>(Other)</td><td colspan="2"></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td colspan="2"></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="7">Continuous assessment: laboratory tests, practical tests, knowledge tests, preliminary exams. Exam: written and oral (numeric and theory) as unity.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="5">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="5">1. Turk, S.: Računarske mreže, Školska knjiga, Zagreb, 1991..</td><td></td><td></td></tr>
<tr><td colspan="5">2. Rožić, N.: Informacije i komunikacije: kodiranje s primjenama, Zagreb 1992.</td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="7">- Ožegović, J. Računalne mreže, Veleučilište u Splitu, 2000
- Lecture notes: Ožegović, J., Računalne mreže, continuously upgraded
- A. Kristić, V. Pekić: Upute za laboratorijske vježbe, Internet</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="7">- Lecture attending evidence
- Annual exam passing analysis
- Student feedback with teacher evaluation
- Teacher self-evaluation
- Graduated students feedback</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="7"></td></tr>
</table>

NAME OF THE COURSE	**CONTROL ENGINEERING**						
Code	FENA10	Year of study	3				
Course teacher	Dinko Vukadinović, Ph.D., Full Professor	Credits (ECTS)	5				
Associate teachers	Mateo Bašić, Ph.D. Assistant Professor Ivan Grgić, Assistant	Type of instruction (number of hours)	L	S	AE	LE	DE
			45	0	0	15	0
Status of the course	Obligatory	Percentage of application of e-learning	0				
COURSE DESCRIPTION							
Course objectives	Training students for: - understanding of basic principles of continuous and digital control systems, - stability analysis of control systems - determination of performance indices of control systems						
Course enrolment requirements and entry competences required for the course	Theory of Systems and Mathematics 3						
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: 1) classify control systems upon different criterions 2) design the analogue PI controller 3) carry out the system stability of continuous and digital control systems 4) apply absolute value optimum and symmetrical optimum to determine contoller's parameters 5) determine performance indices of control systems upon the response of a controlled variable 6) calculate the transfer function of multi-loop systems						

Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Basic concepts and terminology	2	
	System analysis in the time domain	1	
	Frequency characteristics of systems	1	
	Frequency characteristics of operational amplifiers	1	
	Frequency domain analysis: Nyquist and Bode methods	2	
	Multi-loop automatic control systems, Masson’s rule	2	
	DC machine as an object of control	2	
	Stability of automatic control systems	1	
	Stability criterions by Hurwitz, Nyquist, Bode and Kharitonov	2	
	Performance indices of automatic control systems	2	
	State-variable feedback systems	2	
	PID controller and engineering tuning methods	2	
	Root locus technique	2	
	Control system optimisation - absolute value optimum	2	
	Control system optimisation - symmetrical optimum	2	
	Synthesis of linear systems of automatic control	3	
	Fundamentals of digital control systems	1	
	Z-transform, sampling process and digital control systems	2	
	Digital PID controller	1	
	Sensitivity of control systems	2	
	Experimental synthesis of a cascade speed-control system of a DC motor	2	
	Nonlinear automatic control systems and methods of linearization	2	

	List of laboratory exercises	LE hours
	Time response and Bode magnitude and phase plots of PI controller	4
	PI controller tuning based on Ziegler-Nichols method	3
	Air-temperature control system	4
	Speed control system of a separately-excited DC motor	4
Format of instruction	x lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	x independent assignments ☒ multimedia x laboratory ☐ work with mentor ☐ **(other)**
Student responsibilities	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	1.5	Research		Practical training	
	Experimental work		Report		Individual work	2
	Essay		Seminar essay		Laboratory exercises	0.5
	Midterm exams	0.3	Oral exam		Auditory exercises	0.5
	Written exam	0.2	Project		(Other)	

Grading and evaluating student work in class and at the final exam	During the semester, two midterm exams are held - the first after 7 weeks of lectures and the second after 13 weeks of lectures. Each midterm exam consists of 4 problems, either theoretical or numerical. In the final exams, students take those parts of the course which they did not pass in the midterm exams. The requirement for passing grade is that the sum of the laboratory exercises' grade (L) and the midterms' grades (M1 and M2), expressed as a percentage, is 50% or more. The sum is calculated as Grade (%) = 0.25L + 0.375(M1 + M2) where the number of points achieved in each midterm exam has to be at least 50%. The students that do not pass the midterm exams take the final written exam which consists of 4 problems. The requirement for a positive evaluation of the final exam is at least 50% points achieved. In the final exam, the students that did not pass one of the midterm exams are presented with 4 problems from the corresponding part of the course. Subsequently, the grade is determined as follows: Grade (%) = 0.25L + 0.75(I) where I is the number of points achieved in the final written exam (at least 50%). The final grade for the course is determined as follows: 50% to 61% - Sufficient (2) 62% to 74% - Good (3) 75% to 87% - Very good (4) 88% 100% - Excellent (5)

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Vukadinović, D., „Predavanja iz Regulacijske tehnike za šk. god. 2013/14“, FESB, Split, 2014.		e-learning portal
Optional literature (at the time of submission of study	Dorf, R.C.; Bishop, R.H.: Modern Control Systems, 12th edition, Prentice Hall, 2011.		

programme proposal)	
Quality assurance methods that ensure the acquisition of exit competences	- Keeping records of student attendance - Annual analysis of the performance at midterm exams and final exams - Feedback from students via surveys - Self-evaluation of teachers - Feedback from graduated students
Other (as the proposer wishes to add)	

NAME OF THE COURSE	**DIGITAL ELECTRONICS**						
Code	FELA05	Year of study	2				
Course teacher	Julije Ožegović, Ph.D., Full Professor	Credits (ECTS)	6				
Associate teachers	Josip Musić, Ph.D., Assistant Professor; Duje Čoko, Ph.D., Assistant Professor, Vesna Pekić, Ph.D., Ante Kristic, Ph.D.	Type of instruction (number of hours)	L	S	AE	LE	DE
			45	0	15	15	0
Status of the course	Obligatory	Percentage of application of e-learning	0				

COURSE DESCRIPTION

Course objectives	Training students for: - Course provides fundamental knowledge of Boolean algebra and automata theory as the digital electronics basis, with practical skills of combinatorial and sequential circuits' synthesis, including programmable structures.
Course enrolment requirements and entry competences required for the course	None
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - design combinatorial and sequential logic circuit - choose optimal design method - discuss on Boolean algebra properties application - model digital systems using finite state automata - explain application of small, medium and high scale integration circuits - determine the information structure of the system - evaluate the achieved results of digital system modelling and synthesis

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

Course content	L or S hours	AE hours
Digital and analog signals, information and coding-	3	0
Number systems. Binary number system-	3	0
Modulo arithmetic-	3	0
Logic gates-	1	0
Boolean algebra and logic algebra-	2	0
Boolean functions. Decomposition to partial functions.	3	0
Logic algebra complete systems	1	0
Minimization of Boolean function and circuit realization using logic gates.	6	3
Circuit realization using multiplexers and demultiplexers.	3	2
Multiplexer - demultiplexer structures (ROM). Programmable logic structures.	3	2
Time relations. Bistables. Bistable synthesis. Registers, shift registers and counters. Memories (RAM).	3	2
Discrete finite digital automata. Specification and minimization. Structural synthesis.	6	2
Programmable automata. Wilkies' model. Microprogramming concept. Algorithms.	3	2
Automata, grammars and languages taxonomy.	3	0
Event algebra. Automata specification using regular expressions.	3	2

List of laboratory or design exercises	LE or DE hours
Logic gates.	2
Minimization of Boolean function and circuit realization using logic gates.	2
Circuit realization using multiplexers and demultiplexers.	2

<table>
<tr><td rowspan="4"></td><td colspan="5">Programmable logic structures synthesis (EPROM, GAL).</td><td>2</td></tr>
<tr><td colspan="5">Bistable synthesis.</td><td>2</td></tr>
<tr><td colspan="5">Finite automata synthesis using logical gates and bistables.</td><td>2</td></tr>
<tr><td colspan="5">Finite automata synthesis using programmable logic structures (EPROM, GAL). Turing machine simulation.</td><td>2</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">☐ independent assignments
☐ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Attend all forms of teaching, pass ingress and egress tests, perform 100% laboratory exercises, pass preliminary exams or full exam (numeric and theory).</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1,5</td><td>Research</td><td></td><td>Practical training</td><td>0,5</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Auditory exercises</td><td>0,5</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Individual learning</td><td>3,5</td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Continuous assessment: laboratory tests, practical tests, knowledge tests, preliminary exams. Exam: written and oral (numeric and theory) as unity.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">3. Ožegović, J. Digitalna i mikroprocesorska tehnika, Veleučilište u Splitu, 2002.</td><td></td><td>Yes</td></tr>
<tr><td colspan="4">4. Župan-Tkalić-Kunštić: Logičko projektiranje digitalnih sustava, Školska knjiga, Zagreb, 1984, 1995.</td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">- Ožegović, J. Digitalna i mikroprocesorska tehnika, upute za laboratorijske vježbe, interna skripta, FESB Split 1995.
- Lecture notes: Ožegović, J., Digitalna elektronika, continuously upgraded</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Lecture attending evidence
- Annual exam passing analysis
- Student feedback with teacher evaluation
- Teacher self-evaluation
- Graduated students feedback</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">CONTROL OF POWER ELECTRONICS SYSTEMS</td></tr>
<tr><td>Code</td><td>FENA16</td><td>Year of study</td><td colspan="5">3</td></tr>
<tr><td>Course teacher</td><td>Dinko Vukadinović, Ph.D., Full Professor</td><td>Credits (ECTS)</td><td colspan="5">4</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Mateo Bašić, Ph.D. Assistant Professor
Miljenko Polić, Assistant</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td>0</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Elective</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- understanding of direct-current power transmission and flexible AC transmission systems (FACTS),
- understanding of active power filters</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7"></td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:

1) explain the role of FACTS devices for power transmission
2) analyze operating modes of FACTS controllers
3) apply the mathematical model of the static VAR compensator and static synchronous series compensator for reactive power compensation
4) explain the role of active power filters for high-order harmonics compensation in phase currents of electric power system
5) compare uninterruptable power supply systems which operate in normal mode of operation, in stored-energy mode of operation and bypass mode of operation</td></tr>
<tr><td rowspan="19">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Course content</td><td>L hours</td><td>AE hours</td></tr>
<tr><td colspan="5">Scope of power electronics devices; FACTS</td><td>2</td><td></td></tr>
<tr><td colspan="5">Static synchronous compensators (STATCOM)</td><td>2</td><td></td></tr>
<tr><td colspan="5">Static VAR compensators (thyristor controlled reactor and thyristor switched capacitor)</td><td>2</td><td></td></tr>
<tr><td colspan="5">Battery energy storage systems</td><td>2</td><td></td></tr>
<tr><td colspan="5">Superconducting magnetic energy storage</td><td>1</td><td></td></tr>
<tr><td colspan="5">Static synchronous series compensator</td><td>2</td><td></td></tr>
<tr><td colspan="5">Thyristor-sontrolled series capacitor</td><td>2</td><td></td></tr>
<tr><td colspan="5">Thyristor switched series reactor</td><td>2</td><td></td></tr>
<tr><td colspan="5">Thyristor controlled phase shifting transformer</td><td>1</td><td></td></tr>
<tr><td colspan="5">Conventional and advanced HVDC systems</td><td>3</td><td></td></tr>
<tr><td colspan="5">Active power filters and high-order harmonics compensation</td><td>3</td><td></td></tr>
<tr><td colspan="5">Uninterruptable power supply (UPS) systems</td><td>2</td><td></td></tr>
<tr><td colspan="5">Application of Matlab-Simulink software for FACTS devices simulation</td><td>2</td><td></td></tr>
<tr><td colspan="6">List of laboratory exercises</td><td>LE hours</td></tr>
<tr><td colspan="6">Static VAR compensator modeling for 400 kV power line</td><td>5</td></tr>
<tr><td colspan="6">Static synchronous compensator (STATCOM) modeling</td><td>5</td></tr>
<tr><td colspan="6">Calculation of currents and voltages in the power system with squirrel cage induction generator and STATCOM compensator</td><td>5</td></tr>
</table>

<table>
<tr><td>Format of instruction</td><td colspan="4">x lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">x independent assignments
☒ multimedia
x laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">The presence on lectures in the amount of at least 70 % of the times scheduled.
Performed all required laboratory exercises.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work</td><td>1</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Laboratory exercises</td><td>1</td></tr>
<tr><td>Midterm exams</td><td>0.3</td><td>Oral exam</td><td></td><td>Auditory exercises</td><td>0.5</td></tr>
<tr><td>Written exam</td><td>0.2</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">During the semester, two midterm exams are held - the first after 7 weeks of lectures and the second after 13 weeks of lectures. Each midterm exam consists of 4 problems, either theoretical or numerical. In the final exams, students take those parts of the course which they did not pass in the midterm exams.
The requirement for passing grade is that the sum of the laboratory exercises’ grade (L) and the midterms’ grades (M1 and M2), expressed as a percentage, is 50% or more. The sum is calculated as

Grade (%) = 0.25L + 0.375(M1 + M2)

where the number of points achieved in each midterm exam has to be at least 50%.
The students that do not pass the midterm exams take the final written exam which consists of 4 problems. The requirement for a positive evaluation of the final exam is at least 50% points achieved. In the final exam, the students that did not pass one of the midterm exams are presented with 4 problems from the corresponding part of the course. Subsequently, the grade is determined as follows:

Grade (%) = 0.25L + 0.75(I)

where I is the number of points achieved in the final written exam (at least 50%).

The final grade for the course is determined as follows:
50% to 61% - Sufficient (2)
62% to 74% - Good (3)
75% to 87% - Very good (4)
88% 100% - Excellent (5)</td></tr>
<tr><td rowspan="2">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">Vukadinović, D.: Predavanja iz kolegija Upravljanje sustavima energetske elektronike, šk. god. 2008/09.</td><td></td><td>e-learning portal</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">Acha E., Agelidis V.G., Anaya-Lara O., Miller T.J.E.: Power Electronic Control in Electrical Systems, 2002.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Keeping records of student attendance
- Annual analysis of the performance at midterm exams and final exams
- Feedback from students via surveys
- Self-evaluation of teachers
- Feedback from graduated students</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
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<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">DATABASES</td></tr>
<tr><td>Code</td><td>FELB08</td><td>Year of study</td><td colspan="5">2.</td></tr>
<tr><td>Course teacher</td><td>Vladan Papić, Ph.D., Full Professor</td><td>Credits (ECTS)</td><td colspan="5">6</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Tea Marasović, Ph.D., Assistant Professor</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td>0</td><td>30</td><td></td><td></td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- Understanding how typical database work,
- Modelling, normalization and design of simple databases,
- Retreaval, input, deleting and updating of data using simple and complex SQL queries.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- Explain basic terms used in databases, types and structures, methodology and life cycle,
- Use standard DBMS,
- Come up with queries for creation and retreaval of dana from tables,
- Translate given E-R diagram into relational form,
- Analyze relations in a database and conclude about level of normalization,
- Model simple databases according to given specification,
- Explain basic problems of databases working in multi user environment..</td></tr>
<tr><td rowspan="10">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Course content</td><td>L hours</td><td>AE hours</td></tr>
<tr><td colspan="5">Basic terms. File model. Database and database managament system. Physical and logical independence of data. Database design methodology.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Database models. Database types and structures. Database life cycle.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Data modelling. Steps in designing database. Entities and attributes. Relationship and relationship set. Functionality of relationship. Entity membership in relationships.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Representation of ER-model with diagram. Complex ER diagrams. Conceptual database design using ER-model. How to make data model in easiest way?</td><td>2</td><td></td></tr>
<tr><td colspan="5">Relational database model. Structure of relational database. Transfeer of ER model into relational model. Comparison of relational model with network and hierarhical models.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Normalization and normal forms. First normal form (1NF). Functional dependencies – basic definitions and terminology. Second normal form (2NF). Third normal form (3NF)</td><td>2</td><td></td></tr>
<tr><td colspan="5">Boyce-Codd normal form (BCNF). Multi-valued dependencies and forth normal form (4NF). Joining dependencies and fifth normal form (5NF). Normal form of keys and domains. Reasons for aborting with normalization.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Relational model operations. Relational algebra. Relational calculus.</td><td>2</td><td></td></tr>
<tr><td colspan="5">SQL (Structured Query Language). Processing of SQL instruction. Database definition using SQL (DDL). Modification</td><td>2</td><td></td></tr>
</table>

	of existing table. Deleting table. Indexes. Inserting data into tables.		
	Database queries. Simple queries on a relation. Search condition. Reports.	1	
	Queries on more than one relation. Query for table creation. Queries for insert, modification and deleting of dana. Aliases.	1	
	Aggregate functions. Group queries. Nested queries – subqueries.. Union. SQL queries optimization.	1	
	Multiuser environment problems. Views.	1	
	Protection from unautorizhed use. Ading privileges – single and cascade. Revoking priviledges. User groups. Data integrity and security. Time stamps.	2	
	Database storing and recovery. Database replication. Transaction log. Criteriums for DBMS evaluation.	2	
	List of laboratory exercises		LE hours
	Introduction to DBMS.		2
	ER-diagrams		2
	Transfering ER-diagrams into relational model		2
	Data modelling: etities and relationships.		2
	Creating writing dana into database.		2
	Filtering, sorting and searching for data.		2
	Simple queries.		2
	Complex queries.		2
	Input forms.		2
	Views and reports.		6
	Macro commands.		2
Format of instruction	☒ lectures ☐ seminars and workshops ☐ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☒ independent assignments ☒ multimedia ☒ laboratory ☐ work with mentor ☐ (other)	
Student responsibilities	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.		

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance	1,5	Research		Practical training	
Experimental work		Report		Individual work	2,2
Essay		Seminar essay		Laboratory exercises	0,5
Tests	0,2	Oral exam		Preparation for laboratory exercises	0,5
Written exam	0,1	Project		(Other)	

Grading and evaluating student work in class and at the final exam	There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. In the final exams students are answering parts they did not pass in the midterms. The midterm and final exams are carried out as written tests and it lasts for max. 90 minutes. The requirement for passing grade is 40% points on each midterm exam or final exam and positive assessment of laboratory exercises. In final grading (in percentage), each midterm exam contributes with max. 40%, lab. exercises with max. 20% out of total possible points (40%+40%+20%). Final grade is formed in the following way: Percentage Grade 50% to 61% sufficient (2) 62% to 74% good (3) 75% to 87% very good (4) 88% to 100% excellent (5)

<table>
<tr><td rowspan="2">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>Papić, V. Databases, lectures. Textbook, FESB (in Croatian)</td><td></td><td>e-learning portal</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">An Introduction to Database Systems, Eighth Edition by C.J. Date, Addison Wesley 2003.
Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer D. Widom: Database Systems: The Complete Book, Prentice-Hall 2002.
Clare Churcher, Beginning Database Design From Novice to Professional, Apress, 2007.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">- Evaluation of results in accordance with the above learning outcomes
- Feedback from students via surveys
- Self-evaluation of teachers
- Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

NAME OF THE COURSE	DIGITAL INSTRUMENTATION 1						
Code	FELA20	Year of study	3				
Course teacher	Ivan Marasović, Ph.D., Assistant Professor	Credits (ECTS)	5				
Associate teachers		Type of instruction (number of hours)	L	S	AE	LE	DE
			30		0	15	
Status of the course	Obligatory	Percentage of application of e-learning					

COURSE DESCRIPTION

Course objectives	Training students for: - Understanding the main properties of digital instrumentation chain using microcontrollers in instrumentation. - Signal acquiring and conditioning, analog to digital conversion, data representation. - Development of digital instrumentation chain based on the AVR ATMEL series microcontroller.
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: - State the basic principles of microcontrollers. - Choose the basic peripheral components necessary for microcontrollers based system. - Programing microcontrollers in assembler and C. - Acquisition, conditioning and processing physical signals by using microcontrollers. - Send processed data to computer using serial communication (RS232) and representation on the alphanumerical 16x2 display.

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

Course content	L hours
Introduction. Digital instrumentation chain based on the microcontrollers.	2
Microcontroller and microprocessors. Microprocessors architecture. Program counter, instructions and operation code, pipeline and status register. Memory organization and buses.	2
ATmega16 microcontroller architecture (internal modules, IO ports, timer/counter, USART, ADC). Registers and memory organization and addressing.	2
System clock and clock options. Power management and sleep modes. System control and reset.	2
General purpose input-output pins, data direction register, data register and input register. Alternate port functions. Timer/counter modules and modes of operation. Timer/counter interrupt vectors.	2
Universal Synchronous and Asynchronous serial Receiver and Transmitter (USART) for serial communication. USART register description. Baud rate setting.	2
Memory programing, memory and data memory lock bits. Fuse bits, signature and calibration byes. Parallel, serial and JTAG programing.	2
Microcontroller peripheral components, supply, reset and clock source circuits.	2
Digital instrumentation chain. Acquiring, conditioning and signal processing. Noise and method for noise cancelling.	2
Analog circuits in instrumentation chain, amplifiers, filters, bridges and analog-digital converters.	2
Data representation, LED, seven segment display, LCD alphanumerical and graphic display. Development of custom defined symbols. Connecting display to microcontroller, initialization and communication.	2

	Standard communication interfaces in digital instrumentation, USART (RS232), SPI, TWI/I2C, CAN, WIFI, Ethernet, IrDA, DALI, 1-wire	2
	ARM microcontrollers and processors. Architecture and mode of operations.	2
	List of laboratory or design exercises	LE hours
	Introduction to Atmel studio and STK500. I/O pins configuration, LED blinking examples in assembler and C.	3
	Program, data and EEPROM memory using.	3
	Timer/counter application. Interrupts generated by timer/counter. Executing program - monitoring module (watchdog timer).	3
	Using serial standard RS232, connecting microcontroller to computer. Analog comparator module application.	3
	Using alphanumerical 16x2 display and LM35 temperature sensor. Connecting display and temperature sensor to microcontroller and digital thermometer development.	3

Format of instruction	☒ lectures ☐ seminars and workshops ☐ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☒ multimedia ☒ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	Students should attend at least 70% of the lectures. Students must complete all laboratory exercises.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	2	Research		Practical training	
	Experimental work		Report		Individual work	1.25
	Essay		Seminar essay		Laboratory exercises	1
	Tests	0.15	Oral exam		Preparation for laboratory exercises	0.5
	Written exam	0.1	Project		(Other)	

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

There are two midterm exams and a final exam. The first midterm exam is scheduled after 7 weeks of classes and the second one after the following 6 weeks. Each midterm exam is written and consists of 10 theoretical/numerical/programming problems. Each midterm exam lasts 90 minutes. To pass an exam, the student should score at least 50% in the midterms and also have a positive assessment of the laboratory exercises.

The final grade (in percentage) is determined according to the formula:

$$Grade(\%) = 0,25(M1+M2)+0,5L,$$

where:

- M1, M2 – grade from questions in midterms given in percentage,
- L – grade from laboratory exercises given in percentage,

Students not passing the midterm exams take part in the final exam. It consists of 10 theoretical/numerical/programing problems and lasts 160 minutes. For passing the final exam, students must score at least 50%, as well as have a positive assessment of the laboratory exercise. The grade on final exams is determined by the formula:

$$Grade(\%) = 0.5(T)+0.5L,$$

where:

- T – grade from theoretical questions given in percentage,
- L – grade from laboratory exercises given in percentage.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	I. Marasović – autorizirana predavanja (PowerPoint)		e-learning portal

	M. Ali Mazidi, Sa. Naimi, Se. Naimi, The AVR microcontrollers and embedded systems, Using assembly and C, Prentice Hall, 2011.		
	Ivo Mateljan: Virtualna instrumentacija – skripta, FESB, 2008.		
	A. Šantić: Elektronička instrumentacija, 3. izdanje, Školska knjiga, Zagreb, 1993.		
	Marasović, I: Digitalna instrumentacija I - Upute za laboratorijske vježbe, Skripta za internu upotrebu,		e-learning portal
Optional literature (at the time of submission of study programme proposal)	P. Horowitz, W. Hill: The Art of Electronics, Cambridge University Press, 2015. M. Balch: Complete digital design: A comprenhensive guide to digital electronics and computer system architecture, McGRAW-HILL, 2003. Timothy S. Margush: SOME ASSEMBLY REQUIRED Language Programming with the AVR Microcontroller, CRC Press, 2012. Günther Gridling, Bettina Weiss: Introduction to Microcontrollers, Courses 182.064 & 182.074, Vienna University of Technology Institute of Computer Engineering Embedded Computing Systems Group, 2007		
Quality assurance methods that ensure the acquisition of exit competences	- Record of number of students attending the classes - Evaluation of results in accordance with expected learning outcomes - Feedback from students via student surveys - Teachers self-evaluation - Institutional and non-institutional evaluations		
Other (as the proposer wishes to add)			

NAME OF THE COURSE	**DIGITAL SIGNAL PROCESSING**							
Code	FELA29	Year of study	3.					
Course teacher	Dinko Begušić, Ph.D., Full Professor	Credits (ECTS)	5					
Associate teachers	Maja Stella, Ph.D., Assistant Professor	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30	0	15	15	0	
Status of the course	Obligatory:114 (Elective: 111, 112, 120)	Percentage of application of e-learning						

COURSE DESCRIPTION

Course objectives	Training students for: - understanding and application of basic concepts and methods of digital signal processing, - application of methods for analysis and synthesis of discrete time signals and systems, - application and design of digital filters, - permanent adoption and deepening of the knowledge in the area of digital signal processing.
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 and methods for analysis of discrete time signals and systems, - apply the the methods for frequency analysis of signals and systems defined in the discrete time domain, - apply the linear integral transforms for discrete time signals and systems analysis and synthesis, - apply and design digital FIR and IIR filters, - understanding of the basic methods of adaptive signal processing, - peroform analysis and synthesis of disrete signals and systems by using standard software environment (MATLAB).

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

Course content	L or S hours	AE hours
The basic concepts of discrete time signals and systems.	2	1
Analysis of linear time invariant systems.	2	1
z- transform.	2	1
Application of the z-transform in the analysisi of discrete time signals and systems.	2	1
Frequency analysis of discrete time signals and systems.	2	1
Discrete Fourier transform (DFT).	2	1
Fast Fourier transform (FFT).	2	1
Implementation and application of discrete time systems.	2	1
Analysis and synthesis of discrete time systems.	2	1
Digital filter structures.	2	1
Design of FIR filters.	2	1
Design of IIR filters.	2	1
Adaptive signal processing methods and applications.	2	1

List of laboratory or design exercises	LE or DE hours
Generation and presentation of discrete time domain signal.	2
Linear time invariant systems in discrete time domain.	2
Analysis of inear time invariant systems using z-transform.	2

	Application of DFT in linear filtering.	2
	Linear filtering of long signal sequences using the overlap-save method.	2
	Design of FIR filters.	2
	Design of IIR filters.	2

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

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1,5	Research	-	Practical training	-
	Experimental work	-	Report	-	Individual work	2,2
	Essay	-	Seminar essay	-	Laboratory exercises	0,5
	Tests	0,2	Oral exam	-	Preparation for laboratory exercises	0,5
	Written exam	0,1	Project	-	(Other)	

Grading and evaluating student work in class and at the final exam	There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. Each midterm and final test consists of 10 theoretical questions and numerical problems. The duration of each test is 2 school hour. In the final exams students that did not pass the midterm exams take part. The midterm and final exams are carried out as written tests. The requirement for passing grade is the positive assessment of laboratory exercises, the seminar exercise and 50 % points on each midterm exam or the final exam. The continuous knowledge assessment grade (in percentage) is formed according to the formula: Grade(%) = 0,05 NP + 0,15 LV + 0,4 (M1 + M2) the activities in percentage: • NP - attendance at lectures, • LV – laboratory assessment, • M1, M2 – test results. The final grade is based on the grade of the continuous knowledge assesment grade and the oral part of the final exam. The students whose grade may be formed without the need for the oral part of the final exam may not be obliged to attend tthe oral part of the exam. There are two terms for the final exam and one additional term for the make up exam. The requirement for attendance of the final exam or the make up exam is the passing grade for all laboratory excercises and submitted seminar excercis work. At the final exam the student writes the test from the area of the miterm exam(s) which has/have not been succesfully passed before. At the make up exam the student writes the test from the complete course.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	D.Begušić: Digital signal processing, handouts, FESB, 2016.		e-learning portal

Optional literature (at the time of submission of study programme proposal)	- Martin Vetterli, Jelena Kovačević, Goyal Vivek K: Foundations of Signal Processing, Cambridge University Press, 2014 - Proakis, J.G., Manolakis, D.G.: Digital Signal Processing: Principles, Algorithms, and Applications, Prentice Hall, 1996 - Haykin,S.: Adaptive Filter Theory, Prentice Hall, 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	**ECONOMICS AND PRODUCTION ORGANIZATION**						
Code	FETA01	Year of study	2.				
Course teacher	Ivica Veža, Ph.D., Full Professor	Credits (ECTS)	3				
Associate teachers		Type of instruction (number of hours)	L	S	AE	LE	DE
			30				
Status of the course	Obligatory	Percentage of application of e-learning	0				

COURSE DESCRIPTION

Course objectives	Training students for: - understanding basic knowledge of production organization theory, and new organization structures - solving problem of profitability (based on income and cost) and equilibrium point (based on supply and demand)
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 difference between classic and neoclassic organization theories - define the modern theories of organization - define outer and inner factors that affect the selection of organization structure - calculate fixed and variable costs - calculate equilibrium point

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

Course content	L or S hours	AE hours
Introduction. Organization basics.	2	
Theory of organization (classic, neoclassic, modern). Modelling of organization structures.	2	
Types of organization structures.	2	
Modern trends in organization modelling.	2	
Lean Management (VS,5S, kaizen)	2	
Toyota Production System.	2	
Parallel engineering, fractal factory.	2	
Networked factory (virtual factory), business process reengineering, agile manufacturing.	2	
Organization of material factors. Organization of human resources.	2	
Organization of control and management. Organization dynamics.	2	
Enterprise, entrepreneurship, entrepreneur. Legal entities of enterprise. Types of integration of enterprise.	2	
Organization of business functions.	2	
Theory of production and costs. Theory of production. Optimal combination of production factors. Production costs.	2	

List of laboratory or design exercises	LE or DE hours

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

<table>
<tr><td>Student responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1,0</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work (Other)</td><td>2,0</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Tests</td><td>0</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">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. In the final exams students that did not pass the midterm exams take part. Each midterm test consists of 5 theoretical questions and lasts for 45 minutes. The midterm and final exams are carried out as written tests. The requirement for passing grade is 40 % points on each midterm exam or the final exam. Grade (in percentage) is formed according to the formula:
Grade(%) = 0,5 (M1 + M2)
the activities in percentage:
- M1, M2 – test results.
Final grade is calculated after the second final exam based on the ECTS relative grade system in accordance to Regulations of studies and studying system of University of Split. Students that passed the exam are divided into the four groups: 15% best ones are given grade excellent, next 35% are given grade very good, next 35% grade good, and last 15% grade sufficient. Students that didn't pass the exam after second final exam write correction exam on the autumn and maximum grade they can get is sufficient. Correction exam is test of the whole curriculum of the course. It is a written test consisting of 10 theoretical questions and lasts for 45 minutes.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">Dulčić, Ž.; Pavić, I.; Rovan, M.; Veža, I.: Proizvodni menedžment. Fakultet elektrotehnike, strojarstva i brodogradnje – Ekonomski fakultet, Split, 1996.</td><td>5</td><td></td></tr>
<tr><td colspan="4">Sikavica P.; Novak, M.: Poslovna organizacija, informator, Zagreb, 2011.</td><td>5</td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">- Schroeder, R.G.: Upravljanje proizvodnjom, Mate, Zagreb, 2000</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Assessment of students presence on lectures
- Annual institutional evaluation of students success on exams
- Feedback from students via surveys
- Self-evaluation of teachers
- Feedback from faculty alumni students of the importance of the curriculum of courses</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="6">ELECTRICAL DISTRIBUTION NETWORKS</td></tr>
<tr><td>Code</td><td>FENA15</td><td>Year of study</td><td colspan="5">3</td></tr>
<tr><td>Course teacher</td><td>Damir Jakus, Ph.D.
Assistant Professor</td><td>Credits (ECTS)</td><td colspan="5">4</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Josip Vasilj, Ph.D.</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td></td><td></td><td>15</td><td></td></tr>
<tr><td>Status of the course</td><td>Elective</td><td>Percentage of application of e-learning</td><td colspan="5">30</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- Understanding the specifics related to the network structure, grid planning and operation as well as network element construction
- Development of models for the distribution network analysis under stationary conditions
- Understanding the specifics related to the distribution network neutral earthing
- Calculation of short circuit currents in distribution networks
- Selection of network elements while respecting the technical requirements and ability to propose measures for the network operation improvements
- Understanding the effects of distribution generation connection on network conditions
- Deepening the basic knowledge in the field of electricity transmission and distribution</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- Identify the typical structures of the distribution networks and their components with all their specifics
- Define the classic single line diagram and disposition of distribution substations
- Determine the equivalent circuits of distribution network elements for different type of calculations
- Perform the distribution network power flow and voltage conditions analysis using specialized software packages
- Simulate the impact of distributed generation connection on distribution network conditions
- Parametrize the distribution network elements to ensure normal network operation
- Select low voltage network protection devices and dimensioned TS 10 / 0.4 kV earthing system
- To carry out a techno-economic analysis of the excessive consumption of reactive power and to propose measures for power factor improvement
- Simulate the operation of the distribution network and to calculate energy losses</td></tr>
<tr><td rowspan="4">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="2">Course content</td><td colspan="3">L or S hours</td><td colspan="2">AE hours</td></tr>
<tr><td colspan="2">1. DISTIRIBUTION NETWORK POSITION AND ROLE IN ELECTRIC POWER SYSTEMS:
- production, transmission and distribution of electrical energy
- basic characteristics and differences of transmission and distribution networks</td><td colspan="3">2</td><td colspan="2"></td></tr>
<tr><td colspan="2">2. DISTIRBUTION NETWORK TOPOLOGY AND STRUCTURE:
- Middle voltage network structure
- Low voltage network structure</td><td colspan="3">2</td><td colspan="2"></td></tr>
<tr><td colspan="2">3. DISTIRBUTION NETWORK SUBSTATIONS:
- Distribution substations</td><td colspan="3">2</td><td colspan="2"></td></tr>
</table>

		- Examples of real distribution substations 110/35 V, 35/10 kV and 10/0.4 kV		
	4.	BASIC ELECTRIC PARAMETERS AND EQUVIVALNET SCHEMES FOR NETWORK ELEMENTS - Symmetrical components system - Physical interpretation of direct, inverse and zero system - Calculation of element impedances - Equivalent schemes	2	
	5.	DISTRIBUTION NETWORK FAULT ANALYSIS (PART 1) - Three phase fault - Two phase fault - Single phase faults - Single phase faults in low voltage grid	3	
	6.	DISTRIBUTION NETWORK FAULT ANALYSIS (PART 2) - Transformer earthling options in middle voltage distribution networks - Single phase faults - Single phase faults in networks earthed using low-ohm resistors - ground faults in unearthed networks - Examples of fault analysis calculations	2	
	7.	APROXIMATIVE NETWORK ANALYSIS UNDER STATIONARY CONDITIONS - Approximate load flow calculations in radial distribution networks - Approximate voltage drop calculations - Rating power lines and transformers based on load flow and voltage drop calculations - Examples of load flow and voltage profile calculations	2	
	8.	LOAD FLOW CALCULATION USING BACKWARD-FORWARD METHOD - Formation of incidence matrix: BIBC, BCBV, DLF - Load flow calculations in radial distribution networks - Load flow calculations in weakly meshed distribution networks	3	
	9.	LOW VOLTAGE DISTRIBUTION NETWORKS (PART 1) - Specificities of low voltage distribution networks - Low voltage distribution network types based on earthing type - Load modeling and load flow calculations - Load flow / voltage conditions calculations	2	
	10.	LOW VOLTAGE DISTRIBUTION NETWORKS (PART 2) - Planning and design of low voltage networks - Network protection and fuse selection criteria - Grounding system calculation in low voltage distribution networks	2	
	11.	ACTIVE POWER/ENERGY LOSS CALCULATION - Power/energy loss classification - Power losses in transformers and power lines - Energy loss calculations using approximate approach and using load duration curve	2	
	12.	REACTIVE POWER COMPENSATION - Individual/group/central/mixed compensation - Positive effects of reactive power compensation - Dimensioning of capacitors banks	2	
	13.	IMPACT OF DISTRIBUTED GENERATION CONNECTION - Impact on network voltage conditions and control - Impact on network losses - Impact on network protection - Higher harmonics, voltage/current asymmetry, flickers…	2	
	14.	DISTIRBUTION NETWORK OPERATION AND CONTROL - Supervision, control, SCADA - Network reliability and energy not served - MTU system	2	

<table>
<tr><td rowspan="7"></td><td colspan="6">List of laboratory or design exercises</td><td>LE or DE hours</td></tr>
<tr><td colspan="6">1. Preparing for the lab. exercises and demonstration of software tools used in exercises</td><td>2</td></tr>
<tr><td colspan="6">2. Load flow / voltage conditions/ power losses analysis and compensation of reactive power in the distribution networks</td><td>3</td></tr>
<tr><td colspan="6">3. The preparatory exercise for the load flow calculations in low-voltage distribution networks</td><td>3</td></tr>
<tr><td colspan="6">4. Low-voltage distribution network project: load modeling / load flow / voltage calculations; selection and rating of lines and transformers, short circuit analysis, selection and compliance testing of fuses, ground resistance calculation and design of pole mounted substation 10/0.4 kV earthing (Part 1)</td><td>2</td></tr>
<tr><td colspan="6">5. Low-voltage distribution network project: load modeling / load flow / voltage calculations; selection and rating of lines and transformers, short circuit analysis, selection and compliance testing of fuses, ground resistance calculation and design of pole mounted substation 10/0.4 kV earthing (Part 2)</td><td>2</td></tr>
<tr><td colspan="6">6. Analysis of distributed generation connection on the distribution networks</td><td>3</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="4">☒ independent assignments
☒ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="7">- The presence on lectures in the amount of at least 70 % of the times scheduled.
- Completed all required laboratory exercises.
- Completed and graded seminar work assignment.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1</td><td>Research</td><td></td><td>Practical training</td><td colspan="2"></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td colspan="2">1</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>0.5</td><td>(Other)</td><td colspan="2">0.5</td></tr>
<tr><td>Tests</td><td>0.5</td><td>Oral exam</td><td></td><td>(Other)</td><td colspan="2"></td></tr>
<tr><td>Written exam</td><td>0.5</td><td>Project</td><td></td><td>(Other)</td><td colspan="2"></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="7">During the semester there will be two midterm exams covering lectures. The first midterm exam will be in the eighth week of summer semester, and the second one in the last week of summer semester. As a part of laboratory exercises students will be given their seminar assignments. Student can pass the class by passing two midterm exams and by completing their seminar assignments. In the two final exams in June and July, students can pass reaming part(s) which they didn’t pass through midterm exams. Also, if the student passes one part of class materials through first final exam, then he is not obliged to re-take that part of the exam in the second final exam. The class subject is divided into two parts according to separation defined for midterm exams.

Students who have failed to pass the class after two final exams can try to pass the subject by taking the disciplinary exam which is organized in first part of autumn term. The last chance to pass the subject is through commission exam which will be held in the second part of the autumn exam period. During the disciplinary and commission exam students have to re-take whole exam covering both subject parts regarding their previous results in mid-term and final exams. In autumn term the requirement for positive mark is that the student has at least 50% success on the exam as well as positive mark from seminar assignment.
The requirement for positive mark is that the student has at least 50% points from each part of the course subject during midterm and final exams (or 50% points for the entire course subject on disciplinary and commission exam), as well as positively</td></tr>
</table>

<table>
<tr><td></td><td colspan="3">evaluated seminar assignment. The final score (in percentage) is formed on the basis of all activities according to the formula:

Grade (%) = 0,3xG1 + 0,3xG2 + 0,3xS + 0.1xP
Grade (%) = 0,6xG + 0,3xS + 0.1xP (for disciplinary and commission exam)

wherein:
• G1, G2 - points obtained for each subject part during midterms and(or) final exams
• G - points obtained during disciplinary and commission exam
• S – point given for seminar assignment
• P - presence at lectures
The final grade is determined as follows:
Grade (%) Mark
50 % do 6 1% sufficient (2)
62 % do 74 % good(3)
75 % do 87 % very good(4)
88 % do 100 % excellent(5)

Exam terms:
The first and second final exam: June / July
The disciplinary and commission exam: August / September

Under the Article 65 of the Faculty Statute, the student is required to participate in all forms of teaching and attend: lectures at least 70% of scheduled time and laboratory exercises 100% of scheduled time. If you do not meet these requirements, the student will not be able to take the examination.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>Goić R., Jakus D., Penović I.: Distribucija električne energije - interna skripta, FESB, 2014.</td><td></td><td>e-learning</td></tr>
<tr><td>Goić, R. - Upute za energetske proračune u niskonaponskoj distributivnoj mreži (2009), Split, FESB</td><td></td><td>e-learning</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">- E. Lakaervi, E.J. Holmes: Electricity Distribution Network Design, Peter Peregrinus Lt, 1989.
- Abdelhay A. Sallam, Om P. Malik:Electric Distribution Systems, Wiley-IEEE Press, 2011.
- Dale R. Patrick, Stephen W. Fardo: Electrical Distribution Systems, The Fairmont Press, 2009.
- E. Lakaervi, E.J. Holmes: Electricity Distribution Network Design, Peter Peregrinus Lt, 1989.
- William H. Kersting: Distribution System Modeling and Analysis, CRC Press, 2002.
- Programski paket PowerCAD, upute za rad (2009), Split, FRACTAL d.o.o.
- Programski paket WINdis, upute za rad (2009), Split, FRACTAL d.o.o.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">- Keeping records of student class attendance
- Annual review of the exam success
- Feedback from students via surveys
- Self-evaluation of teachers
- Feedback on the subject relevance from the former students who have already graduated</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">ELECTRICAL DRIVES</td></tr>
<tr><td>Code</td><td>FENA11</td><td>Year of study</td><td colspan="5">3.</td></tr>
<tr><td>Course teacher</td><td>Božo Terzić, Ph.D., Full Professor</td><td>Credits (ECTS)</td><td colspan="5">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Marin Despalatović, Ph.D., Associate Professor
Goran Majić, Ph.D.</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td>0</td><td>15</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- understanding the stationary and dynamic characteristics of non-controlled and controlled electrical drives,,
- permanent adoption and deepening of knowledge in the field of electrical drives.
- working in a real drive</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">Entry competences:
- Basic knowledge of the courses Fundamentals of Electrical Engineering 1 and 2
- Basic knowledge of the course Electrical Machines
- Basic knowledge of the course Power Electronics</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- calculate and measure stationary operating characteristics of motoring and braking operation of uncontrolled electric drives,
- commissioning uncontrolled drive, as well as simple controlled drive with the corresponding power converter,
- select the type, as well as nominal speed and power of the motor, for defined stationary and dynamic operating characteristics of load,
- measure and analyze the motor current and voltage waveforms at uncontrolled and controlled drives,
- define the basic parameters of power converters for simple controlled drives and drives with soft starter
- calculate and choose the soft starter for uncontrolled motors
- calculate the power losses and heating of the motors in dynamic and stationary operations.
- detect and solve simple problems and faults in drives</td></tr>
<tr><td rowspan="6">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="3">Course content</td><td colspan="2">L hours</td><td colspan="3">AE hours</td></tr>
<tr><td colspan="3">Basic notions and definitions of electrical drive (ED). The main conditions of ED. Motoring and braking operations of ED. Mechanical characteristics of loads.</td><td colspan="2">2</td><td colspan="3">1</td></tr>
<tr><td colspan="3">Steady state operation of ED with DC motors. Separately excited DC motor: mechanical characteristics, the way of speed control, braking operations. Series excited DC motor: mechanical characteristics, braking operations.</td><td colspan="2">2</td><td colspan="3">1</td></tr>
<tr><td colspan="3">Steady state operation of ED with induction motors. Power supply from voltage sources: mechanical characteristics, the way of speed control. Power supply from the current source: mechanical characteristics at a constant stator current and constant main flux.</td><td colspan="2">2</td><td colspan="3">1</td></tr>
<tr><td colspan="3">Braking modes of induction motor drives: regenerative braking, plugging, DC dynamic braking. The stationary states of the ED with synchronous motors.</td><td colspan="2">2</td><td colspan="3">1</td></tr>
<tr><td colspan="3">The basics of the ED dynamics. The stability of operating point, electromechanical time constant, starting and sudden load of separately excited DC motor, non-linear starting of induction motors, dynamic losses of ED with DC and induction motor.</td><td colspan="2">2</td><td colspan="3">1</td></tr>
</table>

<table>
<tr><td rowspan="19"></td><td>Starting methods of ED. Starters for DC motors – basic terms and parameters, determination of starter resistances. Rotor resistance starters for slip-ring induction motor – physical conditions of starting, determination of starter resistances.</td><td>2</td><td>1</td></tr>
<tr><td>Starting methods of ED: Starting current limitation for induction cage motor – star-delta starting, auto transformer starting, thyristor soft-starting. The problem of heating during starting of heavy-duty ED. Synchronous motors starting.</td><td>2</td><td>1</td></tr>
<tr><td>First midterm exam</td><td></td><td></td></tr>
<tr><td>Heating and motor selection for ED: Heating theory of electrical machines – homogeneous heat equation, modes of heat transfer, thermal time constant.</td><td>2</td><td>1</td></tr>
<tr><td>Heating and motor selection for ED: The method of average losses. Type of duty-cycles in ED.</td><td>2</td><td>1</td></tr>
<tr><td>Power supply of controlled ED with separately excited DC motor: Ward Leonhard drive system. Motor supplied from tyristor converter – ideal mode of operation, the influence of inductance in the motor armature circuit, the influence of network impedance.</td><td>2</td><td>1</td></tr>
<tr><td>Network current harmonics with DC motor supplied by three-phase thyristor converter. DC motor supplied by chopper for servo drives.</td><td>2</td><td>1</td></tr>
<tr><td>Power supply of controlled ED with induction motor: Control principle of AC drives. Basic types of frequency converters. Induction motor supplied by frequency converter – six step voltage source inverter, current source inverter.</td><td>2</td><td>1</td></tr>
<tr><td>Brushless DC motor and synchronous permanent magnet motor. Vector control principle of synchronous permanent magnet motor.</td><td>2</td><td>1</td></tr>
<tr><td>Second midterm exam</td><td></td><td></td></tr>
<tr><td colspan="2">List of laboratory exercises</td><td>LE hours</td></tr>
<tr><td colspan="2">Steady-state characteristics of separately excited DC motor</td><td>2</td></tr>
<tr><td colspan="2">DC dynamic braking of separately excited DC motor</td><td>2</td></tr>
<tr><td colspan="2">Steady-state characteristics of induction motor</td><td>2</td></tr>
<tr><td colspan="2">Dynamic characteristics of ED with squirrel cage induction motor</td><td>2</td></tr>
<tr><td colspan="2">Starting of squirrel cage induction motor</td><td>2</td></tr>
<tr><td colspan="2">DC motor supplied by thyristor converter</td><td>2</td></tr>
<tr><td colspan="2">Induction motor supplied by frequency converter</td><td>3</td></tr>
</table>

<table>
<tr><td>Format of instruction</td><td>☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td>☐ independent assignments
☒ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="2">The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.</td></tr>
</table>

<table>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1,5</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work</td><td>2,2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Laboratory exercises</td><td>0,5</td></tr>
<tr><td>Tests</td><td>0,2</td><td>Oral exam</td><td></td><td>Preparation for laboratory exercises</td><td>0,5</td></tr>
<tr><td>Written exam</td><td>0,1</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. Each midterm test consists of 10 theoretical questions and numerical problems. At the final exams students take part of course that did not pass the midterm exams. The midterm and final exams are carried out as written tests. The requirement for passing grade is the positive</td></tr>
</table>

	assessment of laboratory exercises and 50 % points on each midterm exam. Final grade (in percentage) is formed according to the formula: Grade(%) = 0,2 LV + 0,4 (M1 + M2) where the activities in percentage: • LV – laboratory assessment, • M1, M2 – test results. The final grade is determined according to the following criteria: • 50-62% - sufficient (2) • 63-75% - good (3) • 76-88% - very good (4) • 89-100% - excelent (5) Students who did not pass the exam after two final exams take a makeup exam in the autumn period on which takes the whole exam. The exam consists 10 theoretical questions and numerical problems and lasts 90 minutes. The percentage grade is determined by the formula: Grade(%) = 0,2 LV + 0,8 PI where PI is percentage grade of makeup exame. The final grade is determined by the same criteria as for the two final exams.		
Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	1. M. Jadrić, B. Terzić: Authorized lectures, FESB		e-learning portal
Optional literature (at the time of submission of study programme proposal)	1. B. Jurković: Elektromotorni pogoni, Školska knjiga, Zagreb, 1983. 2. Bose, B.K.: Power Electronics and Variable Drives, IEEE Press, New York, 1997.		
Quality assurance methods that ensure the acquisition of exit competences	- Evaluation of results in accordance with the above learning outcomes - Feedback from students via surveys - Self-evaluation of teachers - Institutional and non-institutional evaluations		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">ELECTRICAL INSTALLATIONS AND LIGHTING</td></tr>
<tr><td>Code</td><td>FENA13</td><td>Year of study</td><td colspan="5">3.</td></tr>
<tr><td>Course teacher</td><td>Tonći Modrić, Ph.D., Assistant Professor
Matislav Majstrović, Ph.D., Full Professor</td><td>Credits (ECTS)</td><td colspan="5">4</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td>0</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Elective</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- understanding the basic theoretical and practical knowledge in the field of electrical installations and lighting,
- selection of lighting fixtures and lighting calculation,
- designing of electrical installations and lighting by using modern software tools.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
1. specify the basic terms and quantities in the field of electrical installations and lighting,
2. describe the basic elements in the field of electrical installations and lighting,
3. apply technical regulations and standards in the field of electrical installations and lighting,
4. calculate and select the basic elements in the project of electrical installations and lighting,
5. apply corresponding software tools (Schneider Ecodial, Relux, DIALux) for calculation and designing of electrical installations and lighting,
6. design a project of electrical installations and lighting for a given object.</td></tr>
<tr><td rowspan="15">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Course content</td><td>L hours</td></tr>
<tr><td colspan="6">General overview of low voltage electrical installations.</td><td>2</td></tr>
<tr><td colspan="6">Basic elements of low voltage electrical installations.</td><td>2</td></tr>
<tr><td colspan="6">Technical regulations for designing low voltage electrical installations.</td><td>2</td></tr>
<tr><td colspan="6">The content of the low voltage electrical installations project (project assignment, technical description, calculations).</td><td>2</td></tr>
<tr><td colspan="6">Load power. Peak load. Calculations in electrical installations in normal operation and in case of fault.</td><td>2</td></tr>
<tr><td colspan="6">Short-circuit and overvoltage protection.
Protection against excessive touch voltage. Grounding.</td><td>2</td></tr>
<tr><td colspan="6">Designing of low voltage electrical installations.
Testing and maintenance of low voltage electrical installations.</td><td>2</td></tr>
<tr><td colspan="6">Physical basics of light and colors. Photometry.
Lighting quantities and units.</td><td>2</td></tr>
<tr><td colspan="6">Electrical light sources. Indoor and outdoor luminaries.</td><td>2</td></tr>
<tr><td colspan="6">Basic methods and standards for lighting designing.
Lighting calculations.</td><td>2</td></tr>
<tr><td colspan="6">Legislation and environmental protection.</td><td>2</td></tr>
<tr><td colspan="6">Indoor lighting.</td><td>2</td></tr>
<tr><td colspan="6">Outdoor lightning. Road lighting.
Lighting in advertisements.
Light radiation measurements.</td><td>2</td></tr>
<tr><td colspan="6">List of laboratory exercises</td><td>LE hours</td></tr>
</table>

	Introduction to the software package for designing of low voltage electrical installations (Schneider Ecodial).	2
	Selection and calculation of basic elements in electrical installations.	2
	Introduction to the software package for lighting designing (Relux).	2
	Indoor lighting project (Relux).	2
	Outdoor lighting and road lighting project (Relux).	2
	Introduction to the software package for lighting designing (DIALux).	2
	Lighting project (DIALux).	3

Format of instruction	☒ lectures ☒ seminars and workshops ☐ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia ☒ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	The presence on lectures in the amount of at least 70% of the times scheduled. Performed all required laboratory exercises and submitted all written reports and seminar tasks.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	1,0	Research		Practical training	
	Experimental work		Report		Individual work	1,2
	Essay		Seminar essay	0,4	Laboratory exercises	1,0
	Tests	0,2	Oral exam		Preparation for laboratory exercises	0,1
	Written exam	0,1	Project		(Other)	

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

There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. Each midterm test consists of 5 theoretical questions while final tests consist of 10 theoretical questions. 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 with submitted all written reports as well as seminar tasks and 50 % points on each midterm exam or the final exam. Grade (in percentage) is formed according to the formula:

$$\text{Grade (\%)} = 0{,}05 \cdot NP + 0{,}15 \cdot LV + 0{,}40 \cdot (G1 + G2)$$

the activities in percentage:

- NP – attendance at lectures,
- LV – laboratory assessment,
- G1, G2 – midterm test results.

Students that did not pass the exam after two final exams take part in the exam, which covers the lectures from entire course.
In that case, grade (in percentage) is formed according to the formula:

$$\text{Grade (\%)} = 0{,}1 \cdot LV + 0{,}9 \cdot G$$

the activities in percentage:

- LV – laboratory assessment,
- G – correction test result.

The final grade is determined as follows:

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

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	T. Modrić, M. Majstrović: "Predavanja iz predmeta Električne instalacije i rasvjeta (113)", Sveučilište u Splitu, FESB, Split, 2017. (interna skripta u elektroničkom obliku)		e-learning portal

Optional literature (at the time of submission of study programme proposal)	• V. Srb: Električne instalacije i niskonaponske mreže, Tehnička knjiga, Zagreb, 1991. • E. Mileusnić, B. Jinek: Ispitivanje električnih instalacija niskog napona, ZIRS, Zagreb, 2013. • A. Halep: Električne instalacije i osvjetljenje, Planjax, Sarajevo, 2005. • E. Širola: Cestovna rasvjeta, Esing, Zagreb, 1997. • B. Atkinson, R. Lovegrove, G. Gundry: Electrical Installation Designs, 4th edition, Wiley, 2013.
Quality assurance methods that ensure the acquisition of exit competences	• Evaluation of student presence on lectures. • Evaluation of results in accordance with the above learning outcomes. • Feedback from students via surveys. • Self-evaluation of teachers. • Institutional and non-institutional evaluations.
Other (as the proposer wishes to add)	-

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="8">ELECTRICAL MACHINES</td></tr>
<tr><td>Code</td><td>FENA07</td><td>Year of study</td><td colspan="6">3.</td></tr>
<tr><td>Course teacher</td><td>Marin Despalatović, Ph.D., Associate Professor
Ivica Jurić-Grgić, Ph.D., Associate Professor</td><td>Credits (ECTS)</td><td colspan="6">7</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Goran Majić, Ph.D.</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td colspan="2">DE</td></tr>
<tr><td>45</td><td></td><td>15</td><td>15</td><td colspan="2"></td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="6">0</td></tr>
<tr><td colspan="9">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="8">Training students for understanding the principle of operation and to analyze various types of electrical machines (synchronous, compensators, reluctance, induction, DC and AC commutator, permanent magnet, stepper)</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="8">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="8">Students will be able to:
1. Explain the principle of operation of various types of electrical machines,
2. Describe all construction parts and the implementation of the basic types of electrical machines,
3. Compare different electrical machines based on the theoretical knowledge and carried out typical measurements in the laboratory (experiments),
4. Apply the Swedish diagram, circle diagram, and I-line to analyze synchronous, induction and DC machines characteristics, respectively,
5. Calculate the winding and equivalent circuit parameters of the electrical machine,
6. Compute power balance and electromagnetic torque of electric machine,
7. Sketch winding implementation and vector diagrams for AC electrical machines,
8. Employ the method of symmetrical components to analyze unbalanced or single-phase fed three-phase electrical machine,
9. Use tool for computer modeling and simulation of electrical machines,
10. Verify computer responses and the machine characteristic quantities by comparison with the corresponding measurements obtained in the laboratory.</td></tr>
<tr><td rowspan="6">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Course content</td><td>L or S hours</td><td>AE hours</td></tr>
<tr><td colspan="6">Synchronous machines: the purpose and composition of the synchronous machine, round rotor and rotor with salient poles, rated values, line current density.</td><td>3</td><td>1</td></tr>
<tr><td colspan="6">Field and reactance of excitation winding on round rotor, MMF curve, magnetic field and induction curve, mutual inductance of excitation and armature windings.</td><td>3</td><td>1</td></tr>
<tr><td colspan="6">Rotor induced EMF, no-load characteristics, field and reactance of excitation coil of hydro-generators, construction principles and design of armature winding.</td><td>3</td><td>1</td></tr>
<tr><td colspan="6">Armature winding EMF, single- and double-layer winding, winding factors for the fundamental and higher harmonics, armature winding MMF.</td><td>3</td><td>1</td></tr>
<tr><td colspan="6">Flux linkages and reactance of armature winding, inductance and reactance on the main and leakage magnetic circuit, two-axis model of the synchronous machine. The reduction of the armature winding to the excitation coil, phasor (vector) diagram and operating modes of synchronous machine. The synchronous compensator and reluctance motor.</td><td>3</td><td>1</td></tr>
</table>

	The electromagnetic torque and power (load) angle characteristics. The damping cage and its role. Permanent three phase short circuit. Determination of synchronous reactance by measurement. Determination of excitation current, the Swedish diagram, PQ chart, sudden three phase short circuit.	3	1
	Induction machines: design and principle of operation, rotating field, resulting vectors of three-phase variables, inductances and flux linkages, vector voltage equations in the original coordinates.	3	1
	First midterm exam		
	Transformation of rotor variables, reduction of rotor quantities, voltage equations and equivalent circuit diagram, steady state characteristics - the balance of power and electromagnetic torque, current characteristics, a simplified circle diagram.	3	1
	The balance of power and torque in the circle diagram, simplified torque characteristics, the influence of stator resistance on current and torque characteristics, analysis of the locked rotor torque. Machines with squirrel cage rotor: reduction to the theory of slip ring machine; double cage and deep bar rotors.	3	1
	Adjusting drive speed: adding resistance to the rotor circuit, voltage and/or frequency changes. Unbalanced power supply: application of the method of symmetrical components, single-phase induction motor.	3	1
	Commutator machines: design and principle of operation of DC machines, induced voltage (EMF) and voltage equations, electromagnetic torque, armature reaction - occurrence and consequences, reducing the impact of the armature reaction. Steady state characteristics, excitation windings, types of DC machines.	3	1
	No-load characteristic, external characteristics of generators, motor mechanical characteristics. Principle of operation and characteristics of single-phase series commutator motor. Brushless DC motors: overview of features and materials for the production of permanent magnets, hysteresis loop, degaussing line, construction and design of the rotor with permanent magnets.	3	1
	Motors with rectangular and sinusoidal shape of magnetic field, induced voltage (EMF), power supply, electromagnetic torque, external (mechanical) characteristics. Stepper motors: construction and principle of operation. Steady-state characteristics, electromagnetic torque.	3	1
	Second midterm exam		
	List of laboratory or design exercises		LE or DE hours
	1. Determination of no-load, short circuit and V-curve of synchronous generator.		3
	2. Determination of steady state operating point and parameters of synchronous generator - synchronous reactance in the direct and quadrature axis, power (load) angle, torque on the shaft.		3
	3. No-load and locked rotor tests of a three-phase induction motor - determination of equivalent circuit parameters and circle diagram.		2
	4. Recording torque and current characteristics of three-phase induction motor.		2
	5. Basic tests on DC machine - determination of winding ends, machine terminals, neutral axis, no-load curve and the direction of rotation.		3
	6. Voltage and current waveforms of electronically commutated motor, estimation of electrical power and torque on the shaft.		2
Format of instruction	☒ lectures	☐ independent assignments	

<table>
<tr><td></td><td colspan="4">☐ seminars and workshops
☒ exercises
☐ *on line* in entirety
☐ partial e-learning
☐ field work</td><td colspan="4">☒ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="8">The presence on lectures in the amount of at least 70% of the times scheduled.
Performed all laboratory exercises.</td></tr>
<tr><td rowspan="5">Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*</td><td>Class attendance</td><td>2</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work</td><td>3,8</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Laboratory exercises</td><td>0,5</td></tr>
<tr><td>Tests</td><td>0,1</td><td>Oral exam</td><td></td><td>Preparation for laboratory exercises</td><td>0,5</td></tr>
<tr><td>Written exam</td><td>0,1</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="8">There are two midterm exams during semester. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. By midterm exams students can pass the entire exam. On the exam (final, correctional and commission) students take the parts of material which they did not pass on the midterm or previous exams. A separate part of the material means the material of each midterm exam. The exams are carried out as written tests. The duration of the midterm exams are 60 minutes, while exams are 2x60 minutes.

The requirement for passing grade is at least 50% of points on each (midterm) exam and the positive assessment (minimum 50% of points) of all laboratory exercises. Grade (in percentage) is formed as follows:

$$\text{Grade}(\%) = 0{,}4\cdot(ME1 + ME2) + 0{,}2\cdot LE$$
where
ME1, ME2 - points obtained at (midterm) exams expressed in percentages
LE - average grade of all laboratory exercises expressed in percentages

The final grade is determined as follows:

Percentage Grade
0% to 49% insufficient (1)
50% to 61% sufficient (2)
62% to 74% good (3)
75% to 87% very good (4)
88% to 100% excellent (5)

Exam group: 12
Examinations are held in accordance with the course calendar schedule.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="4">**Title**</td><td colspan="2">**Number of copies in the library**</td><td colspan="2">**Availability via other media**</td></tr>
<tr><td colspan="4">M. Kurtović: Sinkroni strojevi, Interna skripta, FESB, Split, 2007.</td><td colspan="2"></td><td colspan="2">e-learning portal</td></tr>
<tr><td colspan="4">M. Jadrić: Asinkroni strojevi; Kolektorski strojevi; Elektronički komutirani motori, Interna skripta, FESB, Split, 2007.</td><td colspan="2"></td><td colspan="2">e-learning portal</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="8">Z. Sirotić, Z. Maljković: Sinkroni strojevi, Element, Zagreb, 1996.
M. Jadrić, B. Frančić: Dinamika električnih strojeva, Graphis, Zagreb, 2004.
B. Jurković, Z. Smolčić: Kolektorski strojevi, Školska knjiga, Zagreb, 1986.
R. Wolf: Osnove električnih strojeva, Školska knjiga, Zagreb, 1995.</td></tr>
<tr><td>Quality assurance methods that ensure</td><td colspan="8">- Keeping records of students course attendance</td></tr>
</table>

the acquisition of exit competences	- Annual review of the performance of the examinations - 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	**ELECTRICAL MEASUREMENTS**						
Code	FENA03	Year of study	2.				
Course teacher	Tomislav Kilić, Ph.D., Full Professor	Credits (ECTS)	6				
Associate teachers	Tonko Garma, Ph.D. Assistant Professor	Type of instruction (number of hours)	L	S	AE	LE	DE
			45	0	0	30	0
Status of the course	Obligatory	Percentage of application of e-learning	0				
COURSE DESCRIPTION							
Course objectives	Training students for: - understanding and application of basic principles of metrology, - understanding and application of electrical measuring instruments, - applying of electrical measuring instruments and measuring methods, - expression of measuring results and uncertainty in measurement.						
Course enrolment requirements and entry competences required for the course	None						
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: 1. define the SI quantities and units, 2. describe the basic terms and principles of metrology, 3. apply rules for printing and using units, 4. express results and errors of measurement, 5. explain the principle of operation of analogue and digital instruments, 6. describe basic methods for measuring electrical quantities, 7. choose adequate measuring instrument and method, 8. measure DC and AC current, voltage, power, resistance and frequency.						
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours					
	Introduction to Measurements. Brief history of metrology. International system of quantities and units. Fundamental and Derived Units. Definitions of fundamental SI units. SI prefixes. Rules and style conventions for printing and using units.	3					
	Etalons of electrical quantities. Josephson effect. Quantum Hall effect. Standards of electrical quantities (resistance, capacitance, inductance and voltage).	3					
	Measuring accuracy and uncertainty (absolute and relative errors, measurement result, true value, statistic analysis, measurement uncertainty).	3					
	Electromechanical (analogue) instruments. Pointers and scales. The torque equation of electromechanical instruments. Regulations for analogue instruments. Static and dynamic response of instruments.	3					
	The moving coil instrument. Extension of range of moving coil instruments. The moving coil instrument with rectifier.	3					
	The moving iron instrument. The electrodynamometer-type instruments. Electrothermal instruments.	3					
	Single-phase induction-type energy meter. Phasor diagram of single-phase induction-type energy meter. Three-phase induction-type energy meter.	3					
	First midterm exam	3					
	Null-methods. DC and AC bridges. Unbalanced bridges. Compensators. Instrument transformers.	3					
	Theory of transformers. Potential (voltage) transformers. Current transformers. Errors introduced by transformers. Hall effect transducer. Voltage dividers.	3					
	Electronic instruments. Static and dynamic characteristics. Operational amplifiers (inverting, non-inverting. integration, derivation types). Differential and instrumentation amplifiers.	3					

	Digital instruments. A/D converters. Digital multimeters. Digital frequency meters.	3
	Cathode ray oscilloscope. Time base generator. Dual trace oscilloscope. Vertical input. Digital oscilloscope.	3
	Methods for current, voltage, resistance and power measurement. Computer based measuring systems.	3
	Second midterm exam	3
	List of laboratory exercises	LE hours
	Electrical resistance measurement and statistic analysis	2
	Measurement uncertainty of resistance measured by UI method	2
	Calibration of instruments by method of comparison	2
	Extension of range of moving coil instruments	2
	Measurement of electrical quantities with oscilloscope	2
	Error due to nonsinusoidal signals	2
	Instrument transformers	2
	Measurement of hysteresis loop	2
	Measurement of resistance with DC bridge	2
	Measurement of inductance and capacitance	2
	Measurement of three-phase power	2
	Practical skills exam	8

Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☒ multimedia ☒ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1,5	Research		Practical training	
	Experimental work		Report		Individual work	2,7
	Essay		Seminar essay		Laboratory exercises	1
	Tests	0,2	Oral exam		Preparation for laboratory exercises	0,5
	Written exam	0,1	Project		(Other)	

Grading and evaluating student work in class and at the final exam	There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. Each midterm test consists of 10 theoretical questions and numerical problems and final tests consist of 20 theoretical questions and numerical problems. In the final exams students that did not pass the midterm exams take part. The midterm and final exams are carried out as written tests. The requirement for passing grade is the positive assessment of laboratory exercises and 40 % points on each midterm exam or the final exam. Grade (in percentage) is formed according to the formula: Grade(%) = 0,05 NP + 0,25 LV + 0,35 (M1 + M2) the activities in percentage: • NP - attendance at lectures, • LV – laboratory assessment, • M1, M2 – test results.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	T. Kilić: Autorizirana predavanja, FESB		e-learning portal
	S. Milun: *Električna mjerenja – skripta s predavanja*, FESB		e-learning portal

Optional literature (at the time of submission of study programme proposal)	• V. Bego: *Mjerenja u elektrotehnici*, 9. dopunjeno izdanje, Graphis, Zagreb, 2003. • D. Vujević, B. Ferković: *Osnove elektrotehničkih mjerenja – I. i II. dio*, Školska knjiga, Zagreb, 1994. • S. Tumanski: Principles of Electrical Measurement, Taylor & Francis, New York, 2005.
Quality assurance methods that ensure the acquisition of exit competences	- Evaluation of results in accordance with the above learning outcomes - Feedback from students via surveys - Self-evaluation of teachers - Institutional and non-institutional evaluations
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">ELECTRICAL NETWORKS</td></tr>
<tr><td>Code</td><td>FENA06</td><td>Year of study</td><td colspan="5">3</td></tr>
<tr><td>Course teacher</td><td>Damir Jakus, Ph.D.
Assistant Professor</td><td>Credits (ECTS)</td><td colspan="5">6</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Josip Vasilj, Ph.D.</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>45</td><td>0</td><td>0</td><td>15</td><td></td></tr>
<tr><td>Status of the course</td><td>Mandatory</td><td>Percentage of application of e-learning</td><td colspan="5">30</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- Understanding the specifics related to the network structure, grid planning and operation as well as network element construction
- Development of equivalent models under system of symmetrical components
- Generation of network models which are reduced on specific voltage level or per unit system
- Understanding and application of basic calculation methods for electrical network analysis
- The formation of the network element replacement models using the two-port theory
- Determination of electrical parameters and calculation of voltage and current distribution across power lines
- The application of matrix algebra in power system analysis
- Understanding the concept and usage of symmetrical component analysis
- Deepening the basic knowledge in the field of electricity transmission and distribution</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- Explain the importance, role and relations among the basic power system sectors
- Explain the role of each element in the power system, and state and recognize its different versions
- Determine electrical parameters for equivalent models of various power system elements
- Apply basic theorems to analyze electrical networks on real examples
- Apply the two port theory to determine and transform the equivalent models of network elements
- Calculate voltage/current conditions on real power system line
- Determine electrical parameters for over-ground and underground power lines
- Simulate conditions in three-phase and single phase networks
- Apply matrix algebra in power system analysis
- Understand the concepts behind system of symmetrical components
- Deepening the basic knowledge in the field of electricity transmission and distribution</td></tr>
<tr><td rowspan="3">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Course content</td><td>L or S hours</td><td>AE hours</td></tr>
<tr><td colspan="5">1 The structure and main characteristics of the power system, the type of electrical power networks and their role in the system. Power lines (overhead lines and cables) performance, type and main components</td><td>3</td><td></td></tr>
<tr><td colspan="5">2 Equivalent schemes and calculation of its electrical parameters for different elements in electric power networks</td><td>3</td><td></td></tr>
</table>

	3	Calculation of currents and voltages in a symmetrical power networks: voltage level reduction method.	3
	4	Calculation of currents and voltages in a symmetrical power networks: per unit system reduction method.	3
	5	Analytical techniques in power system analysis: Linear networks, Superposition theorem, Compensation theorem, Reciprocity theorem, Thevenin's/Norton's/ Millman's theorem	3
	6	Two port networks: calculation of constants, connection schemes	4
	8	Different transmission line models, telegraphic equations, current and voltage relations on a long transmission lines	4
	9	Ideal transmission line, real transmission line, reflections, Ferranti effect	3
	10	Transmission line parameters: resistance and inductance; transposition and equivalenting.	4
	11	Transmission line parameters: capacitance and resistive leakage	4
	12	Power system calculations using matrix algebra: Network topology, graphs, incidence matrix, methods for calculating bus impedance matrix	4
	13	Methods for calculating bus admittance matrix. Examples of power system calculations using matrix algebra.	4
	14	Symmetrical components: Transformation matrix, physical meaning, element models in symmetrical components system, different applications of symmetrical component system	3
	List of laboratory or design exercises		LE or DE hours
	1.	Preparing for the lab. exercises and demonstration of software tools used in exercises	2
	2.	Current and voltage relations on a long transmission lines – Matlab calculations	2
	3.	Single phase electrical network– Matlab calculations	3
	4.	Three phase electrical network – Matlab calculations	2
	5.	Calculation of bus impedance/admittance matrix – Matlab calculations	3
	6.	Technical visit to high-voltage substation and surrounding overhead lines (visit to TS 400/220/110 kV Konjsko)	3

Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☒ independent assignments ☒ multimedia ☒ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	- The presence on lectures in the amount of at least 70 % of the scheduled time. - Completed all required laboratory exercises.	

Screening student work *(name the proportion of ECTS*	Class attendance	1	Research		Practical training	
	Experimental work		Report		Self work	2

<table>
<tr><td rowspan="3">credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Essay</td><td></td><td>Seminar essay</td><td>1</td><td>Laboratory work</td><td>1</td></tr>
<tr><td>Tests</td><td>0.5</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>0.5</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">During the semester there will be two midterm exams covering lectures. The first midterm exam will be in the eighth week of summer semester, and the second one in the last week of summer semester. As a part of laboratory exercises students will be given their work assignments which will be graded after completion. Student can pass the class by passing two midterm exams and by completing their laboratory work assignments. In the two final exams in February and March, students can pass reaming part(s) which they didn’t pass through midterm exams. Also, if the student passes one part of class materials through first final exam, then he is not obliged to re-take that part of the exam in the second final exam. The class subject is divided into two parts according to separation defined for midterm exams.

Students who have failed to pass the class after two final exams can try to pass the subject by taking the disciplinary exam which is organized in first part of autumn term. The last chance to pass the subject is through commission exam which will be held in the second part of the autumn exam period. During the disciplinary and commission exam students have to re-take whole exam covering both subject parts regarding their previous results in mid-term and final exams. In autumn term the requirement for positive mark is that the student has at least 50% success on the exam as well as positive mark from seminar assignment.
The requirement for positive mark is that the student has at least 50% points from each part of the course subject during midterm and final exams (or 50% points for the entire course subject on disciplinary and commission exam), as well as positively evaluated seminar assignment. The final score (in percentage) is formed on the basis of all activities according to the formula:

Grade (%) = 0,35xG1 + 0,35xG2 + 0,2xS + 0.1xP
Grade (%) = 0,7xG + 0,2xS + 0.1xP (for disciplinary and commission exam)

wherein:
• G1, G2 - points obtained for each subject part during midterms and(or) final exams
• G - points obtained during disciplinary and commission exam
• S – point given for seminar assignment
• P - presence at lectures
The final grade is determined as follows:
Grade (%) — Mark
50 % do 61% — sufficient (2)
62 % do 74 % — good(3)
75 % do 87 % — very good(4)
88 % do 100 % — excellent(5)

Exam terms:
The first and second final exam: February / March
The disciplinary and commission exam: August / September

Under the Article 65 of the Faculty Statute, the student is required to participate in all forms of teaching and attend: lectures at least 70% of scheduled time and laboratory exercises 100% of scheduled time. If you do not meet these requirements, the student will not be able to take the examination.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">Goić R., Jakus D., Penović I.: Električne mreže - interna skripta, FESB, 2014.</td><td></td><td>e-learning</td></tr>
<tr><td colspan="4">Ožegović, M.; Ožegović, K.: Električne energetske mreže I-III, FESB Split, Computing d.o.o. Split</td><td></td><td>e-learning</td></tr>
</table>

	Goić, R., Jakus, D., Krstulović, J., Mučić, D. – Električne mreže – upute za laboratorijske vježbe -, Split, FESB		e-learning
Optional literature (at the time of submission of study programme proposal)	- D. P. Kothari, I. J. Nagrath: Modern Power System Analysis, McGraw-Hill Education, 2003. - J. Grainger , W. Stevenson Jr.: Power System Analysis, McGraw-Hill, 1994 - Stag, G. W.; El-Abiad, A., H.: Computer Methods in Power System Anylysis, McGraw-Hill, New York, 1968 - Venikov, V.,A.: Electrical Network Performance Calculations and Analysis, Mir Publishers, Moscow, 1985		
Quality assurance methods that ensure the acquisition of exit competences	- Keeping records of student class attendance - Annual review of the exam success - Feedback from students via surveys - Self-evaluation of teachers - Feedback on the subject relevance from the former students who have already graduated		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="6">ELECTRICAL SAFETY</td></tr>
<tr><td>Code</td><td>FENA14</td><td>Year of study</td><td colspan="4">3</td></tr>
<tr><td>Course teacher</td><td>Rino Lucić, Ph.D., Full Professor</td><td>Credits (ECTS)</td><td colspan="4">4</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td></tr>
<tr><td>30</td><td></td><td></td><td>15</td></tr>
<tr><td>Status of the course</td><td>elective</td><td>Percentage of application of e-learning</td><td colspan="4">0</td></tr>
</table>

Note: the Type of instruction columns are L / S / AE / LE / DE with hours 30 / – / – / 15 / –.

Type of instruction (number of hours)	L	S	AE	LE	DE
	30			15	

COURSE DESCRIPTION

Course objectives	Training students for: - spotting the danger of electrical shock - adoption of the most important technical protective measures of electrical shock, - understanding of the methodology, procedures and measures for protection when working with electrical equipment, machinery and plants.
Course enrolment requirements and entry competences required for the course	None
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - explain the danger of possible electric shock on low and high voltage facilities, - describe and define the most important technical protective measures from electric shock on low and high voltage facilities, - assess the validity of protection against direct contact in electrical installations, - examine validity of protection against indirect contact in electrical installations.

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

Course content	L or S hours	AE hours
Impact of electrical current on human beings.	2	
Types of hazards associated with electrical current: direct contact, indirect contact, transferred potential, induced voltages, electric arc, static electricity, residual charge, lightning strikes, the impact of electric and magnetic fields on humans.	6	
Technical safety performance of low voltage installations. Types of low-voltage systems, grounding protection against direct or indirect contact, simultaneous protection against direct or indirect contact.	4	
Protection with electrical separation, overvoltage protection against high voltage, protection against atmospheric overvoltage and switching overvoltage. Special protection measures on construction sites and limited conductive area.	4	
Technical safety in high voltage installations.	2	
Overhead lines, safety distances and heights. Grounding of columns.	2	
Rules and safety measures at work on electrical installations.	2	
Security measures in switchyards, substations and power plants.	2	
Safety measures when working on overhead lines, cables and in underground facilities. Live working.	2	

List of laboratory or design exercises	LE or DE hours
Protection against direct contact	3
Protection against indirect contact	3
Overcurrent protective device	3
Current breaker	3
Groundings	3

Format of instruction	☒ lectures	☐ independent assignments

<table>
<tr><td></td><td colspan="4">☐ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">The presence at the lectures at least 70% of the times scheduled. Performed all required laboratory exercises.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0,5</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Independent work</td><td>2,5</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Laboratory exercises</td><td>0,5</td></tr>
<tr><td>Tests</td><td>0,2</td><td>Oral exam</td><td></td><td>Preparation for laboratory exercises</td><td>0,2</td></tr>
<tr><td>Written exam</td><td>0,1</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">During the semester there will be two tests. The first test will be at the eighth week of classes, the second at the first week of the exam period. Student can pass the entire exam by tests.
At the two final exams, students take parts of the curriculum that did not pass by tests. If at the first final exam student passes one of the two parts of curriculum that part of curriculum the student does not have to take on another final exam.
The condition for positive assessment is that the student has at least 50% of each part of the curriculum at the tests or at the final exam The final grade (in percent) is formed on the basis of all activities according to the formula:

Rating (%) = 0.1 * LV + 0.45 * (G1 + G2)

wherein the activity is expressed in percentage according to:

LV - percentage obtained by laboratory exercises,
G1, G2 - percentage obtained by tests or exams of the parts of curriculum given in lectures.

Students who did not pass the exam after two final exams can pass the exam at the last week of August or the first week of September. Last chance to take the exam in this school year is a commission exam. In a commission exam all students take the entire curriculum, and the condition for positive assessment is that the student has at least 50% of entire curriculum.

The final score (in percentage) is formed on the basis of all activities according to the formula:

Rating (%) = 0.1 * LV + 0.9 * G

wherein the activity is expressed in percentage according to:

LV - percentage obtained by laboratory exercises,
G - percentage obtained by exams of the entire curriculum given in lectures.

The final grade is determined as follows:

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

Under Article 48 of the Statute of the Faculty, the student is required to participate in all forms of teaching activities: lessons attendance at least 70% and 100% of</td></tr>
</table>

<table>
<tr><td></td><td colspan="3">laboratory exercises. Student should make 100% of laboratory reports. If a student does not meet these requirements, s student will not be able to take the exams.</td></tr>
<tr><td rowspan="2">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>R.Lucic: Lectures, FESB</td><td></td><td>e-learning portal</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">- G. G. Seip: Electrical Installation Handbook-Third Edition, John&Wiley, 2000.
- P. E. Sutherland: Principles of electrical safety, IEEE Wiley, 2015.
- M. Mitolo: Electrical Safety of Low-Voltage Systems, Mc Graw Hill, 2009.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">- Keeping records of his attendance
- Annual review of the performance of the examinations
- Student survey in order to evaluate teachers
- Self-evaluation of teachers
- Feedback from students who have already graduated from the relevance of the course content</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

NAME OF THE COURSE	**ELECTROMAGNETIC FIELDS**						
Code	FELA32	Year of study	3				
Course teacher	Dragan Poljak, Ph.D., Full Professor	Credits (ECTS)	5				
Associate teachers	Anna Šušnjara	Type of instruction (number of hours)	L	S	AE	LE	DE
			30	0	15	15	
Status of the course	Obligatory	Percentage of application of e-learning	0				

COURSE DESCRIPTION

Course objectives	Training students for: - Understanding and apply fundamental principles and laws of electromagnetism, - Formulating and solve simple problems in static, quasistatic and dynamic fields, - Permanent adopting and fostering the knowledge in electromagnetics, - Applying anaytic and numerical methods to solve engineering problems involving elektromagnetic waves and elektromagnetic radiation
Course enrolment requirements and entry competences required for the course	Mathematics 2 and 3, Physics 2, Fundamental of Electrical Engineering 1 and 2
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - Define fundamental notions, quantities, and laws of electromagnetic fields, - Apply fundamental laws of electromagnetic theory for calculation of basic quantities of electromagnetic fields - Apply methods an dtechniques suitable for handling problems in propagation electromagnetic waves and radiation of electrically short antennas, - Mathematically formulate simple cases of plane wav epropagation and radiation from electrically small antennas, - Analyze simple transmission lines, grounding electrodes, antennas - Calculate parametars of simple transmission lines, grounding electrodes, antennas - Develop simple codes and use commercial software packages for propagation and radiation problems

Course content broken down in detail by weekly class schedule (syllabus)	Course content	L or S hours	AE hours
	Introduction. Laws of classical electrodynamics.	2	1
	Electrical properties of materials, isotropy, linearity, homogenity.	2	1
	Maxwell's equations in differential form. Maxwell's equations in integral form.	2	1
	Maxwell's equations for special cases. Media classification and application of approximations depending on frequency range	2	1
	Continuity conditions.	2	1
	Poynting vector. Poynting theorem. Complex Poynting vector for time-harmonic fields.	2	1
	Electromagnetic potentials. Wave equations and paticar solutions for potentials.	2	1
	Electrostatic fields. Green theorems. General solution of Poisson equation. The field of a point charge.	2	1
	Magnetostatic field. Stationary and quasistationary currents. Magnetic scalar and vector potentials. Biot-Savart law. Self inductance and mutual inductance.	2	1
	Solution methods of electromagnetic phenomena. Analytical methods.	2	1

	Image theory method. Typical examples. Separation of variables. Typical examples.	2	1
	Numerical methods: Finite Difference Method. Method of Moments. Finite Element Method. Typical examples.	2	1
	Plane wave. Plane wave propagation in lossless media and lossy media. Electromagnetic radiation. Hertz dipole.	2	1
	List of laboratory or design exercises		LE or DE hours
	Field and potential inside a capacitor. (plate, cylindrical and spherical capacitor)		3
	Spatial charge distribution – Poisson equation.		2
	Field an dpotential of a point charge.		2
	Magnetic field of infinite conductor and infinite cable.		2
	Propagation of EM wave in a dielectric medium.		2
	Propagation of EM wave in a lossy medium.		2
	Radiation of electromagnetic field of a short dipole.		2

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

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	2	Research		Practical training	
	Experimental work		Report		(Other)	2,2
	Essay		Seminar essay		(Other)	0,2
	Tests	0,2	Oral exam		(Other)	0,2
	Written exam	0,2	Project		(Other)	

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

There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. Each midterm test (120 min in duration) consists of 3 questions (each containing theoretical part and short numerical problem) and 2 longer numerical problems. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on each midterm. Grade (in percentage) is formed according to the formula:

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

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

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

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

<table>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>D.Poljak, Teorija elektromagnetskih polja s primjenama u inženjerstvu, Šk. knjiga Zagreb, 2014.</td><td></td><td></td></tr>
<tr><td>D.Poljak i dr., Modeliranje žičanih antena primjenom računala, Kigen Zagreb 2009.</td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">1. D. Poljak, Advanced Modeling in Computational Electromagnetic compatibility, Wiley Interscience, New York 2007.
2. Z. Haznadar, Ž. Štih: Elektromagnetizam, Školska knjiga, Zagreb 1997.
3. S. Ratnajeevan, H. Hoole, P. Ratnamahilan, P. Hoole: A Modern Short Course in Engineering Electromagnetics, Oxford University Press, 1996.
4. S.M.Wentworth: Fundamentals of Electromagnetics with Engineering Applications, Wiley, 2005</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">- Evaluation of results in accordance with the above learning outcomes
- Feedback from students via surveys
- Self-evaluation of teachers
- Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

NAME OF THE COURSE	**ELECTRONIC CIRCUITS**							
Code	FELA10	Year of study	3.					
Course teacher	Ivan Marinović, Ph.D., Full Professor	Credits (ECTS)	5					
Associate teachers	Duje Čoko, Ph.D.	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30		15	15		
Status of the course	Obligatory	Percentage of application of e-learning						

COURSE DESCRIPTION	
Course objectives	Training students for: - DC and AC analysis of basic electronic circuits - doing measurements applying oscilloscope
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 analogue electronic circuits - do DC analysis of electronic circuits - do AC analysis of electronic circuits - do analysis in frequency domain - make measurements of basic circuit parameters applying oscilloscope

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

Course content	L or S hours	AE hours
Cascade amplifier	1	0.5
Amplifier frequency characteristic and Bode diagram	1	0.5
Low-frequency and high-frequency analysis of BT and JFET amplifiers	4	2
Impulse response of linear amplifier	1	0.5
Nose in BT, JFET and MOSFET amplifiers	1	0.5
Feedback amplifiers	6	3
Power amplifiers, A-class amplifier with transformer, AB-class amplifier	8	4
Differential amplifier	2	1
Operational amplifier	6	3

List of laboratory or design exercises	LE or DE hours
Frequency characteristic of BT amplifier	2
Frequency characteristic of JFET amplifier	2
Frequency characteristic of two-stage amplifier	2
Feedback amplifier	2
AB-class amplifier	2
Differential amplifier	2
Operational amplifier	3

Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia ☒ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	The presence on lectures and exercises in the amount of at least 70% of the times scheduled. Performed all required laboratory exercises.	

Screening student work *(name the proportion of ECTS*	Class attendance	2	Research		Practical training	
	Experimental work		Report		Exercises	1

<table>
<tr><td rowspan="3">credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Individual work</td><td>2</td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">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.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">P. Biljanović: Elektronički sklopovi, Školska knjiga, Zagreb</td><td>5</td><td></td></tr>
<tr><td colspan="4">I. Zulim, P. Biljanović: Elektronički sklopovi - zbirka zadataka, Školska knjiga, Zagreb</td><td>5</td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">-</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Evidence of students attendance
- Annual analysis of grades achieved
- Teachers self-evaluation
- Students feedback via questionnaires and surveys</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

NAME OF THE COURSE	**ELECTRONIC CONVERTERS FOR POWER SUPPLIES**						
Code	FENA17	Year of study	3				
Course teacher	Dinko Vukadinović, Ph.D., Full Professor	Credits (ECTS)	4				
Associate teachers	Mateo Bašić, Ph.D. Assistant Professor Ivan Grgić, Assistant	Type of instruction (number of hours)	L	S	AE	LE	DE
			30	0	0	15	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 electronic converters for power supplies - making a selection of components for electronic converters for power supplies
Course enrolment requirements and entry competences required for the course	
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: 1) Explain the operating principles of electronic converters in the linear and switch mode 2) Describe the characteristics of electronic converters components 3) Analyze single-phase half-wave diode rectifier loaded with the capacitor and the resistor 4) Analyze the impact of the power transformer leakage inductance on the natural commutation in the single-phase bridge rectifier 5) Calculate the minimal inductance in the DC-DC converters which ensures the operation in continuous mode 6) Discuss the current and voltage waveforms in isolated DC-DC converters 7) Derive the voltage transfer ratio for isolated DC-DC converters 8) Explain the active power factor correction 9) Compare the UPS systems which operate in normal mode of operation, in stored-energy mode of operation and bypass mode of operation

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

Course content	L hours	AE hours
Introduction. Schemes of electronic converters for power supplies	1	
Components of electronic converters for power supplies	1	
Diode rectifiers	3	
Switch-mode non-isolated DC-DC converters (buck, boost, buck-boost, Ćuk and bridge)	3	
Switch-mode isolated DC-DC converters (forward, flyback, push-pull, half-bridge and bridge)	6	
Single-phase and three-phase inverters	4	
Frequency converters	2	
Active and passive power factor correction	2	
Uninterruptable power supply	2	
Examples of electronic converters in electric drives and electric power generation	2	

List of laboratory exercises	LE hours
Single-phase half-wave diode rectifier	4
Single-phase full-wave diode rectifier	4
Non-isolated DC-DC boost converter	4
Non-isolated DC-DC buck-boost converter	3

Format of instruction	x lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	x independent assignments ☒ multimedia x laboratory ☐ work with mentor ☐ **(other)**
Student responsibilities	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	1	Research		Practical training	
	Experimental work		Report		Individual work	1
	Essay		Seminar essay		Laboratory exercises	1
	Midterm exams	0.3	Oral exam		Auditory exercises	0.5
	Written exam	0.2	Project		(Other)	

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

During the semester, two midterm exams are held - the first after 7 weeks of lectures and the second after 13 weeks of lectures. Each midterm exam consists of 4 problems, either theoretical or numerical. In the final exams, students take those parts of the course which they did not pass in the midterm exams.

The requirement for passing grade is that the sum of the laboratory exercises' grade (L) and the midterms' grades (M1 and M2), expressed as a percentage, is 50% or more. The sum is calculated as

Grade (%) = 0.25L + 0.375(M1 + M2)

where the number of points achieved in each midterm exam has to be at least 50%.
The students that do not pass the midterm exams take the final written exam which consists of 4 problems. The requirement for a positive evaluation of the final exam is at least 50% points achieved. In the final exam, the students that did not pass one of the midterm exams are presented with 4 problems from the corresponding part of the course. Subsequently, the grade is determined as follows:

Grade (%) = 0.25L + 0.75(I)

where I is the number of points achieved in the final written exam (at least 50%).
The final grade for the course is determined as follows:
50% to 61% - Sufficient (2)
62% to 74% - Good (3)
75% to 87% - Very good (4)
88% 100% - Excellent (5)

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Vukadinović, D.: Predavanja iz kolegija Elektronički pretvarači za napajanje, šk. god. 2014/15.		e-learning portal

Optional literature (at the time of submission of study programme proposal)	Hase, Y.: Handbook of power systems engineering with power electronics applications, John Wiley, 2013. Emadi A., Nasiri A., Bekiarov S. B.: Uninterruptable Power Supplies and Active Filters, CRC Press, New York, 2005.
Quality assurance methods that ensure the acquisition of exit competences	- Keeping records of student attendance - Annual analysis of the performance at midterm exams and final exams - Feedback from students via surveys - Self-evaluation of teachers - Feedback from graduated students
Other (as the proposer wishes to add)	

NAME OF THE COURSE	**ELECTRONIC DEVICES AND CIRCUITS**							
Code	FELA03	Year of study	2					
Course teacher	Tihomir Betti, Ph.D., Assistant Professor Ivan Marasović, , Ph.D., Assistant Professor	Credits (ECTS)	6					
Associate teachers		Type of instruction (number of hours)	L	S	AE	LE	DE	
			30		30	15		
Status of the course	Obligatory	Percentage of application of e-learning						
COURSE DESCRIPTION								
Course objectives	Training students for: - Understanding the main properties of semiconductors and operating principles of the basic electronic devices. - Analysis of simple amplifier circuits with bipolar or field-effect transistors at DC and small-signal AC conditions. - Analysis of basic circuits with operational amplifier.							
Course enrolment requirements and entry competences required for the course	Completed course Fundamentals of Electrical Engineering 1.							
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - State the basic properties of semiconductors. - Explain the operating principle of the basic semiconductor devices (diodes and transistors). - Calculate the main parameters of semiconductor materials and electronic devices. - Apply the basic electronic device models and to calculate main properties of the simple amplifier circuits. - Describe the amplifier frequency response and calculate amplifier bandwidth. - Explain the operation and calculate the properties of the simple circuits with operating amplifier.							

Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Introduction. Semiconductor materials. Energy bands in semiconductors. Intrinsic and extrinsic semiconductors.	2	2
	Carrier transport phenomena: diffusion and drift transport. Carrier mobilities. Einstein relation. Generation and recombination of carriers. Continuity equation.		
	Abrupt p-n junction. P-n junction under bias. Current-voltage characteristics.		
	Narrow and wide side of the diode. Accumulated charge of minority carriers. Temperature dependence of the diode current and voltage.		
	Bipolar junction transistors (BJT): structure and technology. Transistor operation in the active mode. Transistor parameters. Static characteristics of BJT. The Early effect.		
	Ebers-Moll model of a BJT. BJT modes of operation.		
	Unipolar transistors (FETs). Types of unipolar transistors. JFET and MOSFET: operation, dynamic parameters and static characteristics.		
	Introduction to electronic amplifiers. Amplification (relative and in decibels). Types of electronic amplifiers.		

	BJT and FET amplifier circuits at DC conditions. The quiescent (DC operating) point. Temperature stabilization of the BJT common emitter amplifier using emitter resistor.		
	Dynamic properties of BJT amplifiers. Hybrid (h-parameter) BJT model. Common emitter, common collector and common base amplifiers.		
	Dynamic properties of FET amplifiers. FET small-signal equivalent circuit model. Common sourse, common drain and common gate amplifiers.		
	The amplifier frequency response. Transistor amplifier equivalent circuits for low and high frequencies. Cutoff frequencies. Bode plots.		
	Operational amplifier: definition and basic properties. Examples of circuits with operational amplifier.		
	List of laboratory or design exercises		LE hours
	Semiconductor diode. Light-emitting diode (LED)		2
	Zener diode.		1
	Bipolar junction transistor (BJT).		2
	Junction field-effect transistor (JFET).		2
	Common emitter BJT amplifier.		2
	Common collector BJT amplifier.		2
	Common source (JFET) amplifier.		2
	Operational amplifier.		2

Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☒ multimedia ☒ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	Students should attend at least 70% of the lectures. Students must complete all laboratory exercises.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	2	Research		Practical training	
	Experimental work		Report		Individual work	2.75
	Essay		Seminar essay		Laboratory exercises	0.5
	Tests	0.15	Oral exam		Preparation for laboratory exercises	0.5
	Written exam	0.1	Project		(Other)	

Grading and evaluating student work in class and at the final exam	There are two midterm exams and a final exam. The first midterm exam is scheduled after 7 weeks of classes and the second one after the following 6 weeks. Each midterm exam is written and consists of 4 theoretical questions and 3 numerical problems, which are graded independently. Each midterm exam lasts 105 minutes. To pass an exam, the student should score at least 50% both from theoretical questions and numerical problems in the midterms and also have a positive assesment of the laboratory exercises. The final grade (in percentage) is determined according to the formula: Grade(%) = 0.2(T1+T2)+0.2(P1+P2)+0.2L, where: • T1, T2 – grade from theoretical questions in midterms given in percentage, • P1, P2 – grade from numerical problems in midterms given in percentage, • L – grade from laboratory exercises given in percentage. Students not passing the midterm exams take part in the final exam. It consists of 8 theoretical questions and 6 numerical problems and lasts 165 minutes. For passing the final exam, students must score at least 50% both from theoretical part and from numerical problems, as well as have a positive assesment of the laboratory exercise. The grade on final exams is determined by the formula: Grade(%) = 0.4(T)+0.4(P)+0.2L, where:

<table>
<tr><td></td><td colspan="3">• T – grade from theoretical questions given in percentage,
• P – grade from numerical problems given in percentage,
• L – grade from laboratory exercises given in percentage.</td></tr>
<tr><td rowspan="6">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>T. Betti, I. Marasović: Elektronički elementi i sklopovi – autorizirana predavanja (PowerPoint)</td><td></td><td>e-learning portal</td></tr>
<tr><td>I. Zulim, S. Gotovac: Osnovni poluvodički elektronički elementi, FESB, Split, 1998.</td><td></td><td></td></tr>
<tr><td>P. Biljanović: Elektronički sklopovi, Školska knjiga, Zagreb, 2005.</td><td></td><td></td></tr>
<tr><td>I. Zulim, P. Biljanović: Elektronički sklopovi – zbirka zadataka, Školska knjiga, Zagreb, 1994.</td><td></td><td></td></tr>
<tr><td>S. Bovan, I. Marasović: Elektronički elementi i sklopovi – Upute za laboratorijske vježbe, FESB, Split, autorizirana skripta</td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">- P. Biljanović: Poluvodički elektronički elementi, Školska knjiga, Zagreb, 2004.
- B. Juzbašić: Elektronički elementi, Školska knjiga, Zagreb, 1984.
- A.S. Sedra, K.C. Smith: Microelectronic Circuits, 6th edition, Oxford University Press, 2009.
- S.M. Sze, K.K. Ng: Physics of Semiconductor Devices, Wiley, 2006.
- J. Millman, A. Grabel: Microelectronics, 2nd edition, McGraw-Hill, 1987.
- P. Horowitz, W. Hill: The Art of Electronics, Cambridge University Press, 2015.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">- Record of number of students attending the classes
- Evaluation of results in accordance with expected learning outcomes
- Feedback from students via student surveys
- Teachers self-evaluation
- Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

NAME OF THE COURSE	ELECTROTECHNICAL MATERIALS AND TECHNOLOGY						
Code	FELA02	Year of study	2.				
Course teacher	Maja Stella, Ph.D., Assistant Professor	Credits (ECTS)	4				
Associate teachers	Prof. dr. sc. Dinko Begušić, Ph.D., Full Professor Josip Lörincz, Ph.D., Assistant Professor	Type of instruction (number of hours)	L	S	AE	LE	DE
			30	0	0	15	0
Status of the course	Obligatory	Percentage of application of e-learning					

COURSE DESCRIPTION

Course objectives	Training students for: - understanding structure, properties, and application of basic materials and technologies in electrical engineering - knowledge and application of conductive, semiconductive, insulating and magnetic materials in electrical engineering, - basic knowledge in microelectronic and optical technologies - permanent adoption and deepening of the knowledge of materials and technology in electrical engineering.
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 knowledge of basic materials and technologies in electrical engineering - evaluate and apply basic materials and technologies - evaluate and apply a conductive, semiconductive, insulating and magnetic materials in electrical engineering - evaluate and apply the fundamental microelectronic and optical technologies - permanently adopt and deepen the knowledge of materials and technology in electrical engineering.

Course content broken down in detail by weekly class schedule (syllabus)	Course content	L or S hours	AE hours
	Introduction. Structure and properties of materials. Properties of conductors	2	-
	Materials for conductors: copper and its alloys and aluminum	2	-
	High melting point conductors: tungsten, molybdenum, tantalum and niobium. Materials for specific purposes: gold, silver, iron and platinum.	2	-
	Materials for resistors, thermocouple, thermocouple, fused, conductors through the glass and contacts	2	-
	Superconductivity and superconducting materials. Semiconductor materials. Cleaning semiconductors. Methods for obtaining a single crystal	2	-
	Magnetic materials in general. Soft magnetic materials (iron, alloys: iron-calcium and iron-nickel.	2	-
	The soft magnetic materials for the HF technique (a ferromagnetic powder and ferrite core). Hard magnetic materials (carbon steels, alloy dispersion, ductile hard magnetic materials and materials based on metal oxides).	2	-
	Insulating materials in general. Features overview the most commonly used insulation materials: air, insulating liquids, mica, ceramics.	2	-
	Glass, varnishes, putty insulation, laminates and fibrous materials, caoutchouc and rubber, synthetic resin (thermoplastic and thermosetting). Printed circuit.	2	-

	Soldering process. Microelectronics: Introduction and historical development. The division of integrated circuits. Planar technology: general.	2	-
	Procedures of planar technology: epitaxy, oxidation or passivation Si surface, diffusion and ion implantation. Metallization.	2	-
	Thin layer technology: generally, preparation of thin film components (resistors, capacitors, conductive paths). Thick film technology: in general, production of thick components (resistors, capacitors, conductive paths). Methods for preparation of application specific integrated circuits (ASIC).	2	-
	Fiber optic transmission systems: historical development, the light propagation through the light conductor, the optical fiber type, the protection of the optical fiber, types of optical fiber and manufacture of the fiber optical cable	2	-
	List of laboratory or design exercises		LE or DE hours
	Specific electric resistance measurement		2
	Resistance measurement of color-coded resistors		2
	Varistors		2
	Thermistors		2
	Measuring the temperature with thermocouple		2
	Testing quality of transformer plates and measurement losses in the iron		2
	Rated power dissipation in resistors		2

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

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1,0	Research	-	Practical training	-
	Experimental work	-	Report	-	Individual work	2,2
	Essay	-	Seminar essay	-	Laboratory exercises	0,5
	Tests	0,2	Oral exam	-		
	Written exam	0,1	Project	-	(Other)	

Grading and evaluating student work in class and at the final exam	There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. Each midterm and final test consists of 5 theoretical questions. The duration of each test is 2 school hour. In the final exams students that did not pass the midterm exams take part. The midterm and final exams are carried out as written tests. The requirement for passing grade is the positive assessment of laboratory exercises, the seminar exercise and 50 % points on each midterm exam or the final exam. The continuous knowledge assessment grade (in percentage) is formed according to the formula: Grade(%) = 0,2 LV + 0,4 (M1 + M2) the 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 formed 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 passing grade for all laboratory exercises. 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 complete course.		
Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	M. Kapov: Elektrotehnički materijali i tehnologije, skripta, FESB Split, 2005.		e-learning portal
Optional literature (at the time of submission of study programme proposal)	M. Vrdoljak, M. Kapov: Elektrotehnički materijali- lab. vježbe, skripta, FESB Split, 2001 V. Bek: Tehnologija elektromaterijala, ETF Zagreb, 1989. P. Biljanović: Mikroelektronika, ETF Zagreb, 1983.		
Quality assurance methods that ensure the acquisition of exit competences	- Evaluation of results in accordance with the above learning outcomes - Feedback from students via surveys - Self-evaluation of teachers - Institutional and non-institutional evaluations		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">ELEMENTS OF INDUSTRIAL AUTOMATION</td></tr>
<tr><td>Code</td><td>FELA23</td><td>Year of study</td><td colspan="5">3</td></tr>
<tr><td>Course teacher</td><td>Ozren Bego, Ph.D.,
Associate Professor</td><td>Credits (ECTS)</td><td colspan="5">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Danijel Jolevski, Ph.D.,
Assistant Professor</td><td rowspan="2">Type of instruction
(number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td>0</td><td>0</td><td>30</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- understanding terms and concept of industrial automation,
- understanding working principles of programable logic controllers (PLC), sensors and actuators,
- programing PLCs,
- design simpler automation systems and control loops.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">Passed course Digital electronics.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- define and describe automation system.
- select sensors according to defined criteria,
- analyze pneumatic actuators in automation system,
- analyze hydraulic actuators in automation system,
- program PLC,
- analyze quality of control system.</td></tr>
<tr><td rowspan="16">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Course content</td><td>L or S hours</td><td>AE hours</td></tr>
<tr><td colspan="5">Introduction in course. Basics of industrial automation. Technical process definition, classification, examples. Historical overview of automation. Examples of industrial automation: hydro power plant, ladle furnace, concrete plants.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Differences in machine and plant automation. Central and decentral control structure. Communication between industrial computers. Redundancy.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Process computer structures and requirements. CPU, peripherals. Process signal types.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Signal processing (multiplexing, filtering). Analog-to-digital convertors, ADC types. Digital-to-analog convertors.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Sensors – types, static and dynamic characteristics, transfer of digital and analog signals, galvanic isolation, noise suppression.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Proximity sensors (mechanical, inductive, capacitive, optical). Linear and rotate movement and speed measurement.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Temperature, pressure, flow and level measurement.</td><td>2</td><td></td></tr>
<tr><td colspan="5">First midterm exam</td><td>2</td><td></td></tr>
<tr><td colspan="5">Actuators – types. Electromechanical actuators, step motors.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Pneumatic actuators.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Hydraulic actuators.</td><td>2</td><td></td></tr>
<tr><td colspan="5">PID controllers, industrial PID, PID parameters adjustment</td><td>2</td><td></td></tr>
<tr><td colspan="5">Industrial plant visit.</td><td>4</td><td></td></tr>
<tr><td colspan="5">Second midterm exam</td><td>2</td><td></td></tr>
<tr><td colspan="6">List of laboratory or design exercises</td><td>LE or DE hours</td></tr>
</table>

	Introduction in PLC	3
	Programing PLC – introduction	3
	Programing PLC – binary instructions, timers, counters, data conversions	3
	Programing PLC – analog signal measurements	3
	Sequential control, analog control	6
	Level control in laboratory fluid storage model (motor control, pump characteristic measurement, PID control)	8

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

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1	Research		Practical training	
	Experimental work		Report		Laboratory attendance	1
	Essay		Seminar essay		Independent work	2.2
	Tests	0.2	Oral exam		Preparation for laboratory work	0.5
	Written exam	0.1	Project		(Other)	

Grading and evaluating student work in class and at the final exam	There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. Each midterm and final test consists of 10 questions. In the final exams students that did not pass the midterm exams take part. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on each midterm exam or the final exam. Grade (in percentage) is formed according to the formula: Grade(%) = 0,05 NP + 0,15 LV + 0,4 (M1 + M2) the activities in percentage: • NP - attendance at lectures, • LV – laboratory assessment (independent/group work), • M1, M2 – test results.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	O. Bego: Predavanja iz predmeta Elementi automatizacija industrijskih postrojenja, FESB		e-learning portal

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

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">ELEMENTS OF ELECTRICAL POWER SWITCHGEARS</td></tr>
<tr><td>Code</td><td>FENA08</td><td>Year of study</td><td colspan="5">3.</td></tr>
<tr><td>Course teacher</td><td>Tonći Modrić, Ph.D., Assistant Professor</td><td>Credits (ECTS)</td><td colspan="5">6</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>45</td><td>0</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- understanding the basic theoretical and practical knowledge in the electrical power switchgears,
- understanding the concept of different electrical power switchgear types,
- dimensioning and selection of basic high voltage electrical power switchgear elements,
- determination of equivalent circuits and impedances of elements in power system,
- calculation of basic fault currents in power system.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- specify the role of electrical power switchgears in power system,
- enumerate different electrical power switchgear types,
- define the currents relevant for dimensioning the electrical power switchgear elements,
- specify the basic high voltage elements in the electrical power switchgears,
- describe the basic faults in the electrical power switchgear,
- calculate the basic fault currents,
- compare the characteristic currents and voltages during basic faults in power system,
- select the basic high voltage elements in the electrical power switchgear,
- distinguish the importance of different methods of power system neutral point grounding.</td></tr>
<tr><td rowspan="7">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Course content</td><td>L hours</td></tr>
<tr><td colspan="6">Role and functions of electrical power switchgears in power system. Different electrical power switchgear types. Basic high voltage elements and subsystems of electrical power switchgears (classification and graphical symbols).</td><td>2</td></tr>
<tr><td colspan="6">Stresses of electrical power switchgear elements caused by electrical current. Basic faults. Calculation of symmetrical and unsymmetrical fault currents using the method of symmetrical components. Numerical examples.</td><td>5</td></tr>
<tr><td colspan="6">Influence of transformation to the unsymmetrical currents distribution. Calculation of unsymmetrically loaded power transformer currents. Application of arrows that represent currents in the case of basic unsymmetrically loaded power transformers. Numerical examples.</td><td>5</td></tr>
<tr><td colspan="6">Equivalent short-circuit impedances of power system elements. Numerical examples.</td><td>6</td></tr>
<tr><td colspan="6">Analysis of typical short-circuit current-time diagram. Short-circuit current components.</td><td>2</td></tr>
<tr><td colspan="6">Definitions and calculations of currents relevant for dimensioning of electrical power switchgear elements (peak, thermal and breaking short-circuit current).</td><td>2</td></tr>
</table>

	Voltage stresses of high voltage electrical power switchgear elements. Standard nominal and highest voltages used in power system. Overvoltages. Standard withstand voltages and testing procedures. Insulation coordination. Grounding of power system neutral point. Numerical examples.	4
	Basic high voltage electrical power switchgear elements.	7
	Power transformer on load operation (parallel operation, harmonics, unsymmetrical loads). Examples.	2
	Selection example of typical high voltage elements in the electrical power switchgear.	2
	Typical system concepts and circuit configurations.	1
	Basic elements of secondary systems in the electrical power switchgear.	1
	List of laboratory exercises	LE hours
	Unsymmetrical load of two-winding power transformers.	3
	Unsymmetrical load of three-winding power transformers.	3
	Measurement of power transformer impedances.	3
	Current transformer.	3
	Calculation of fault currents and voltages on a computer.	3

Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☒ independent assignments ☐ multimedia ☒ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	The presence on lectures in the amount of at least 70% of the times scheduled. Performed all required laboratory exercises and submitted all written reports with measurement and calculation results.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance	1,7	Research		Practical training		
Experimental work		Report		Individual work	3,0	
Essay		Seminar essay		Laboratory exercises	0,6	
Tests	0,2	Oral exam		Preparation for laboratory exercises	0,4	
Written exam	0,1	Project		(Other)		

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

There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. Each midterm test consists of 3 theoretical questions and 1 numerical problem. Each final test consists of 6 theoretical questions and 2 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 with submitted all written reports and 50 % points on each midterm exam or the final exam. Grade (in percentage) is formed according to the formula:

$$\text{Grade (\%)} = 0{,}05\ NP + 0{,}05\ LV + 0{,}45\ (M1 + M2)$$

the activities in percentage:

- NP – attendance at lectures,
- LV – laboratory assessment,
- M1, M2 – midterm test results.

The final grade is determined as follows:

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

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	T. Modrić: Autorizirana predavanja, FESB		e-learning portal
	T. Modrić: Autorizirane auditorne vježbe, FESB		e-learning portal
	I. Medić, E. Sutlović: Električna postrojenja, upute za laboratorijske vježbe, Redak, Split, 2014.		webknjizara.hr
Optional literature (at the time of submission of study programme proposal)	• H. Požar: Visokonaponska rasklopna postrojenja, Tehnička knjiga, Zagreb, 1990. • K. Meštrović: Sklopni aparati srednjeg i visokog napona, Graphis, Zagreb, 2007. • R. Milošević: Vakuumski električni sklopni aparati, Graphis, Zagreb, 2011. • A. Dolenc: Transformatori, Sveučilište u Zagrebu, 1968.		
Quality assurance methods that ensure the acquisition of exit competences	- Evaluation of student presence on lectures - 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	**ENGINEERING GRAPHICS AND PRESENTATION**						
Code	FELA08	Year of study	1.				
Course teacher	Dinko Begušić, Ph.D., Full Professor	Credits (ECTS)	4				
Associate teachers	Maja Stella, Ph.D., Assistant Professor Srđana Dragičević, M.Sc., Ivan Teklić, dipl. ing.	Type of instruction (number of hours)	L	S	AE	LE	DE
			15	0	0	30	0
Status of the course	Obligatory	Percentage of application of e-learning					

COURSE DESCRIPTION

Course objectives	Training students for: - understanding and application of basic concepts and technologies of graphic communications in technical applications, - knowledge of basic concepts of computer graphics, - application of standard graphic tools and environments (AutoCAD, MATLAB) - permanent adoption and deepening of the knowledge in the area of graphic communications in technical applications.
Course enrolment requirements and entry competences required for the course	None
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - define the basic concepts of graphic communications in technical applications, - define the basic concepts of computer graphics, - identify the characteristics of display technologies and devices, - define and apply the basic methhods of drawing of primitive shapes, - define and apply the basic concepts of color and animation in computer graphics, - apply the standard graphic tools and environments (AutoCAD, MATLAB), - apply the methods and techniques for graphical communication and presentation in the area of electrical engineering and information technology.

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

Course content	L or S hours	AE hours
Graphical communication in technical applications.	1	-
Fundamentals of technical drawing.	1	-
Orthogonal and axonometric projection.	1	-
Use of schematics and symbols.	1	-
Applications and fundamentals of computer graphics.	1	-
Architectures of computer graphics systems.	1	-
Display technologies.	1	-
Mathematic fundamentals of advanced graphics.	1	-
Graphic primitives.	1	-
Modelling of curves in the computer graphics.	1	-
Graphic transforms.	1	-
Colour in computer graphics.	1	-
Basic concepts of computer animation.	1	-

List of laboratory or design exercises	LE or DE hours
AutoCAD: user interface.	2
AutoCAD: formating of the technical drawing.	2
AutoCAD: drawing of the basic shapes.	2
AutoCAD: orthogonal projection.	2
AutoCAD: 3D view.	2

	Microsoft VISIO: user interface.	2
	Microsoft VISIO: sample schematic presentation (1).	2
	Microsoft VISIO: sample schematic presentaion (2).	2
	MATLAB: drawing of the mathematical functions.	2
	MATLAB: transformation of 2D objects.	2
	MATLAB: animation.	2
	MATLAB: interactive graphical presentation.	2
	Preparation for the seminar excercise.	2

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

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0,5	Research	-	Practical training	-
	Experimental work	-	Report	-	Individual work	1,2
	Essay	-	Seminar essay	0,5	Laboratory exercises	1,0
	Tests	0,2	Oral exam	-	Preparation for laboratory exercises	0,5
	Written exam	0,1	Project	-	(Other)	

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

There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. Each midterm and final test consists of 10 theoretical questions and numerical problems. The duration of each test is 1 school hour. In the final exams students that did not pass the midterm exams take part. The midterm and final exams are carried out as written tests. The requirement for passing grade is the positive assessment of laboratory exercises, the seminar exercise and 50 % points on each midterm exam or the final exam. Grade (in percentage) is formed according to the formula:

$$\text{Grade}(\%) = 0{,}05\ NP + 0{,}35\ LV + 0{,}3\ (M1 + M2)$$

the activities in percentage:

- NP - attendance at lectures,
- LV – laboratory assessment,
- M1, M2 – test results.

The grading is based on the rang list based on the point grades.

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**
	Dinko Begušić: Engineering graphics and presentation, interactive digital textbook, 2014.		e-learning portal

Optional literature (at the time of submission of study programme proposal)	- Lukša Padovan: Inženjerska grafika i dokumentiranje, Graphis, Zagreb 1999. - James D. Foley, Andries van Dam, Steven K. Feiner, John F. Hughes: Computer Graphics: Principles and Practice, 2nd ed. in C, Addison-Wesley, 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)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">ENGINEERING MECHANICS</td></tr>
<tr><td>Code</td><td>FESA01</td><td>Year of study</td><td colspan="5">1</td></tr>
<tr><td>Course teacher</td><td>Željan Lozina, Ph.D., Full Professor
Damir Sedlar, Ph.D., Assistant Professor</td><td>Credits (ECTS)</td><td colspan="5">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Tomac Ivan, Ph.D.</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td></td><td>15</td><td></td><td></td></tr>
<tr><td>Status of the course</td><td>Elective</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for: This course will introduce the fundamentals of engineering dynamics. It will develop the skills in how to model and analyses the motion of particles and rigid bodies as a foundation for dynamic analysis of mechanical systems. This fundamental course will also help develop engineers eyes to understand how machines work, and develop an engineering mind set to present and communicate work in a clear and concise written format.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- Apply kinematics of the three-dimensional particle motion in various coordinate systems: Cartesian, natural and cylindrical.
- Explain the concepts of displacement, velocity and acceleration as vectors and how to determine them.
- Explain the notion of a force as a vector.
- Explain concepts of kinetic, potential and mechanical energies and the concept of a conservative force.
- Explain concepts of power and mechanical efficiency.
- Apply particle dynamics
- Ability to make a right decision related to a choice of the system of particles whose motion is to be studied.
- Ability to correctly draw the free-body diagram (FBD) for the system.
- Ability to write and solve Newton equations of motion for the system.
- Ability to use principles derived from Newton’s second law, including Work & Energy, and Momentum.
- Apply the kinematics of two-dimensional (planar) rigid-body motion.
- Ability to use concepts of angular displacement, angular velocity and angular acceleration.
- Ability to draw a FBD for a system of rigid bodies.
- Ability to determine mass moment of inertia for body.
- Ability to use principles derived from Newton’s second law, including Work & Energy, and Momentum, to derive equations of motion for a general rigid-body planar motion.
- Ability to use SEI of units in all mechanical quantities (linear and angular displacement, velocity and acceleration, mass, force, torque, work/energy, power, momentum, mass moment of inertia).</td></tr>
<tr><td rowspan="9">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="3">Course content</td><td colspan="2">L or S hours</td><td colspan="2">AE hours</td></tr>
<tr><td colspan="3">Kinematics of Rectilinear motion.</td><td colspan="2">2</td><td colspan="2">1</td></tr>
<tr><td colspan="3">Kinematics of Curvilinear motion.</td><td colspan="2">2</td><td colspan="2">1</td></tr>
<tr><td colspan="3">Bounded motion of particle, 2. Newton law.</td><td colspan="2">2</td><td colspan="2">1</td></tr>
<tr><td colspan="3">Principle of kinetic energy.</td><td colspan="2">2</td><td colspan="2">1</td></tr>
<tr><td colspan="3">Work –energy theorem.</td><td colspan="2">2</td><td colspan="2">1</td></tr>
<tr><td colspan="3">Principles of linear and angular momentum.</td><td colspan="2">2</td><td colspan="2">1</td></tr>
<tr><td colspan="3">Kinematics of Relative motion of particle, Coriolis acceleration.</td><td colspan="2">2</td><td colspan="2">1</td></tr>
<tr><td colspan="3">Midterm</td><td colspan="2"></td><td colspan="2"></td></tr>
</table>

	Planar kinematics of body.	2	1
	Body inertia.	2	1
	Planar kinetics of body.	2	1
	Planar kinetics of bodies.	2	1
	Work and energy of body. Conservation laws.	2	1
	Principles of linear and angular momentum of body. Impact of bodies.	2	1
	List of laboratory or design exercises		LE or DE hours

Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☒ multimedia ☐ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

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

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

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. 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 50 % points on each midterm exam or the final exam. Grade (in percentage) is formed according to the formula:

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

- M1, M2 – test results.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Ž. Lozina: Lectures, FESB		Elearning portal
	Ž. Lozina: Kinematika, Sveučilište u Splitu		
	Ž. Lozina: Dinamika, Sveučilište u Splitu		

Optional literature (at the time of submission of study programme proposal)	Gross, D., Hauger, W., Schröder, J., Wall, W.A., Bonet, J.: Engineering mechanics 3, Springer, 2011.
Quality assurance methods that ensure the acquisition of exit competences	- Evaluation of results in accordance with the above learning outcomes - Feedback from students via surveys - Self-evaluation of teachers - Institutional and non-institutional evaluations
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="8">ENGLISH LANGUAGE 1</td></tr>
<tr><td>Code</td><td>FEOA04</td><td>Year of study</td><td colspan="5">1</td></tr>
<tr><td>Course teacher</td><td>Nina Sirković, Ph.D., Assistant Professor</td><td>Credits (ECTS)</td><td colspan="5">3</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">-</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td></td><td>30</td><td></td><td></td><td></td></tr>
<tr><td>Status of the course</td><td>Mandatory</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- understanding and application of technical vocabulary concerning electrical engineering and information technology
- development of students' oral and written communication skills in English
- improving general English language knowledge</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- Explain basic notions of electrical engineering, electricity, electromagnetism, electrical charge and conductivity
- Define and explain the term electronics and explain use of semiconductors and transistors
- Correctly read numbers, units, equations and other mathematical expressions used in engineering
- Translate independently less complicated professional texts and interpret tables, diagrams and charts
- Use relevant grammar structures (passive, reduced relative clauses, cause and effect clauses, irregular plurals, MLU-s)
- Use phrasal expressions to improve English language knowledge</td></tr>
</table>

Course content broken down in detail by weekly class schedule (syllabus)	Course content	S hours	AE hours
	Introduction to the course, U 1 - Electricity	2	
	Study section 1 – introduction to characteristics of technical English	2	
	U 2 – Electromagnetism	2	
	Study section 2 – general and technical English	2	
	U 3 – Electric charges, electrical conductivity	2	
	Study section 3 – multiword lexical units	2	
	U 4 - Mathematics	2	
	First midterm exam		
	U 5 – Electronics	2	
	Study section 5 – passive voice	2	
	U 6 – Semiconductors	2	
	Study section 6 –reduced relative clauses	2	
	U 7 – Transistors	2	
	Study section 7- *both, either, neither*	2	
	Second midterm exam		

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

<table>
<tr><td></td><td colspan="3">☐ field work</td><td colspan="3"></td></tr>
<tr><td>Student responsibilities</td><td colspan="6">The presence on lectures in the amount of at least 70 % of the times scheduled.
Performed all required exercises.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td></td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work</td><td>1</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Tests</td><td>2</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">There are two midterms and a final exam. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. Students who do not pass both midterm exams have to take the final exam containing learning materials from both midterm exams.

50 % of the test should be solved to have a passing grade. The grade is formed according to the score:
15 % of best solved tests - excellent (5)
35 % of second best solved test - very good (4)
35 % next solved tests - good (3)
15 % of lowest passing tests- sufficient (2).

Students who pass the final test in the third term can get only sufficient grade (2).

Midterm and final exams are carried out according to the academic year calendar.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">1. Štambuk, Anuška (2005). English in Electrical Engineering and Computing. Split: FESB.</td><td></td><td></td></tr>
<tr><td colspan="4">2. Glendinning, Eric H.; John McEwan (2006). Oxford English for Information Technology. Oxford:OUP</td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">Glendinng, Eric H.; Glendinning, Norman (2001). Oxford English for Electrical and Mechanical Engineering. Oxford: Oxford University Press.

Master, Peter (2004). English Grammar and Technical Writing. Washington: US Department of State, Office of English Language Programs.

Mc Carthy, Michael; O'Dell, Felicity. (2008). Academic Vocabulary in Use. Cambridge: Cambridge University Press.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">Evaluation of results in accordance with the above learning outcomes
Feedback from students via surveys
Self-evaluation of teachers</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

NAME OF THE COURSE	**ENGLISH LANGUAGE 2**		
Code	FEOA05	Year of study	1
Course teacher	Nina Sirković, Ph.D., Assistant Professor	Credits (ECTS)	4

			L	S	AE	LE	DE
Associate teachers	-	Type of instruction (number of hours)		30			

Status of the course	Mandatory	Percentage of application of e-learning	0

COURSE DESCRIPTION

Course objectives	Training students for: - understanding and application of technical vocabulary concerning electrical engineering and information technology - development of students' oral and written communication skills in English - improving general English language knowledge
Course enrolment requirements and entry competences required for the course	None
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - Explain basic notions of computer science - Define and explain the structure of the computer and its performances - Explain and describe types of communications and their role in everyday life - Explain the function of internet technology - Translate independently less complicated professional texts and interpret tables, diagrams and charts - Use relevant grammar structures (passive, reduced relative clauses, cause and effect clauses, irregular plurals, MLU-s)

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

Course content	S hours	AE hours
U 9 – Computer technology	2	
Study section 9 – adjective comparison	2	
U 10 – Computers: structure and function	2	
Study section 10 – word formation: suffixes	2	
U 11 – Computer programming and computer science	2	
Study section 11 – word formation: prefixes	2	
Revision	2	
First midterm exam		
Analysis of the midterm exam results	2	
U 13 - Telecommunications	2	
Study section 13 – modal verbs	2	
U 14 – Mobile data systems and internet technology	2	
Study section 14 – modal verbs cont.	2	
Revision	2	
Second midterm exam		

Format of instruction	☐ lectures ☒ seminars and workshops ☐ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☒ independent assignments ☐ multimedia ☐ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required exercises.	

Screening student work *(name the proportion of ECTS credits for each activity*	Class attendance		Research		Practical training	
	Experimental work		Report		Individual work	1

so that the total number of ECTS credits is equal to the ECTS value of the course)	Essay		Seminar essay		Presentations	1
	Tests	2	Oral exam		(Other)	
	Written exam		Project		(Other)	

Grading and evaluating student work in class and at the final exam	During the semester students are to hold a presentation from their field of profession. The presentation is evaluated according to the structure and content, delivery, nonverbal communication and visuals and takes 20% points of the overall exam grade. There are two midterms and a final exam. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. Each midterm exam takes 40% of the overall exam grade. Students who do not pass both midterm exams have to take the final exam containing learning materials from both midterm exams. 50 % of the test should be solved to have a passing grade. The grade is formed according to the achieved results from the presentation and the following tests score: 15 % of best solved tests - excellent (5) 35 % of second best solved test - very good (4) 35 % next solved tests - good (3) 15 % of lowest passing tests- sufficient (2). Students who pass the final test in the third term can get only sufficient grade (2). Midterm and final exams are carried out 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**
	Štambuk, Anuška (2005). English in Electrical Engineering and Computing. Split: FESB.		
	Glendinning, Eric H.; John McEwan (2006). Oxford English for Information Technology. Oxford:OUP		

Optional literature (at the time of submission of study programme proposal)	Glendinng, Eric H.; Glendinning, Norman (2001). Oxford English for Electrical and Mechanical Engineering. Oxford: Oxford University Press. Master, Peter (2004). English Grammar and Technical Writing. Washington: US Department of State, Office of English Language Programs. Mc Carthy, Michael; O'Dell, Felicity. (2008). Academic Vocabulary in Use. Cambridge: Cambridge University Press. Kovač, Mirjana M.; Sirković, Nina (2014). Presentation, Writing and Interpersonal Communication Skills. Split, FESB.
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
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">ENGLISH LANGUAGE 3</td></tr>
<tr><td>Code</td><td>FEOA06</td><td>Year of study</td><td colspan="5">2</td></tr>
<tr><td>Course teacher</td><td>Daniela Matić, Ph.D., Assistant Professor</td><td>Credits (ECTS)</td><td colspan="5">3</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">/</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td></td><td>30</td><td></td><td></td><td></td></tr>
<tr><td>Status of the course</td><td>Mandatory</td><td>Percentage of application of e-learning</td><td colspan="5">0%</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- developing communicative and social skills necessary in electrical engineering profession, primarily in everyday situations and those beyond the limits of their professional life;
- acquiring and enhancing knowledge on foreign language structures;
- improving English for special purposes knowledge at receptive level (written and oral reception) depending on the course of studies;
- raising awareness of students’ own responsibility in learning process.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- recognize various text types, textual patterns and language activities;
- identify and explain professional vocabulary;
- recognize key ideas, words and sentences;
- find and eventually use grammar structures typical for professional and scientific texts;
- use various reading and listening methods in order to comprehend the context of authentic general English and professional texts;
- present various topics orally and in written form;
- analyze various professional materials and present them within professional communication procedures.</td></tr>
<tr><td rowspan="9">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Course content</td><td>L or S hours</td><td>AE hours</td></tr>
<tr><td colspan="5">Introduction to the course and requirements; introduction to Instructions and Presentation guide on the e-learning portal Revision of English Language 1 and 2 contents</td><td>2</td><td></td></tr>
<tr><td colspan="5">Unit 7 – Electric power generation, transmission and distribution; compound nouns; fixed phrases from electrical engineering; fixed phrases from academic English</td><td>2</td><td></td></tr>
<tr><td colspan="5">Unit 7 – understanding speaker emphasis; asking for clarification; responding to queries and requests for clarification</td><td>2</td><td></td></tr>
<tr><td colspan="5">Unit 8 – Telecommunications – synonyms; nouns from verbs; definitions; common 'direction' verbs in essay titles (discuss, analyze, evaluate, etc.).</td><td>2</td><td></td></tr>
<tr><td colspan="5">Unit 8 – understanding dependent clauses with passives; paraphrasing; expanding notes into complex sentences; recognizing different essay types/structures; writing essay plans and writing essays</td><td>2</td><td></td></tr>
<tr><td colspan="5">Unit 9 – Signal processing - fixed phrases from electrical engineering; fixed phrases from academic English</td><td>2</td><td></td></tr>
<tr><td colspan="5">Unit 9 – using note-taking system; recognizing digressions in lectures; making effective contributions to a seminar; referring to other people’s ideas in a seminar</td><td>2</td><td></td></tr>
<tr><td colspan="5">8. Mid-term exam</td><td>2</td><td></td></tr>
</table>

	Unit 10 – *Electric cars* – 'neutral' and marked words; fixed phrases from electrical engineering; fixed phrases from academic English	2	
	Unit 10 – recognizing the writer's stance; inferring implicit ideas; writing situation-problem-solution-evaluation essays	2	
	Unit 11 – *Microelectromechanical systems* – words/phrases used to link ideas (moreover, as a result, etc.); stress patterns in noun phrases and compounds; fixed phrases from academic English; words/phrases related to research	2	
	Unit 11 – recognizing the speaker's stance; writing up notes in full; agreeing/disagreeing	2	
	Unit 12 – *Lighting engineering* – verbs used to introduce ideas from other sources; linking words/phrases conveying contrast (whereas), result (consequently), reasons (due to), etc.; words for quantities.	2	
	Unit 12 – understanding how ideas in a text are linked, deciding whether to use direct quotation or paraphrase; incorporating quotations; writing research reports, writing effective introductions/conclusions.	2	
	15. End-of-term exam	2	

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

Student responsibilities	In order to take an exam and eventually obtain a grade, each student has to fulfill the following requirements: - minimum class attendance of 70%; - delivered and positively graded presentation in English before other students during regular classes.

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1	Research	1	Practical training	
	Experimental work	/	Report	0.5	(Other)	
	Essay	/	Seminar essay		(Other)	
	Tests	0.5	Oral exam	/	(Other)	
	Written exam		Project	/	(Other)	

Grading and evaluating student work in class and at the final exam	During regular classes students are supposed to prepare and deliver a presentation on an electrical engineering topic of their choice, which will be graded. During the semester, students will be continuously assessed as they will take two exams, a mid-term and an end-of term exam. The former will be held in week 8 and the latter in week 15. Both exams will test their knowledge of English naval architecture lexis from the educational materials and grammar structures specific for their profession. If they fail at either of these exams or do not sit for them, they have to take the final exam scheduled in the examination period after the classes have finished. The final grade is calculated as follows: - written exam (mean of mid-term and end-of term exam positive results, or final exam) – 70% - positively graded presentation – 20% - regular attendance – 5% - written assignments (homework) – 5% All exams are scheduled according to the current academic year calendar.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Smith, R.H.C. (2014). *English for Electrical Engineering in Higher Education Studies*. Reading: Garnet Education.		
Optional literature (at the time of submission of study programme proposal)	Glendinning, Eric H., McEwan J. (2006). *Oxford English for Information Technology*. Oxford:OUP		
Quality assurance methods that ensure the acquisition of exit competences	- Regular class attendance records - Tutorials - Evaluation of results in accordance with the above learning outcomes - Feedback from students via surveys - Self-evaluation of teachers - Institutional and non-institutional evaluations		
Other (as the proposer wishes to add)	/		

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">FUNDAMENTALS OF ELECTRICAL ENGINEERING 1</td></tr>
<tr><td>Code</td><td>FENA01</td><td>Year of study</td><td colspan="5">1.</td></tr>
<tr><td>Course teacher</td><td>Nikša Kovač, Ph.D., Full Professor</td><td>Credits (ECTS)</td><td colspan="5">7</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Mario Cvetković, Ph.D.
Nedjeljka Grulović-Plavljanić, M.Sc., Senior Lectuter</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>45</td><td>0</td><td>30</td><td>0</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- acquisition of basic knowledge in the field of electrical engineering,
- understanding and application of basic principles and laws of electrical engineering,
- solving the simple electrical engineering problems.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- define fundamental phenomena, the quantities and the laws of electrical engineering, respectively,
- apply fundamental laws of electrical engineering,
- calculate the unknowns of simple problems in the field of electrostatics,
- apply methods and techniques for solving linear electrical DC networks,
- compute the required quantities of simple magnetic field problems.</td></tr>
<tr><td rowspan="16">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Course content</td><td>L hours</td><td>AE hours</td></tr>
<tr><td colspan="5">Material structure and SI units. Coulomb's law. Charge distribution.</td><td>3</td><td>2</td></tr>
<tr><td colspan="5">Electrostatic field. Gauss's law.</td><td>3</td><td>3</td></tr>
<tr><td colspan="5">Electric potential. Electric potential and field of charged conductor.</td><td>3</td><td>2</td></tr>
<tr><td colspan="5">Conductors in electrostatic field. Capacitance and capacitor.</td><td>3</td><td>2</td></tr>
<tr><td colspan="5">Dielectrics in electrostatic field. Energy of charged capacitor.</td><td>3</td><td>1</td></tr>
<tr><td colspan="5">Electric current and electric circuit.</td><td>3</td><td>1</td></tr>
<tr><td colspan="5">Basic laws of electric circuit.</td><td>3</td><td>2</td></tr>
<tr><td colspan="5">First midterm exam</td><td></td><td></td></tr>
<tr><td colspan="5">Electric circuit resistances. Power and energy in DC circuits.</td><td>3</td><td>2</td></tr>
<tr><td colspan="5">Linear electric DC networks. Electrostatic networks.</td><td>3</td><td>5</td></tr>
<tr><td colspan="5">Electromagnetism. Magnetic field. Basic laws of magnetic field.</td><td>3</td><td>2</td></tr>
<tr><td colspan="5">Electromagnetic force. Ampere. Electromagnetic induction.</td><td>3</td><td>2</td></tr>
<tr><td colspan="5">Materials in magnetic field.</td><td>3</td><td>1</td></tr>
<tr><td colspan="5">Magnetic circuits. Magnetic field energy.</td><td>3</td><td>1</td></tr>
<tr><td colspan="5">Second midterm exam</td><td></td><td></td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="4">☐ independent assignments
☒ multimedia
☐ laboratory
☐ work with mentor
☒ consultations</td></tr>
</table>

<table>
<tr><td>Student responsibilities</td><td colspan="6">The presence on lectures in the amount of at least 70 % of the times scheduled.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>2,5</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work</td><td>4,0</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Laboratory exercises</td><td></td></tr>
<tr><td>Tests</td><td>0,2</td><td>Oral exam</td><td></td><td>Preparation for laboratory exercises</td><td></td></tr>
<tr><td>Written exam</td><td>0,2</td><td>Project</td><td></td><td>Consultations</td><td>0,1</td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">There are two midterm exams. The first midterm exam is after 7 weeks of lecturing, and the second one is after the next 6 weeks. There are four exams in the examination periods. The exams consist of the material not passed in the midterm exams. The lowest passing point is 50% in each midterm exam, or 50% in the exams.

The final grades are formed according to this scale:

50% - 61% - sufficient (2),
62% - 74% - good (3),
75% - 87% - very good (4),
88% - 100% excellent (5).

The midterm exams and final ones are held in accordance with the Calendar of teaching activities.</td></tr>
<tr><td rowspan="6">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">N. Kovač: Autorizirana predavanja, FESB</td><td></td><td>e-learning portal</td></tr>
<tr><td colspan="4">Jajac B.: Teorijske osnove elektrotehnike, Svezak I, Graphis, Zagreb, 1998.</td><td>10</td><td></td></tr>
<tr><td colspan="4">Jajac B.: Teorijske osnove elektrotehnike, Svezak II, Graphis, Zagreb, 2002.</td><td>10</td><td></td></tr>
<tr><td colspan="4">Jajac B., Grulović N.: Zbirka riješenih zadataka - Elektrostatika, FESB, Split, 2014.</td><td>10</td><td></td></tr>
<tr><td colspan="4">Šehović E. i drugi: Osnove elektrotehnike, zbirka primjera, Prvi dio, Školska knjiga, Zagreb, 1992.</td><td>5</td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">Pinter V.: Osnove elektrotehnike, Knjiga prva, Tehnička knjiga, Zagreb, 1987.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Class attendance evidence
- Annual analysis of the pass rate successfulness
- Student evaluation of the teacher
- Feedback from students who finished graduate studies on the relevance of the course.</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

NAME OF THE COURSE	**FUNDAMENTALS OF ELECTRICAL ENGINEERING 2**							
Code	FENA02	Year of study	1.					
Course teacher	Silvestar Šesnić, Ph.D., Assistant Professor	Credits (ECTS)	6					
Associate teachers	Nikša Kovač, Ph.D., Full Professor Mario Cvetković, Ph.D. Ivana Zulim, Ph.D. Nedjeljka Grulović-Plavljanić, M.Sc., Senior Lectuter	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30	0	30	15	0	
Status of the course	Obligatory	Percentage of application of e-learning	0					
COURSE DESCRIPTION								
Course objectives	Training students for: • understanding the fundamentals of time dependant quantities in electrical engineering; • solving simple AC circuits; • lifelong learning in the field of electrical engineering.							
Course enrolment requirements and entry competences required for the course	None							
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: 1. define basic characteristics of time dependant quantities; 2. describe current-voltage characteristics in AC circuits; 3. apply vector and symbolic methods for solving AC circuits; 4. mathematically describe oscillating circuits; 5. calculate basic parameters of simple three-phase systems; 6. explain mutual inductance in AC circuits; 7. interpret transient behaviour in simple circuits; 8. measure fundamental electrical quantities.							

Course content broken down in detail by weekly class schedule (syllabus)	Course content	L or S hours	AE hours
	Time dependant quantities. Periodical, alternating and sinusoidal currents.	2	2
	Fundamental effects of alternating current. Mean value. Root-mean-square value. Basic principles of AC generator.	2	2
	Current-voltage characteristics in AC circuits.	2	2
	Alternating current power and energy.	2	2
	Mathematical fundamentals of vector representation of sinusoidal quantities.	2	2
	Application of complex calculus to alternating currents and voltages.	2	2
	Analysis of AC circuits via complex calculus. Complex power.	2	2
	Oscillating electric circuits.	2	2
	Resonance in AC circuits.	2	2
	Symmetrical and asymmetrical three-phase systems. Wye connection.	2	2
	Delta connection. Power in three-phase systems.	2	2
	Mutual inductance. Coil with an iron core.	2	2
	Transient behaviour in simple circuits.	2	2

	List of laboratory or design exercises	LE or DE hours
	Introduction to laboratory exercises	2
	Series, parallel and mixed circuit resistance	2
	Kirchhoff laws, superposition principle, Thevenin theorem	2
	Power source operation modes	2
	Active, inductive and capacitive elements in AC circuit	2
	Serial (voltage) resonance	2
	AC power	2
	Three-phase systems – wye and delta connection	2

Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☒ independent assignments ☐ multimedia ☒ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	Attending at least 70% of lectures and 100% of laboratory exercises.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	2	Research		Practical training	
	Experimental work		Report		Laboratory exercises	1
	Essay		Seminar essay		Individual work	2.8
	Tests	0.1	Oral exam		(Other)	
	Written exam	0.1	Project		(Other)	

Grading and evaluating student work in class and at the final exam	Two midterm tests will be conducted during the semester (first after 7, and second after 13 weeks of lectures). After the lectures, three final tests will be conducted (two in summer and one in autumn term). During the final tests, students take exam on the parts they didn't pass during the midterm tests. The requirement for taking the final exam is a positive grade from laboratory exercises. The requirement for passing an exam is at least 50% of points on each midterm (part of the final exam). Final grade is established as follows: - students that have passed during midterm exams and summer final exams; best 15% – excellent (5); following 35% – very good (4); following 35% – good (3); last 15% – satisfactory (2). - students that have passed during autumn final exam – satisfactory (2).

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Pinter, V.: Osnove elektrotehnike, Knjiga druga, Tehnička knjiga, Zagreb, 1987.	1	
	Jajac, B.: Teorijske osnove elektrotehnike, Svezak III, Graphis, Zagreb, 2007.	10	
	Felja, I., Koračin, D.: Zbirka zadataka i riješenih primjera iz osnova elektrotehnike, I i II dio, Školska knjiga, Zagreb	6	

Optional literature (at the time of submission of study programme proposal)	Lončar, J.: Osnovi elektrotehnike, Knjiga prva i druga, Graphis, Zagreb, 2010.
Quality assurance methods that ensure	• record of attendance; • analysis of passing percentages;

the acquisition of exit competences	• student survey; • head of chair evaluation.
Other (as the proposer wishes to add)	

NAME OF THE COURSE	**FUNDAMENTALS OF POWER ENGINEERING**							
Code	FENA04	Year of study	2.					
Course teacher	Slavko Vujević, Ph.D., Full Professor Ranko Goić, Ph.D., Full Professor	Credits (ECTS)	5					
Associate teachers	Tonći Modrić, Ph.D., Assistant Professor Mate Dabro, Ph.D., Assistant Professor Dino Lovrić, Ph.D., Research Assistant Neven Batalić, B.Sc.E.E.	Type of instruction (number of hours)	L	S	AE	LE	DE	
			45	0	0	15	0	
Status of the course	Obligatory	Percentage of application of e-learning	0					
COURSE DESCRIPTION								
Course objectives	Training students for understanding and application of basic knowledge of: - power transformers, - DC and AC rotating electric machines, - low-voltage electrical installations, - lightning and surge protection of structures, - lightning and surge protection of power lines and power plants, - energy sources and energy conversion, - elements and structure of the power networks and substations, - analysis of the three-phase power networks.							
Course enrolment requirements and entry competences required for the course	None							
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - apply acquired knowledge about power transformers, - define the basic principles of electromechanical energy conversion, - explain the principle of operation of rotating electric machines, - apply acquired knowledge about low-voltage electrical installations, - define the basic principles of lightning and surge protection, - describe energy sources and energy conversion, - explain the structure and operation of power systems, - analyze the three-phase power networks.							
Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours						
	Power transformers.	9						
	Electromechanical energy conversion: synchronous machines.	3						
	Electromechanical energy conversion: asynchronous machines, DC machines, universal electric machines.	3						
	Special electrical machines. Electrical drives.	1						
	Low-voltage electrical installations.	2						
	Lightning and surge protection.	3						
	Energy sources and energy conversions.	3						
	Elements of the power networks and substations.	3						
	The structure and main characteristics of the power system: power plants, transmission and distribution networks, loads.	3						
	Review of methods for analysis of AC electric circuits.	3						
	Analysis of three-phase power network.	3						
	Power and energy in power network.	3						
	Two midterm exams							
	List of laboratory exercises	LE hours						
	Parameter estimation of three-phase transformer	3						
	Testing of asynchronous motor	3						

	Testing of electrical installations						3
	Professional visit power plant						3
	Testing of correctness of AC socket connections						3
Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work			☐ independent assignments ☒ multimedia ☒ laboratory ☐ work with mentor ☐ (other)			
Student responsibilities	Attendance on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.						
Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	2	Research		Practical training		
	Experimental work		Report		Individual work	2.2	
	Essay		Seminar essay		Laboratory exercises	0.4	
	Tests	0.2	Oral exam		Preparation for laboratory exercises	0.1	
	Written exam	0.1	Project		(Other)		
Grading and evaluating student work in class and at the final exam	There are two midterm exams. After two midterm exams, student can pass the entire exam. In the two final exams students take course parts that they did not pass in the preliminary exams. If in the first final exam student passes one of the two course parts, that course part the student does not have to take in the second final exam. Students who did not pass the entire exam after two final exams can pass the exam in two additional exams. In the two additional exams students take course parts that did not pass in the preliminary exams. The requirement for a positive evaluation of the course part is that the student has completed at least 50 % points from that course part. The final grade (in percentage) can be calculated using the formula: Grade (%) = 0.1*LV + 0.45*(G1 + G2) where activities in percentage are: LV - laboratory assessment, G1 - points from the first course part, G2 - points from the second course part. The final grade can be calculated as follows: • 50 % to 61 % - pass (2) • 62 % to 74 % - good (3) • 75 % to 87 % - very good (4) • 88 % to 100 % - excellent (5)						
Required literature (available in the library and via other media)	**Title**				**Number of copies in the library**	**Availability via other media**	
	Vujević, S., "Predavanja iz Osnova elektroenergetike – prvi dio", Sveučilište u Splitu, FESB, Split, 2015. (lecture notes – electronic version)					e-learning portal	
	Goić, R., "Predavanja iz Osnova elektroenergetike - drugi dio", Sveučilište u Splitu, FESB, Split, 2013. (lecture notes – electronic version)					e-learning portal	
Optional literature (at the time of submission of study programme proposal)	• Guru, B. S. and Hiziroglu, H. R., "Electric Machinery and Transformers",Oxford University Press, New York - Oxford, 2001. • Hasse, P.; Wiesinger, J. and Zischank, W., "Priručnik za zaštitu od munje i uzemljenje", Kigen d.o.o., Zagreb, 2009. • Bergen, A.R., Vittal, V. „Power System Analysis“, Prentice Hall, New Jersey, 1986.						

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

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="8">INFORMATION AND COMMUNICATIONS</td></tr>
<tr><td>Code</td><td>FELA07</td><td>Year of study</td><td colspan="6">2.</td></tr>
<tr><td>Course teacher</td><td>Joško Radić, Ph.D., Associate professor
Mladen Russo, Ph.D., Assistant professor</td><td>Credits (ECTS)</td><td colspan="6">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Petar Šolić, Ph.D., Assistant professor</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td colspan="2">DE</td></tr>
<tr><td>45</td><td>0</td><td>15</td><td>0</td><td colspan="2">0</td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="6">0</td></tr>
<tr><td colspan="9">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="8">Training students for:
- Acquisition of basic knowledge in the field of information theory
- The acquisition of basic knowledge in the field of signal processing and communication systems
- Understanding and application of fundamental principles in the field of information theory and communication systems</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="8">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="8">Students will be able to:
1. Describe the contents of information to various aspects
2. Explain the idea of information measure
3. Explain models of the information source, the capacity of the source and meaning of entropy
4. Apply the Fourier transform to analyse signals
5. Explain the A / D conversion and how to choose appropriate A / D converter with regard to the characteristics of the analog signal
6. Explain the effect of leakage at DFT
7. Describe the model of the communication system</td></tr>
<tr><td rowspan="16">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Course content</td><td>L hours</td><td>AE hours</td></tr>
<tr><td colspan="6">Introduction to information theory, signal and system</td><td>3</td><td>1</td></tr>
<tr><td colspan="6">Aspects of information: syntactic, semantic, pragmatic and aesthetic</td><td>3</td><td>1</td></tr>
<tr><td colspan="6">Models sources of information and examples</td><td>3</td><td>1</td></tr>
<tr><td colspan="6">Entropy, information content and source capacity, source coding</td><td>3</td><td>1</td></tr>
<tr><td colspan="6">Encryption and cryptography</td><td>3</td><td>1</td></tr>
<tr><td colspan="6">Channel models, binary symmetric channel (BSC)</td><td>3</td><td>1</td></tr>
<tr><td colspan="6">Detection and correction of errors</td><td>3</td><td>1</td></tr>
<tr><td colspan="6">First midterm exam</td><td></td><td></td></tr>
<tr><td colspan="6">Deterministic and random signals and systems</td><td>3</td><td>1</td></tr>
<tr><td colspan="6">Analysis and signal processing, Fourier transform</td><td>3</td><td>1</td></tr>
<tr><td colspan="6">A/D conversion, FFT and DFT</td><td>3</td><td>1</td></tr>
<tr><td colspan="6">Linear dynamic and stochastic systems in time and frequency domain</td><td>3</td><td>1</td></tr>
<tr><td colspan="6">Communication system MODELS</td><td>3</td><td>1</td></tr>
<tr><td colspan="6">Analog and digital modulationS</td><td>3</td><td>1</td></tr>
<tr><td colspan="6">Second midterm exam</td><td></td><td></td></tr>
<tr><td>Format of instruction</td><td colspan="2">☒ lectures
☐ seminars and workshops
☒ exercises</td><td colspan="6">☐ independent assignments
☐ multimedia
☐ laboratory</td></tr>
</table>

	☐ *on line* in entirety ☐ partial e-learning ☐ field work			☐ work with mentor ☐ (other)		
Student responsibilities	The presence on lectures in the amount of at least 70 % of the times scheduled.					
Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1,8	Research		Practical training	
	Experimental work		Report		Individual work	3
	Essay		Seminar essay		Laboratory exercises	
	Tests	0,1	Oral exam		Preparation for laboratory exercises	
	Written exam	0,1	Project		(Other)	

Grading and evaluating student work in class and at the final exam	During the semester there are two mid-term exams and the final exam. Mid-term and final exams consist of questions and tasks. In the final exams students that did not pass the midterm exams take part. The midterm and final exams are carried out as written tests. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on each midterm exam or the final exam. Grade (in percentage) is formed according to the formula: Grade (%) = 0.5 * M1 + 0,5 * M2; M1, M2 - points at the mid-term expressed as a percentage. The final evaluation is determined as follows: percentage Rating 50% to 61% is sufficient (2) 62% to 74% good (3) 75% to 87% of very good (4) 88% 100% Excellent (5)

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Thomas M. Cover, Joy A. Thomas, Elements of Information Theory, John Wiley & Sons		
	L. W. Couch II: Digital and Analog Communication Systems		

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

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">INFORMATION THEORY</td></tr>
<tr><td>Code</td><td>FELA33</td><td>Year of study</td><td colspan="5">3.</td></tr>
<tr><td>Course teacher</td><td>Mladen Russo, Ph.D., Assistant Professor</td><td>Credits (ECTS)</td><td colspan="5">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Petar Šolić, Ph.D., Assistant Professor</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td>0</td><td>0</td><td>30</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="5"></td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- understanding the information source model
- understanding and defining measures of information
- understanding basic encryption techniques
- understanding problems of information transmission over noisy channels
- understanding and application of basic signal processing techniques</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">Passed exam in Information and communications.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- define the information source model, information content and capacity
- construct a Markov model of an information source
- calculate information content, source capacity, information content over a noisy channel
- define encryption techniques
- define the optimal betting strategy</td></tr>
<tr><td rowspan="20">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Course content</td><td>L or S hours</td><td>AE hours</td></tr>
<tr><td colspan="5">Information source models, Markov models</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Redundancy, conditional information content, artificial and natural languages</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Information media, continuous and discrete information systems</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Models of information sources and examples</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Entropy, information content and source capacity, source coding</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Encryption and cryptography</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Noisy channels, binary symmetric channel (BSC)</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Detection and correction of errors</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Games of chance and entropy</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Deterministic and stochastic signals and systems</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Signal analysis and processing, Fourier transform</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">A/D conversion, FFT and DFT</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Linear dynamic and stochastic systems in time and frequency domain</td><td>2</td><td>0</td></tr>
<tr><td colspan="6"></td><td>LE or DE hours</td></tr>
<tr><td colspan="6">Information source models, Markov models</td><td>2</td></tr>
<tr><td colspan="6">Redundancy, conditional information content, artificial and natural languages</td><td>2</td></tr>
<tr><td colspan="6">Information media, continuous and discrete information systems</td><td>2</td></tr>
<tr><td colspan="6">Models of information sources and examples</td><td>2</td></tr>
<tr><td colspan="6">Entropy, information content and source capacity, source coding</td><td>2</td></tr>
</table>

<table>
<tr><td rowspan="8"></td><td colspan="5">Encryption and cryptography</td><td>2</td></tr>
<tr><td colspan="5">Noisy channels, binary symmetric channel (BSC)</td><td>2</td></tr>
<tr><td colspan="5">Detection and correction of errors</td><td>2</td></tr>
<tr><td colspan="5">Games of chance and entropy</td><td>2</td></tr>
<tr><td colspan="5">Deterministic and stochastic signals and systems</td><td>2</td></tr>
<tr><td colspan="5">Signal analysis and processing, Fourier transform</td><td>2</td></tr>
<tr><td colspan="5">A/D conversion, FFT and DFT</td><td>2</td></tr>
<tr><td colspan="5">Linear dynamic and stochastic systems in time and frequency domain</td><td>2</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">☐ independent assignments
☐ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>3</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work</td><td>1,7</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Tests</td><td>0,2</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>0,1</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">During 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(%) = 0,25*M1+0,25*M2 + 0,5*M3; M1, M2 – midterm test results, M3 – laboratory test results.
The final grade is determined as follows:
Percentage Grade
50% to 61% sufficient (2)
62% to 74% good (3)
75% to 87% very good (4)
88% to 100% excellent (5)</td></tr>
<tr><td rowspan="2">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">N. Rožić: Teorija informacija, internal script</td><td></td><td>e-learning portal</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">Rožić, N.: Teorija informacija, e-book, http://www.fesb.lab405/TINF, Split 2001.
Cover, T.: Elements of Information Theory, J. Wiley & Sons., 1991.
Rožić, N.: Informacije i komunikacije: kodiranje s primjenama, Zagreb, 1992.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Evaluation of results in accordance with the above learning outcomes
- Feedback from students via surveys
- Self-evaluation of teachers
- Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="8">INSTRUMENTATION AND TESTING IN WORK ENVIRONMENT</td></tr>
<tr><td>Code</td><td>FENA22</td><td>Year of study</td><td colspan="6">3</td></tr>
<tr><td>Course teacher</td><td>Tonko Garma, Ph.D.
Assistant Professor</td><td>Credits (ECTS)</td><td colspan="6">4</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">-</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td colspan="2">DE</td></tr>
<tr><td>30</td><td>0</td><td>0</td><td>15</td><td colspan="2">0</td></tr>
<tr><td>Status of the course</td><td>Elective</td><td>Percentage of application of e-learning</td><td colspan="6">0</td></tr>
<tr><td colspan="9">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="8">Training students for:
- Understanding concepts related to instrumentation and testing of the working environment
- Independent measurements of quantities determining quality of the working environment
- Independent evaluation of the measurement results with respect to legislation
- Suggestion of actions leading towards improvement of working environment quality</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="8">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="8">Students will be able to:
- Apply basic indicators of the working environment quality
- Comment methods for measurements of the working environment quality parameters
- Applying software tools, simulate outcome of the actions for the working environment quality improvement
- Conduct measurements of the relevant working environment quality quantities
- Analyze measurement results
- Suggest actions for the working environment quality improvement</td></tr>
<tr><td rowspan="12">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Course content</td><td>L or S hours</td><td>AE hours</td></tr>
<tr><td colspan="6">Introduction: Basic concepts regarding instrumentation and quantities in area of working environment and safety at work</td><td>2</td><td></td></tr>
<tr><td colspan="6">Legislation overview</td><td>2</td><td></td></tr>
<tr><td colspan="6">Safety at work environment: physical noxiousness</td><td>2</td><td></td></tr>
<tr><td colspan="6">Safety at work environment: chemical noxiousness</td><td>2</td><td></td></tr>
<tr><td colspan="6">Quantities in work environment quality measurements (lighting level, sound level, vibrations, gas concentrations, smoke and particle content, micro-climatic parameters (temperature, humidity, ionizing and non-ionizing radiation)</td><td>2</td><td></td></tr>
<tr><td colspan="6">Instrumentation and sensors (optoelectronic, electrochemical, infrared, ultraviolet and thermoelectric converters)</td><td>2</td><td></td></tr>
<tr><td colspan="6">Instrumentation and sensors (field and laboratory instruments, monitors, single- and multi-parameter analyzers and loggers)</td><td>2</td><td></td></tr>
<tr><td colspan="6">Measurements in working environment: contact-free measurements (lighting level, sound level, temperature, humidity, ionizing and non-ionizing radiation)</td><td>2</td><td></td></tr>
<tr><td colspan="6">Measurements in working environment: contact measurements (vibrations, gas concentrations, smoke and particle content)</td><td>2</td><td></td></tr>
<tr><td colspan="6">Measurements in working environment: measurement uncertainty</td><td>2</td><td></td></tr>
<tr><td colspan="6">Actions for improving working environment: technical protection actions</td><td>2</td><td></td></tr>
</table>

	Actions for improving working environment: personal protection actions	2	
	Evaluation of the measurement results regarding legislation	2	
	List of laboratory or design exercises		LE or DE hours
	Measurements of the lighting level and nose level		2
	Measurements of the temperature and relative humidity		1
	Measurements of the non-ionizing radiation for LF applications		2
	Measurements of the vibrations		1
	Measurements of the ionizing radiation (Alpha, Beta and Gamma)		2
	Measurements of the gas content		1
	Measurement of the airborne particle content		2
	Independent work		4

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

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1	Research		Practical training	-
	Experimental work		Report		Independent work	1
	Essay		Seminar essay	0,5	Laboratory exercises	1
	Tests	0,5	Oral exam		(Other)	
	Written exam		Project		(Other)	

Grading and evaluating student work in class and at the final exam	Student grade is derived from seminar essay and quality of independent work. Pre-conditions for passing the exam are positive essay and practical skills.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	1.Tonko Garma, " Instrumentacija u radnom okolišu ", FESB, Split, 2014. (ppt prezentacija) 2. Legislation (Official Gazette)		e-learning portal, Internet

Optional literature (at the time of submission of study programme proposal)	- M. Brezinšcak: Mjerenje i računanje u tehnici i znanosti, Tehnicka knjiga, Zagreb, 1970. - Michael J. McGrath, Cliodhna N. Scanaill, „Sensor Technologies: Healthcare, Wellness and Environmental Applications (Expert's Voice in Networked Technologies)“, Apress Open, 2013.
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	INSTRUMENTATION FOR SMART GRID						
Code	FENA23	Year of study	3.				
Course teacher	Goran Petrović, Ph.D., Associate Professor	Credits (ECTS)	4				
Associate teachers	Juraj Alojzije Bosnić, assistant	Type of instruction (number of hours)	L	S	AE	LE	DE
			30	0	0	15	0
Status of the course	Elective	Percentage of application of e-learning	0				

COURSE DESCRIPTION

Course objectives	Training students for: - using Dynamic Signal Analyser - using Power Quality instruments - creating simple virtual instruments.
Course enrolment requirements and entry competences required for the course	passed exam: Electrical measurement
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - use multimeter and digital oscilloscope - use Dynamic Signal Analyzer - use PQ meter with harmonics and flicker - understand syncrophasor and their applications - create virtual instrument in Labview. - describe basic properties of IEC 61850 protocol

Course content broken down in detail by weekly class schedule (syllabus)			
	Course content	L hours	AE hours
	Inductive and electronic voltage and current instrument transformers.	2	0
	Analog transducers of power system quantities.	2	0
	Principles of Sigma Delta, Successive Approximation and Integration type of Analog to digital converters.	2	0
	Mathematical algorithms for calculation of RMS voltage and current, active and reactive power.	2	0
	Reactive power compensation, and suppression of high harmonics. RLC parameters of linear networks.	2	0
	Mathematical algorithms for calculation of voltage and current, spectrum. Total Harmonic Distortion. Flicker.	2	0
	Power quality and instrumentation for PQ. Systems for supervisory control and data acquisition.	2	0
	First midterm exam		
	Introduction to LabVIEW environment. Data types. Simple LabVIEW application for acquire analyze and present data.	2	0
	Using Loops and Decision-Making Structures. Shift registers. Vectors, Arrays, Matrices.	2	0
	Modular programming in LabVIEW. Acquiring Measurements and signal processing with ELVIS and cDAQ Hardware.	2	0
	Implementing File I/O functions to read and write data to files. Automatic report generation.	2	0
	Embedded Control and Monitoring Using LabVIEW. Accessing I-O Through the FPGA	2	0
	Phasor measurement techniques. Synchrophasors and their applications. Extensible Markup Language and IEC 61850 protocol.	2	0
	Second midterm exam		
	List of laboratory exercises		LE hours
	Transient measurements with digital oscilloscope HP 54501A		2

	Harmonic measurements and Network analysis using HP 35655A	2
	Using PQ meter ION 7650	2
	Distant measurement with ALFA via ethernet	2
	Introduction to LabVIEW environment. Data types. Using Loops, Structures.	2
	Shift registers. Vectors, Arrays, Matrices. Modular programming in LabVIEW. Connection instruments into Labview.	2
	Creating network publish variables. User interface creation. Automatic report generation.	2
	Practical skills exam	1

Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☒ multimedia ☒ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1	Research		Practical training	
	Experimental work		Report		Individual work	2
	Essay		Seminar essay		Laboratory exercises	0,5
	Tests	0,5	Oral exam		Preparation for laboratory exercises	0,5
	Written exam	0,5	Project		(Other)	

Grading and evaluating student work in class and at the final exam	There are one midterms exams that is carried out, after 7 weeks of lecturing. Second midterms exam is after laboratory exercises. First midterms exam is written exam and consists of 5 theoretical questions and numerical problems. Second midterm exam is evaluated as knowing Labview programing language. Grade (in percentage) is formed according to the formula: Grade(%) = 0,5 (M1 + M2) the activities in percentage: • M1, M2 – test results.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	G. Petrović: Skripta s predavanja, FESB		e-learning portal

Optional literature (at the time of submission of study programme proposal)	Paulo F. Ribeiro, Paulo Marcio da Silveira, … : Power Systems Signal Processing for Smart Grids, John Wiley & Sons Ltd., 2014. A.G. Phadke, J.S. Thorp: Synchronized Phasor Measurements and Their Applications, Springer, 2008. LabVIEW Basics I Introduction Course Manual
Quality assurance methods that ensure the acquisition of exit competences	- Evaluation of results in accordance with the above learning outcomes - Feedback from students via surveys - Self-evaluation of teachers - Institutional and non-institutional evaluations
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">INTERNET PROGRAMMING</td></tr>
<tr><td>Code</td><td>FELA14</td><td>Year of study</td><td colspan="5">3</td></tr>
<tr><td>Course teacher</td><td>Darko Stipaničev, Ph.D., Full Professor
Ljiljana Šerić, Ph.D., Assistant Professor</td><td>Credits (ECTS)</td><td colspan="5">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Marin Bugarić, Ph.D., Senior Research Assistant
Andrija Sommer, mag.ing</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td>0</td><td>0</td><td>30</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="5">30</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- Understanding the operating principles of the Internet
- Preparation and processing of data and information for publication on the Web
- Designing, editing and maintenance of the content published on the web
- Write simple scripts for dynamic web content on.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">Completed courses:
Programming 1
Programming 2</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
1. Appoint communication protocols used on the Internet
2. Describe the steps of the TCP / IP protocol
3. Identify elements of HTML code
4. Design and write HTML code of Web sites consisting of several web pages
5. Write an external CSS document with instructions for the design of the sites
6. Write simple JavaScript code that dynamically modifies website
7. Explain the difference between client and server scripting technology</td></tr>
<tr><td rowspan="21">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Course content</td><td>L or S hours</td><td>AE hours</td></tr>
<tr><td colspan="5">Introduction. History of the Internet. Internet Communication protocols</td><td>6</td><td></td></tr>
<tr><td colspan="5">HTML language for web page development. HTML5</td><td>4</td><td></td></tr>
<tr><td colspan="5">CSS style language. CSS3</td><td>4</td><td></td></tr>
<tr><td colspan="5">XML, XHTML</td><td>2</td><td></td></tr>
<tr><td colspan="5">JavaScript, DOM</td><td>4</td><td></td></tr>
<tr><td colspan="5">Ajax</td><td>2</td><td></td></tr>
<tr><td colspan="5">jQuerry</td><td>2</td><td></td></tr>
<tr><td colspan="5">PHP</td><td>2</td><td></td></tr>
<tr><td colspan="5">Overview of other tehnologijes for web page programming</td><td>2</td><td></td></tr>
<tr><td colspan="6">List of laboratory or design exercises</td><td>LE or DE hours</td></tr>
<tr><td colspan="6">Introduction. History of the Internet. Internet Communication protocols</td><td>2</td></tr>
<tr><td colspan="6">HTML language for web page development. HTML5</td><td>4</td></tr>
<tr><td colspan="6">CSS style language. CSS3</td><td>4</td></tr>
<tr><td colspan="6">XML, XHTML</td><td>2</td></tr>
<tr><td colspan="6">JavaScript, DOM</td><td>2</td></tr>
<tr><td colspan="6">Ajax</td><td>2</td></tr>
<tr><td colspan="6">jQuerry</td><td>2</td></tr>
<tr><td colspan="6">PHP</td><td>2</td></tr>
<tr><td colspan="6">Overview of other tehnologijes for web page programming</td><td>2</td></tr>
<tr><td colspan="6"></td><td></td></tr>
<tr><td>Format of instruction</td><td colspan="2">☒ lectures</td><td colspan="5">☒ independent assignments</td></tr>
</table>

<table>
<tr><td></td><td colspan="3">☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">☒ multimedia
☐ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">The presence on lectures in the amount of at least 70 % of the times scheduled.
Performed all required laboratory exercises.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>2</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work (Other)</td><td>2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Laboratory exercises (Other)</td><td>0,5</td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>Preparation for laboratory exercises (Other)</td><td>0,5</td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">During the semester there will be two mid-term exams (tests). The first mid-exam will be held after 7 weeks of classes, the second after the next 6 weeks. Mid-term exams are written on a computer and consists of 20 random questions to be answered.
At the final exam students can take only parts of material that they did not pass in the mid-term exams
At the final exam ar autmn students take the whole subject matter of the course.
The requirement for passing grade is positively evaluated seminar paper and at least 60% of points achieved on the mid-term / final exam.
The number of points is calculated as the arithmetic average of the two mid-term exams, or the number of points the entire final exam.
The final grade is determined as follows:
Percentage Rating
60% to 69% is sufficient (2)
70% to 79% good (3)
80% to 89% very good (4)
90% 100% Excellent (5)</td></tr>
<tr><td rowspan="4">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">Lj.Šerić, Programiranje za Internet, predavanj, FESB</td><td></td><td>e-learning portal</td></tr>
<tr><td colspan="4">M.Bugarić, upute za laboratorijske vježbe, FESB</td><td></td><td>e-learning portal</td></tr>
<tr><td colspan="4">http://www.w3schools.com</td><td></td><td>web</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">D. Sušanj, D. Petric: "Velika knjiga o Worl Wide Webu", Znak, Zagreb 1996. g.
L. Abrus ,"Irada weba, abeceda za Webmastere",BUG&SysPrint, Zagreb,2003
Comer, D.E.: The Internet Book, Prentice Hall, 2000.
Zeid, I.: Mastering the Internet & HTML, Prentice Hall, 2000.
Deitel, Deitel & Neto, Internet & WWW – How to Program, Prentice Hall, 2000.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">• Keeping records of the class attendance
• Annual review of the performance of exam
• Student survey in order to evaluate teachers
• Self-evaluation of teachers
• Feedback from students who have already graduated from about the relevance of the course content</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">INTRODUCTION TO WIRELESS COMMUNICATIONS</td></tr>
<tr><td>Code</td><td>FELA46</td><td>Year of study</td><td colspan="5">3.</td></tr>
<tr><td>Course teacher</td><td>Antonio Šarolić, Ph.D., Full Professor</td><td>Credits (ECTS)</td><td colspan="5">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Niko Ištuk, mag. ing. el.</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td></td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>elective</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- understanding the principles of radio signal propagation
- understanding the principles of wireless signal transmission
- understanding all the components of transmitters and receivers
- understanding the important present and emerging wireless communication systems</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- elaborately assess the applicability of a certain antenna for specific purpose
- characterize the frequency bands from the aspect of specific radio system features and needs
- calculate the budget of a wireless link between the transmitter and the receiver
- analyze and compare the characteristics of different radiocommunication systems</td></tr>
<tr><td rowspan="23">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Course content</td><td>L or S hours</td><td>AE hours</td></tr>
<tr><td colspan="5">Introduction and history of wireless communications. Radiation phenomena. Antennas – parameters and elementary radiation sources.</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Antennas – overview of types and frequency.</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Antenna systems.</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Radio spectrum.</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Radio signal propagation. Terrestrial and satellite links.</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Analog modulation procedures.</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Digital modulation procedures.</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Radiocommunication system configuration.</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Theoretical basis of radiocommunication systems. Radio channel. Broadcasting network operation principles.</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Mobile telephony network operation principles.</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Overview of presently operating and emerging systems: GSM, UMTS, LTE.</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Overview of presently operating and emerging systems: Wi-Fi, WIMAX, Bluetooth.</td><td>2</td><td>0</td></tr>
<tr><td colspan="5">Overview of presently operating and emerging systems: RFID, DVB, UWB, GPS, TETRA.</td><td>2</td><td>0</td></tr>
<tr><td colspan="6">List of laboratory or design exercises</td><td>LE or DE hours</td></tr>
<tr><td colspan="6">Antennas – parameters and elementary radiation sources.</td><td>2</td></tr>
<tr><td colspan="6">Antennas – overview of types and frequency.</td><td>2</td></tr>
<tr><td colspan="6">Antenna systems.</td><td>2</td></tr>
<tr><td colspan="6">Radio spectrum.</td><td>2</td></tr>
<tr><td colspan="6">Radio signal propagation. Terrestrial and satellite links.</td><td>2</td></tr>
<tr><td colspan="6">Analog modulation procedures.</td><td>2</td></tr>
<tr><td colspan="6">Digital modulation procedures.</td><td>2</td></tr>
</table>

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

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.		
	David Tse and Pramod Viswanath: Fundamentals of Wireless Communication, Cambridge University Press, 2005.		
Optional literature (at the time of submission of study programme proposal)	- Ramjee Prasad: Technology Trends in Wireless Communications, Artech House, 2003. - 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	**MAINTENANCE AND TESTING OF ELECTRICAL POWER EQUIPMENT**		
Code	FENA18	Year of study	3.
Course teacher	Božo Terzić, Ph.D., Full Professor	Credits (ECTS)	4
Associate teachers	Goran Majić, Ph.D.	Type of instruction (number of hours)	L: 30, S: 0, AE: 0, LE: 15, DE: 0
Status of the course	Elective	Percentage of application of e-learning	0

Type of instruction (number of hours)	L	S	AE	LE	DE
	30	0	0	15	0

COURSE DESCRIPTION

Course objectives	Training students for: - understanding the methods and procedures of testing and maintenance of electrical equipment, - permanent adoption and deepening of knowledge in the field of electrical equipment testing, - using electrical test equipments.
Course enrolment requirements and entry competences required for the course	Entry competences: - Basic knowledge of the courses Fundamentals of Power Engineering - Basic knowledge of the course Electrical Machines - Basic knowledge of the course Power Plant
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - use the instruments and other measuring equipment during testing, - test electrical equipment using methods that are studied in the course, - analyse and comment on the measurement results - assess the condition of tested equipment based on test results, - create and write the detailed report about measurement results.

Course content broken down in detail by weekly class schedule (syllabus)	Course content	L hours	AE hours
	Standardisation. International and national organizations for standardization (ISO, IEC, EN). Croatian state office for standardization and metrology (DZNM).	2	0
	The program of preventive maintenance and testing of electrical equpment. Organization of maintenance service of electrical equipement.	2	0
	Isolation testing with DC voltage. Dielectrics. Low-voltage and high-voltage testing of transformers, cables and electrical machines.	2	0
	Isolation testing with AC voltage. Power and dissipation factor. Power factor measurements of transformers, cables and electrical machines.	2	0
	Types and construction of cables. Cable faults. Methods for determining type and location of the cable fault.	2	0
	Type of transformers. Preventive maintenance of transformer. Failure diagnostics of transformer. Drying of transformer.	2	0
	Testing of transformer – testing of inter-turn isolation, determination of vector group, measuring turns ratio, testing of liquid isolation.	2	0
	First midterm exam		
	Testing of electric machines – Isolation system, heating measurement, testing of inter-turn isolation, testing of iron core, on-line testing.	2	0
	Testing of switching power apparatus – basic types of switching apparatus, type tests, routine tests, field tests.	2	0
	Vibration testing – physical basis, measuring methods, equipment for vibration measurement, diagnostic of irregular vibration states of electric machines.	2	0

	Noise measurement - Physical basis of noise, measuring methods and equipment for noise measurement, source of noise in electrical machines.	2	0
	Thermal imaging of electrical equipment- Physical basics of thermography. Thermal imaging cameras. Examples of thermal imaging recording of electrical machines, transformers and electrical connections.	2	0
	On-line monitoring of electrical equipment. Examples of hydrogenerator and transformer monitoring system.	2	0
	Second midterm exam		
	List of laboratory exercises		LE hours
	The study of websites of international and national standards organization (ISO, IEC, DZNM)		2
	Measurement of isolation resistance of transformers, cables and electrical machines		2
	Testing of inter-turn isolation of electric machines		2
	Thermal imaging of power converter		2
	Type testing of switching apparatus		2
	Vibration measurement and diagnostic of electric machines		2
	Noise measurement of electric machines		3

Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia ☒ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1	Research		Practical training	
	Experimental work		Report		Individual work	1,7
	Essay		Seminar essay		Laboratory exercises	0,5
	Tests	0,2	Oral exam		Preparation for laboratory exercises	0,5
	Written exam	0,1	Project		(Other)	

Grading and evaluating student work in class and at the final exam	There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. At the final exams students take part of course that did not pass the midterm exams. Each midterm test is carried out as written tests with duration of 60 minute and it consists of 8 questions. The requirement for passing grade is the positive assessment of laboratory exercises and 50 % points on each midterm exam. Final grade (in percentage) is formed according to the formula: Grade(%) = 0,2 LV + 0,4 (M1 + M2) where the activities in percentage: • LV – laboratory assessment, • M1, M2 – midterm points. The final grade is determined according to the following criteria: • 50-62% - sufficient (2) • 63-75% - good (3) • 76-88% - very good (4) • 89-100% - excelent (5) Students who did not pass the exam after two final exams take a makeup exam in the autumn period on which takes the whole exam. The exam consists 10 theoretical questions and lasts 90 minutes. The percentage grade is determined by the formula: Grade(%) = 0,2 LV + 0,8 PI where PI is percentage grade of makeup exame. The final grade is determined by the same criteria as for the two final exams.

Required literature (available in the library and via other media)	Title	Number of copies in the library	Availability via other media
	1. B. Terzić: Authorized lectures, FESB		e-learning portal
Optional literature (at the time of submission of study programme proposal)	1. Ž. Novinc, A. Halep: Tehnička dijagnostika i monitoring u industriji, Kigen, Zagreb, 2010. 2. P. Gill: Electrical Power Equipment Maintenance and Testing, Marcel Dekker, Inc, New York, Basel, 1998. 3. N. Srb: Ispitivanje i prematanje elektromotora, Graphis, Zagreb. 4. K. Meštrović: Sklopni aparati srednjeg i visokog napona, Graphis, Zagreb		
Quality assurance methods that ensure the acquisition of exit competences	- Evaluation of results in accordance with the above learning outcomes - Feedback from students via surveys - Self-evaluation of teachers - Institutional and non-institutional evaluations		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">MARINE ELECTRICAL ENGINEERING</td></tr>
<tr><td>Code</td><td>FENA20</td><td>Year of study</td><td colspan="5">3.</td></tr>
<tr><td>Course teacher</td><td>Slavko Vujević, Ph.D.,
Full Professor</td><td>Credits (ECTS)</td><td colspan="5">4</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td>0</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Elective</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for understanding and application of specialized knowledge of:
- marine electrical devices and systems,
- marine electrical equipment,
- marine electrical installations.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- describe the basic principles of ship’s electric power generation,
- describe the basic principles of ship’s electric power transmission and distribution,
- describe the basic principles of ship's electric power consumption,
- describe high voltage power system on ships,
- define safety rules for working with electrical equipment on ships,
- compare the features of marine power systems and terrestrial power systems,
- use the normative documents in the field of marine electrical engineering,
- apply the requirements of classification societies and the requirements of national maritime administrations.</td></tr>
<tr><td rowspan="16">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Course content</td><td colspan="2">L hours</td></tr>
<tr><td colspan="5">Specific features of the ship's electric power system. Marine electric power generation.</td><td colspan="2">2</td></tr>
<tr><td colspan="5">Marine electric propulsion.</td><td colspan="2">4</td></tr>
<tr><td colspan="5">Marine electric power transmission and distribution.</td><td colspan="2">6</td></tr>
<tr><td colspan="5">Marine electric power consumption.</td><td colspan="2">4</td></tr>
<tr><td colspan="5">Marine instrumentation.</td><td colspan="2">2</td></tr>
<tr><td colspan="5">Ship's high voltage electric power system.</td><td colspan="2">4</td></tr>
<tr><td colspan="5">The dangers of electricity. Protection and safety measures when working with electrical equipment. Safety and security measures on ships.</td><td colspan="2">2</td></tr>
<tr><td colspan="5">Standardization of marine electrical engineering through IEC and ISO. Requirements of classification societies and requirements of national maritime administrations.</td><td colspan="2">2</td></tr>
<tr><td colspan="5">Two midterm exams</td><td colspan="2"></td></tr>
<tr><td colspan="5">List of laboratory exercises</td><td colspan="2">LE hours</td></tr>
<tr><td colspan="5">Marine electric power generation</td><td colspan="2">3</td></tr>
<tr><td colspan="5">Marine electric propulsion</td><td colspan="2">3</td></tr>
<tr><td colspan="5">Marine electric power transmission and distribution</td><td colspan="2">3</td></tr>
<tr><td colspan="5">Marine electric power consumption</td><td colspan="2">3</td></tr>
<tr><td colspan="5">Safety and security measures on ships</td><td colspan="2">3</td></tr>
<tr><td>Format of instruction</td><td colspan="2">☒ lectures
☐ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="5">☐ independent assignments
☒ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
</table>

<table>
<tr><td>Student responsibilities</td><td colspan="6">Attendance on lectures in the amount of at least 70 % of the times scheduled.
Performed all required laboratory exercises.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1.5</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work</td><td>1.7</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Laboratory exercises</td><td>0.4</td></tr>
<tr><td>Tests</td><td>0.2</td><td>Oral exam</td><td></td><td>Preparation for laboratory exercises</td><td>0.1</td></tr>
<tr><td>Written exam</td><td>0.1</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">There are two midterm exams. After two midterm exams, student can pass the entire exam. In the two final exams students take course parts that they did not pass in the preliminary exams. If in the first final exam student passes one of the two course parts, that course part the student does not have to take in the second final exam. The requirement for a positive evaluation of the course part is that the student has completed at least 50 % points from that course part. The final grade (in percentage) can be calculated using the formula:
Grade (%) = 0.1*LV + 0.45*(G1 + G2)
where activities in percentage are: LV - laboratory assessment, G1 - points from the first course part, G2 - points from the second course part.
Students who did not pass the entire exam after two final exams can pass the exam in the additional exams. In the two additional exams students take the entire course. The requirement for a positive assessment of the additional exams is that the student has completed at least 50 % points from the entire course. The final grade (in percentage) can be calculated using the formula:
Grade (%) = 0.1*LV + 0.9*G
where activities in percentage are: LV - laboratory assessment, G - points from the entire course.
The final grade can be calculated as follows:
• 50 % to 61 % - pass (2)
• 62 % to 74 % - good (3)
• 75 % to 87 % - very good (4)
• 88 % to 100 % - excellent (5)
Each of the midterm exams consists of ten theoretical questions. Two final exams and two additional exams consist of twenty theoretical questions.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">Vujević, S., "Predavanja iz predmeta Brodska elektrotehnika (113)", Sveučilište u Splitu, FESB, Split, 2014. (lecture notes – electronic version)</td><td></td><td>e-learning portal</td></tr>
<tr><td colspan="4">Milković, M.,"Brodski električni strojevi i uređaji", Sveučilište u Dubrovniku, Dubrovnik, 2005.</td><td>5</td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">• Hall, D.T., "Practical Marine Electrical Knowledge - Second Revised Edition", Witherby & Co Ltd, 1999.
• McGeorge, H.D., "Marine Electrical Engineering and Practice - Second Edition", Butterworth-Heinemann, 1993.
• Skalicki, B. i Grilec, J., "Brodski električni uređaji", Sveučilište u Zagrebu, FSB, Zagreb, 2000.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">• Evaluation of results in accordance with the above learning outcomes
• Feedback from students via surveys
• Self-evaluation of teachers
• Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">MATHEMATICS 1</td></tr>
<tr><td>Code</td><td>FEMX01</td><td>Year of study</td><td colspan="5">1</td></tr>
<tr><td>Course teacher</td><td>Ivan Slapničar, Ph.D., Full Professor, Anita Matković, Ph.D., Associate Professor,
Josipa Barić, Ph.D., Assistant Professor.</td><td>Credits (ECTS)</td><td colspan="5">7</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Ph.D. Nevena Jakovčević Stor, Irena Bego, Anita Carević, Marija Čatipović, Lea Dujić, Ivana Grgić, Lana Periša, Marina Mandić, Dajana Radišić, Mirjana Strukan, Stjepan Vedran Vukasović, Vanja Županović.</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>45</td><td></td><td>45</td><td></td><td></td></tr>
<tr><td>Status of the course</td><td>obligatory</td><td>Percentage of application of e-learning</td><td colspan="5">10</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- application of mathematical concepts and tools from the area of linear algebra, vector calculus, analytic geometry, diferential calculus, analysis of real functions of real variable, sequences and series of numbers and functions, to solving engineering problems.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">Good knowledge of High School mathematics and passed State Exam in Mathematics.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- state definitions and theorems from the enitre course,
- reproduce proofs of basic theorems,
- illustrate theorems with examples,
- solve systems of linear equations,
- apply vector calculus to analytical geometry of space,
- interpret derivatives mathematically, geometrically and physically,
- analyse functions of one variable,
- test convergence of sequences and series of numbers and functions.</td></tr>
<tr><td rowspan="8">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="3">Course content</td><td colspan="2">L or S hours</td><td colspan="2">AE hours</td></tr>
<tr><td colspan="3">1. Introduction. Relations. Functions. Sets of numbers, complex numbers, trigonometric form of complex number, Moivre formulas.</td><td colspan="2">3</td><td colspan="2">3</td></tr>
<tr><td colspan="3">2. Matrices. Basic operations with matrices. Matrix formulation of system of linear equations. Gaussian elimination. Linear independence and rank of a matrix. Kronecker-Capelli theorem.</td><td colspan="2">3</td><td colspan="2">3</td></tr>
<tr><td colspan="3">3. Inverse matrix. Determinants. Submatrices and subdeterminants. Laplace expansion of a determinant. Cramer's rule.</td><td colspan="2">3</td><td colspan="2">3</td></tr>
<tr><td colspan="3">4. Vectors. Basic operations with vectors. Coordinate system. Unit vector and cosines of directions. Linear independence of vectors and basis of a space. Scalar (dot) product, vector product and mixed product.</td><td colspan="2">3</td><td colspan="2">3</td></tr>
<tr><td colspan="3">5. Equations of a line. Equations of a plane. Applications of analytic geometry.</td><td colspan="2">3</td><td colspan="2">3</td></tr>
<tr><td colspan="3">6. Functions of a real variable: defining function, classification of functions. Limits and continuity. Asymptotes. Review of elementary functions.</td><td colspan="2">3</td><td colspan="2">3</td></tr>
<tr><td colspan="3">7. Derivatives. Tangent and normal. Differential and approximate computation.</td><td colspan="2">3</td><td colspan="2">3</td></tr>
</table>

	8. Higher derivatives and differentials. Derivatve of a parametric function. Theorems of differential calculus (Fermat, Rolle, Cauchy, Lagrange). L'Hospital's rule and limits of undetermined forms.	3	3
	9. Monotonicity. Necessary and sufficient conditions for extrema. Geometrical extrema.	3	3
	10. Curvature. Sufficient condition for convexity and concavity. Necessary and sufficient conditions for inflection points. Examining functions and drawing graphs.	3	3
	11. Sequences of real numbers. Basic inequality of convergence. Accumulation point and sub-sequence. Boundedness, monotonicity and convergence. Properties of limits. Cauchy series. Some important limits.	3	3
	12. Series of real numbers. Sufficient condition for convergence. Convergence criteria. Absolute convergence. Alternating series.	3	3
	13. Sequences of functions. Series of functions. Power series and convergence radius. Differentiating series of functions. Taylor series and applications.	3	3
	List of laboratory or design exercises		LE or DE hours

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

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	3	Research		Practical training	
	Experimental work		Report		Self study	3.6
	Essay		Seminar essay		(Other)	
	Tests	0.2	Oral exam		(Other)	
	Written exam	0.2	Project		(Other)	

Grading and evaluating student work in class and at the final exam	During semester two mid-term exams are held. The first exam is scheduled after 7 weeks of lectures, and the second in the week following the lectures. At each mid-term exam students can get 40 points, while the remaining 20 points are attained through assignements during lectures and excercises. The condition for passing the course is minimum 20 points on each mid-term exams and a total of at least 50 points. After semester, two final exams and a correction exam are held. Students which did not pass one mid-term exam, can take only this part of the exam during final exams. Student which did not pass any mid-term exam, take the final exam with comprehensive course content. In that case, masimum numbers of available points is 80. The condition for passing the course is minimum 40 points in the final exam and a total of at least 50 points. The grade is formed after the second final exam according to article 75 of the Statute of FESB: 15% of the best students get the mark excellent (5), next 35% students get the mark very good (4), next 35% students get the mark good (3), and the last 15% students get thet mark sufficient (2).

	Students who did not pass the course after final exams, and have obtained total of at leat 10 points, can attend the correction exam. On the correction exam maximal number of points is 100, and the minimum requirement for a passing grade is 50 points. Mid-term exams, final exams and correction exams are held according to the exam schedule.		
Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	I. Slapničar, Matematika 1, FESB, Split, 2002.	20	http://www.fesb.unist.hr/mat1
	I. Slapničar, J. Barić, M. Ninčević, Matematika 1 – zbirka zadataka, FESB, Split, 2010.	20	http://www.fesb.unist.hr/mat1
	Lecture materials on FESB e-learning portal.		httpd://elearning.fesb.unist.hr
Optional literature (at the time of submission of study programme proposal)	- Petar Javor, Matematička analiza 1, Element, Zagreb, 2001. - Luka Krnić i Zvonimir Šikić, Račun diferencijalni i integralni, I. dio, Školska knjiga, Zagreb, 1993. - S. Pavasović i ostali, Matematika - riješeni zadaci, Građevinski fakultet, Split, 1999. - B. P. Demidovič, Zadaci i riješeni primjeri iz više matematike s primjenom na tehničke nauke, Tehnička knjiga, Zagreb, 1995.		
Quality assurance methods that ensure the acquisition of exit competences	- homework - short tests - quizzes - mid-term exams - final exam - student questionnaires		
Other (as the proposer wishes to add)			

NAME OF THE COURSE	**MATHEMATICS 2**		
Code	FEMX02	Year of study	1
Course teacher	Ivan Slapničar, Ph.D., Full Professor, Anita Matković, Ph.D., Associate Professor, Josipa Barić, Ph.D., Assistant Professor.	Credits (ECTS)	7
Associate teachers	Ph.D. Nevena Jakovčević Stor, Irena Bego, Anita Carević, Marija Čatipović, Lea Dujić, Ivana Grgić, Lana Periša, Marina Mandić, Dajana Radišić, Mirjana Strukan, Stjepan Vedran Vukasović, Vanja Županović.	Type of instruction (number of hours)	L: 45; S: ; AE: 45; LE: ; DE:
Status of the course	obligatory	Percentage of application of e-learning	10

	L	S	AE	LE	DE
Type of instruction (number of hours)	45		45		

COURSE DESCRIPTION

Course objectives	Training students for: - application of mathematical concepts and tools from the area of integral calculus, ordinary differential equations, functions of several variables and multiple integrals, to analyze and solve engineering problems.
Course enrolment requirements and entry competences required for the course	Good knowledge of High School mathematics and passed State Exam in Mathematics.
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - state definitions and theorems from the enitre course, - reproduce proofs of basic theorems, - illustrate theorems with examples, - identify integrals which are elementary integrable and solve them. - solve ordinary differential equations and systems of differential equations. - apply differential equations to model population growth, heat conduction, the oscillator and the predator-prey system. - identify quadratic surfaces - analyze the extrema of real functions of several variables. - apply a single and multiple definite integrals to computation of area, curve length, volume and center of gravity in the standard coordinate systems.

Course content broken down in detail by weekly class schedule (syllabus)	Course content	L or S hours	AE hours
	1. Indefinite integrals. Definition and basic properties. Table of basic integrals. Basic techniques of integration.	3	3
	2. Integration of rational functions. Integration of trigonometric functions. Recursive formulae.	3	3
	3. Integration of some irrational functions. Integrating a series of functions. Application of integrals to free fall with air resistance problem.	3	3
	4. Definite integrals. Definition and basic properties. Newton-Leibnitz formulae. Techniques of integration. Improper integrals.	3	3
	5. Application of definite integrals - the length of arc planar curve, volume and surface area of the rotating body. Numerical integration – trapezoid rule, Simpson's rule, Richardson extrapolation.	3	3
	6. The functions of several variables. Definition and basic properties. Domain of the function. Limits and continuity. Quadratic surfaces.	3	3

	7. Partial derivatives. Differentiability. Tangent plane. Extrema of functions of several variables. Conditional extrema.	3	3
	8. Multiple integrals. Basic concepts and definitions. Double integral. Double integral in polar coordinates. Applications of double integral.	3	3
	9. Triple integral. Triple integral in cylindrical and spherical coordinates. Change of variables in multiple integrals.	3	3
	10. Introduction to Differential Equations. Basic concepts and definitions. Examples: modeling population growth, logistic equation, equation of heat conduction, Hooke's law. Equations with separable variables.	3	3
	11. Homogeneous differential equations. Exact differential equations. Integration factor. Linear differential equations of the first order.	3	3
	12. Bernoulli differential equation. Euler method as numerical procedure for solving linear differential equations. Differential equations of second order.	3	3
	13. Linear differential equations of second order with constant coefficients. Example: electronic circuits - harmonic oscillator. Systems of differential equations. Lotka-Volterra equations for predator-prey system.	3	3
	List of laboratory or design exercises		LE or DE hours

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

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	3	Research		Practical training	
	Experimental work		Report		Self study	3.6
	Essay		Seminar essay		(Other)	
	Tests	0.2	Oral exam		(Other)	
	Written exam	0.2	Project		(Other)	

Grading and evaluating student work in class and at the final exam	During semester two mid-term exams are held. The first exam is scheduled after 7 weeks of lectures, and the second in the week following the lectures. At each mid-term exam students can get 40 points, while the remaining 20 points are attained through assignements during lectures and excercises. The condition for passing the course is minimum 20 points on each mid-term exams and a total of at least 50 points. After semester, two final exams and a correction exam are held. Students which did not pass one mid-term exam, can take only this part of the exam during final exams. Student which did not pass any mid-term exam, take the final exam with comprehensive course content. In that case, maximum numbers of available points is 80. The condition for passing the course is minimum 40 points in the final exam and a total of at least 50 points. The grade is formed after the second final exam according to article 75 of the Statute of FESB: 15% of the best students get the mark excellent (5), next 35% students get the mark very good (4), next 35% students get the mark good (3), and the last 15% students get thet mark sufficient (2).

<table>
<tr><td></td><td colspan="3">Students who did not pass the course after final exams, and have obtained total of at least 10 points, can attend the correction exam. On the correction exam maximal number of points is 100, and the minimum requirement for a passing grade is 50 points.

Mid-term exams, final exams and correction exams are held according to the exam schedule.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>I. Slapničar, Matematika 2, skripta, FESB, Split</td><td></td><td>http://www.fesb.unist.hr/mat2</td></tr>
<tr><td>Lecture materials on FESB e-learning portal.</td><td></td><td>https://elearning.fesb.unist.hr</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">- Petar Javor, Matematička analiza 2, Element, Zagreb, 2000.
- Luka Krnić i Zvonimir Šikić, Račun diferencijalni i integralni, I. dio, Školska knjiga, Zagreb, 1993.
- B. P. Demidovič, Zadaci i riješeni primjeri iz više matematike s primjenom na tehničke nauke, Tehnička knjiga, Zagreb, 1995.
- Dž. Lugić, Matematika II: metodički riješeni zadaci i kratki pregled definicija i teorema, FESB, 1999.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">- homework
- short tests
- quizzes
- mid-term exams
- final exam
- student questionnaires</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">MATHEMATICS 3</td></tr>
<tr><td>Code</td><td>FEMX03</td><td>Year of study</td><td colspan="5">2</td></tr>
<tr><td>Course teacher</td><td>Ivan Slapničar, Ph.D., Full Professor,
Anita Matković, Ph.D., Associate Professor,
Josipa Barić, Ph.D., Assistant Professor</td><td>Credits (ECTS)</td><td colspan="5">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Ph.D. Nevena Jakovčević Stor, mr. sc. Ivančica Mirošević, Irena Bego, Anita Carević, Marija Čatipović, Lea Dujić, Ivana Grgić, Lana Periša, Marina Mandić, Dajana Radišić, Mirjana Strukan, Stjepan Vedran Vukasović, Vanja Županović</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td></td><td>30</td><td></td><td></td></tr>
<tr><td>Status of the course</td><td>obligatory</td><td>Percentage of application of e-learning</td><td colspan="5">10</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
application of mathematical concepts and tools from the area of Vector analysis, Fourier analysis and Laplace transformation, to analyze and solve engineering and economy problems.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">Passed courses Mathematics 1 and Mathematics 2.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- state definitions and theorems from the enitre course,
- illustrate basic notions and connections between them with examples,
- apply Hamilton differencial operator on scalar and vector fields,
- calculate line integrals over scalar and vector fields,
- calculate surface integrals over scalar and vector fields,
- represent functions by Fourier series and integral,
- solve differential equations by use of Laplace transformation.</td></tr>
<tr><td rowspan="10">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Course content</td><td>L or S hours</td><td>AE hours</td></tr>
<tr><td colspan="5">1. Vector analysis. Vector functions of scalar variable. Limits and continuity. Derivative and integral.</td><td>2</td><td>2</td></tr>
<tr><td colspan="5">2. Scalar and vector fields. Gradient, divergence and curl. Hamilton and Laplace operator.</td><td>2</td><td>2</td></tr>
<tr><td colspan="5">3. Conservative and solenoidal fields. Sidelong derivatives.</td><td>2</td><td>2</td></tr>
<tr><td colspan="5">4. Line integrals. Curve parametrization. Tangent line. Line integral of a scalar field.</td><td>2</td><td>2</td></tr>
<tr><td colspan="5">5. Line integral of a vector field. Flow, calculation of scalar potential and Green's theorem.</td><td>2</td><td>2</td></tr>
<tr><td colspan="5">6. Surface integrals. Surface parametrization. Tangent plane. Surface integral of a scalar field.</td><td>2</td><td>2</td></tr>
<tr><td colspan="5">7. Surface integral of a scalar field. Gauss and Stokes theorems and their applications.</td><td>2</td><td>2</td></tr>
<tr><td colspan="5">8. Fourir analysis. Periodic functions and periodic extensions. Ortogonal trigonometric systems.</td><td>2</td><td>2</td></tr>
<tr><td colspan="5">9. Fourier series. Dirichlet's conditions. Convergence of Fourier series.</td><td>2</td><td>2</td></tr>
</table>

<table>
<tr><td rowspan="6"></td><td colspan="5">10. Fourer series for even and odd functions. Parseval's equality.</td><td>2</td><td>2</td></tr>
<tr><td colspan="5">11. Fourier integral. Fourier transformation, inverse Fourier transformation theorems and their applications.</td><td>2</td><td>2</td></tr>
<tr><td colspan="5">12. Laplace transformation. Basic properties of Laplace's transformation. Inverse Laplace transformation.</td><td>2</td><td>2</td></tr>
<tr><td colspan="5">13. Convolution. Applications to differential equations.</td><td>2</td><td>2</td></tr>
<tr><td colspan="6">List of laboratory or design exercises</td><td>LE or DE hours</td></tr>
<tr><td colspan="6"></td><td></td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="4">☒ independent assignments
☐ multimedia
☐ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="7">Regular attendence to and active participation in lectures and excercises.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>2</td><td>Research</td><td></td><td>Practical training</td><td colspan="2"></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Self study</td><td colspan="2">2.6</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(Other)</td><td colspan="2"></td></tr>
<tr><td>Tests</td><td>0.2</td><td>Oral exam</td><td></td><td>(Other)</td><td colspan="2"></td></tr>
<tr><td>Written exam</td><td>0.2</td><td>Project</td><td></td><td>(Other)</td><td colspan="2"></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="7">During semester two mid-term exams are held. The first exam is scheduled after 7 weeks of lectures, and the second in the week following the lectures. At each mid-term exam students can get 40 points, while the remaining 20 points are attained through assignements during lectures and excercises. The condition for passing the course is minimum 20 points on each mid-term exams and a total of at least 50 points.

After semester, two final exams and a correction exam are held.
Students which did not pass one mid-term exam, can take only this part of the exam during final exams.

Student which did not pass any mid-term exam, take the final exam with comprehensive course content. In that case, maximum numbers of available points is 80. The condition for passing the course is minimum 40 points in the final exam and a total of at least 50 points. The grade is formed after the second final exam according to article 75 of the Statute of FESB:

15% of the best students get the mark excellent (5),
next 35% students get the mark very good (4),
next 35% students get the mark good (3), and
the last 15% students get thet mark sufficient (2).

Students who did not pass the course after final exams, and have obtained total of at least 10 points, can attend the correction exam. On the correction exam maximal number of points is 100, and the minimum requirement for a passing grade is 50 points.

Mid-term exams, final exams and correction exams are held according to the exam schedule.</td></tr>
</table>

<table>
<tr><td rowspan="5">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>L. Korkut, M. Krnić, M. Pašić, Vektorska analiza, Element, Zagreb, 2014.</td><td>5</td><td></td></tr>
<tr><td>N. Elezović, Fourierov red i integral, Laplaceova transformacija, Element, Zagreb, 2014.</td><td>5</td><td></td></tr>
<tr><td>Ivan Slapničar, Matematika 3, FESB, Split</td><td></td><td>http://www.fesb.unist.hr/mat3</td></tr>
<tr><td>Lecture materials on FESB e-learning portal.</td><td></td><td>https://elearning.fesb.unist.hr/</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">Luka Krnić i Zvonimir Šikić, Račun diferencijalni i integralni, I. dio, Školska knjiga, Zagreb, 1993.
- B. P. Demidovič, Zadaci i riješeni primjeri iz više matematike s primjenom na tehničke nauke, Tehnička knjiga, Zagreb, 1995.
- Dž. Lugić, Matematika II: metodički riješeni zadaci i kratki pregled definicija i teorema, Sveučilište u Splitu, FESB, 1999.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">- homework
- short tests
- quizzes
- mid-term exams
- final exam
- student questionnaires</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

NAME OF THE COURSE	NETWORK ANALYIS						
Code	FELA11	Year of study	3.				
Course teacher	Matko Šarić, Ph.D., Assistant Professor	Credits (ECTS)	5				
Associate teachers	Tomislav Odrljin, dipl.ing Mijo Vrvilo, mag. ing.	Type of instruction (number of hours)	L	S	AE	LE	DE
			30	0	15	15	0
Status of the course	Obligatory	Percentage of application of e-learning	0				

COURSE DESCRIPTION

Course objectives	Training students for: - analysis of electrical networks in steady and transient state - application of Laplace transform - adopting and deepening knowledge in the fundaentals of electrical engineering
Course enrolment requirements and entry competences required for the course	
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - define and apply methods for analysis of linear electrical networks in steady state - define and apply methods for analysis of linear electrical networks in transient state - define and apply Laplace transform for analysis of linear electrical networks in transient state - define parameters of quadripole networks - define basic terms related to the networks with distributed elements

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

Course content	L or S hours	AE hours
Introduction to the analysis of electrical networks. Network elements, the relation of voltage and current, equivalent circuits.	2	1
Network theorems	2	1
Network analysis in the steady state. Methods of network analysis. Equations in the frequency domain.	2	1
The analysis of networks with sinusoidal sources of different frequencies and sources of non sinusoidal periodic activities.	2	1
Analysis of networks in the transient state. Equations in the time domain. Linear differential equations with constant coefficients. The initial and final conditions. Circuits with complexity of the first, second and higher order.	2	1
Equations of state. Application of the Laplace transform in the analysis of transient states.	2	1
Unit functions in electrical networks. Application of the Laplace theorem of real shift.	2	1
Quadripole networks. Primary and secondary parameters.	2	1
Connecting quadripole networks.	2	1
Circuits with distributed elements. Classical communication lines. Distributed parameters.	2	1
Differential equations of homogeneous line. Characteristic impedance and propagation function	2	1
Phase and group velocity. Distortions on the line.	2	1

List of laboratory or design exercises	LE or DE hours
operational Amplifiers	2
Analyses of network with the operational amplifier	2
Transients in electrical circuits	2
Quadripole parameters	2

	Quadripole attenuation						2
	Delay on the line						2
Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work			☐ independent assignments ☐ multimedia ☒ laboratory ☐ work with mentor ☐ (other)			
Student responsibilities							
Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1,5	Research		Practical training		
	Experimental work		Report		Individual work	2,2	
	Essay		Seminar essay		Laboratory exercises	0,5	
	Tests	0,2	Oral exam		Preparation for laboratory exercises	0,5	
	Written exam	0,1	Project				
Grading and evaluating student work in class and at the final exam	There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. 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(%) = 0,25 LV + 0,75 (M1 + M2)/2 the activities in percentage: • LV – laboratory assessment, • M1, M2 – test results. The final grade is defined in the next way: 50% do 63% sufficient (2) 64% do 77% good (3) 78% do 91% very good (4) 92% do 100% excellent (5)						
Required literature (available in the library and via other media)	**Title**				**Number of copies in the library**	**Availability via other media**	
	Biličić L.: Analiza mreža, FESB. Split, 2008.					e-learning portal	
	Biličić L.: Analiza mreža-zbirka zadataka, FESB. Split, 2008.						
Optional literature (at the time of submission of study programme proposal)	Wai-Kai Chen: The Circuits And Filters Handbook, IEEE Press, USA, 1995. Matick R.E.:Transmission Lines For Digital And Communication Network, IEEE Press, 1995. Gilat A.: MATLAB An Introduction With Applications, John Wiley and Sons, Inc.,2005.						
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	**NUMERICAL METHODS IN ELECTRCAL ENGINEERING**							
Code	FELA15	Year of study	1.					
Course teacher	Vicko Dorić, Ph.D., Associate Professor	Credits (ECTS)	5					
Associate teachers	Vicko Dorić, Ph.D., Associate Professor	Type of instruction (number of hours)	L	S	AE	LE	DE	
			30	0	15	15		
Status of the course	Elective	Percentage of application of e-learning	0					
COURSE DESCRIPTION								
Course objectives	Training students for: - understanding of basic principles of engineering numerical modeling, - defining and solving of simple electrical engineering problems using modern numerical methods, - permanent adoption and deepening of knowledge in the field of numerical modeling - applying numerical methods for solving problems in electronics and communications,							
Course enrolment requirements and entry competences required for the course	Physics1 & 2, Mathematics 2 & 3.							
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - define the basic principles of engineering numerical modeling, - apply numerical methods to transient analysis of current circuits, - apply numerical methods for solving 1D static and dynamic engineering problems, - apply numerical methods for solving 2D static engineering problems, - calculate frequency response of transmission lines using Finite difference method (FD) and Finite element method (FEM), - evaluate wire antenna frequency response using Boundary element method (BEM) - develop simple codes and using commercial software packages for solving problems in electronics and communications.							

Course content broken down in detail by weekly class schedule (syllabus)	Course content	L or S hours	AE hours
	Introduction to the numerical modeling. Sources and fields concepts. Differential and integral approach to the scientific and technical problems solving.	2	1
	Classification of numerical methods. Frequency and time domain analysis. Domain discretization methods. Boundary discretization methods.	2	1
	Overview of numerical methods; Finite difference method (FD), Finite element method (FEM),Boundary element method (BEM)	2	1
	Introduction to the Finite difference method.	2	1
	Finite difference method: 1D static problems,	2	1
	Finite difference method: 2D static problems,	2	1
	Finite difference time domain method: 1D problems	2	1
	Introduction to the Finite element method.	2	1
	Finite element method: 1D static problems,	2	1
	Finite element method: 2D static problems,	2	1
	Time domain Finite element method: 1D problems	2	1

	Introduction to the Boundary element method.	2	1
	Application of numerical methods for analysis of transmission lines, waveguides, electric circuits, antennas, human exposure to the electromagnetic fields.	2	1
	List of laboratory or design exercises		LE or DE hours
	Numerical integration – trapezoidal rule		2
	Numerical integration – Simpson and Gauss quadrature		2
	Adaptive numerical integration		2
	Colocation method		2
	Least square method		2
	Finite difference method		2
	Finite element method		3

Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☒ independent assignments ☐ multimedia ☒ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	2,0	Research		Practical training	
	Experimental work		Report		Individual work	2,2
	Essay		Seminar essay		Laboratory exercises	0,2
	Tests	0,2	Oral exam		Preparation for laboratory exercises	0,2
	Written exam	0,2	Project		(Other)	

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

There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. In the final exams students take tests they didn't pass on the midterm exams. Both midterm tests last for the 120 min. and consists of 5 questions or problems. In order to pass the exam, students are required to finish all laboratory exercises and gain at least 50% of total points at both midterm exams. Final score is determined in following way:

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

where M1 and M2 are midterm exams score.

Final grade is determined according the final score:

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

In the final exams students take tests they didn't pass on the midterm exams. Exam is performed in the written form. It lasts for the 75 min. and consists of 10 questions or problems. In order to pass the exam, students are required to gain at least 50% of total points. The final grade is then determined as explained above.
There is possibility to take a seminar instead of the test.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	D.Poljak, *Teorija elektromagnetskih polja s primjenama u inženjerstvu*, Šk. knjiga Zagreb, 2014.	5	

	D.Poljak i dr., Numeričke metode u elektrotehnici – interna skripta, FESB-Split 2006.	5	
	D.Poljak, V.Dorić, S.Antonijević,: Modeliranje žičanih antena primjenom računala . Zagreb, Kigen d.o.o., 2009.	5	
Optional literature (at the time of submission of study programme proposal)	1. D. Poljak, *Advanced Modeling in Computational Electromagnetic compatibility*, Wiley Interscience, New York 2007. 2. Jović, V.: Uvod u inženjersko numeričko modeliranje, Aquarius Engineering, Split, 1993.		
Quality assurance methods that ensure the acquisition of exit competences	- Evaluation of results in accordance with the above learning outcomes - Feedback from students via surveys - Self-evaluation of teachers - Institutional and non-institutional evaluations		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="6">OBJECT ORIENTED PROGRAMMING</td></tr>
<tr><td>Code</td><td>FELA13</td><td>Year of study</td><td colspan="5">2</td></tr>
<tr><td>Course teacher</td><td>Ivo Mateljan, Ph.D., Professor
Marjan Sikora, Ph.D., Assistant Professor</td><td>Credits (ECTS)</td><td colspan="5">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td></td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="5">30</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- programming with C++ language,
- understanding the principles of object oriented programming</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">Competences from the first year of study.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">On completion of the course, students should, regarding C++ language, be able to:
- explain the concept of namespace, scope and lifetime
- explain difference between object based and object oriented programming
- explain the polymorphism
- use fundamental STL classes: string, vector, list
- use the facilities in the "iostream" to provide user and file i/o in programs
- use the exception handling mechanism
- use Microsoft Visual Studio, to make programs with GUI, with MFC classes</td></tr>
<tr><td rowspan="28">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Course content</td><td>L or S hours</td><td>AE hours</td></tr>
<tr><td colspan="5">Introduction to class. Object based and object oriented programming.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Structural programming, functions and primitive data types. Pointers and references.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Operators, type conversion, variable scope and lifetime.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Classes and objects.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Class abstraction, interface and implementation.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Recapitulation and preparation for mid-term.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Operator overloading.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Streams and file operations.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Generic programming and templates. Strings.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Inheritance and STL library.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Polymorphism.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Exception handling. Multithreading.</td><td>2</td><td></td></tr>
<tr><td colspan="5">Recapitulation and preparation for exam</td><td>2</td><td></td></tr>
<tr><td colspan="6">List of laboratory or design exercises</td><td>LE or DE hours</td></tr>
<tr><td colspan="6">Compilation, debugging, functions</td><td>2</td></tr>
<tr><td colspan="6">Overloaded functions, pointers and references.</td><td>2</td></tr>
<tr><td colspan="6">Operators, type conversion, scope and lifetime of memory objects.</td><td>2</td></tr>
<tr><td colspan="6">Classes an objects I</td><td>2</td></tr>
<tr><td colspan="6">Classes an objects II</td><td>2</td></tr>
<tr><td colspan="6">Dynamic memory allocation, operator overloading</td><td>2</td></tr>
<tr><td colspan="6">Streams and file operations</td><td>2</td></tr>
<tr><td colspan="6">Strings</td><td>2</td></tr>
<tr><td colspan="6">Templates</td><td>2</td></tr>
<tr><td colspan="6">Inheritance</td><td>2</td></tr>
<tr><td colspan="6">Polymorphism</td><td>2</td></tr>
</table>

<table>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☒ seminars and workshops
☒ exercises
☐ *on line* in entirety
☒ partial e-learning
☐ field work</td><td colspan="3">☐ independent assignments
☐ multimedia
☒ laboratory
☒ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>2</td><td>Research</td><td>1</td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Team work</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Tests</td><td>1</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td>1</td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Grade (%) = 0,15L + 0,15P + 0,35(M1 + M2)

Two mid-term exams (M); Laboratory (L); Project (P)</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">Ivo Mateljan: OOP, lecture notes, FESB, 2001.</td><td></td><td></td></tr>
<tr><td colspan="4">Stroustrup, B., The C++ programming Language, Adison Wesley, 1986.</td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">Owen L. Astrachan, Computer Science Tapestry, McGrawHill 2000.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Evaluation of results in accordance with the above learning outcomes
- Feedback from students via surveys
- Self-evaluation of teachers
- Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">OPERATING SYSTEMS</td></tr>
<tr><td>Code</td><td>FELA27</td><td>Year of study</td><td colspan="5">3</td></tr>
<tr><td>Course teacher</td><td>Sven Gotovac, Ph.D., Full Professor</td><td>Credits (ECTS)</td><td colspan="5">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Petra Lončar, Assistant</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>45</td><td></td><td></td><td>15</td><td></td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
1. Understand the architecture, complexity and functionality of the operating system.
2. Understand the methodology of implementing operating system functionalities.
3. Apply and use the functionality of the operating systems in their solutions.
4. Estimate which solutions are appropriate for particular applications.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">Computer Architecture
Data Structures
Algorithms</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
1. Understand and explain the operating system architecture and functionality.
2. Distinguish the functionality of the operating system
3. Understand and explain how individual functionalities are solved.
4. Evaluate the performance of individual solutions
5. Choose appropriate solutions for a particular application
6. Use appropriate solutions in their own applications</td></tr>
<tr><td rowspan="24">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Course content</td><td>L or S hours</td><td>AE hours</td></tr>
<tr><td colspan="5">Introduction to the course, Brief description of topics to be considered, Operating system tasks.</td><td>3</td><td></td></tr>
<tr><td colspan="5">Process Management, Process Definition, Process Descriptor Block, Process States, Context Switch.</td><td>3</td><td></td></tr>
<tr><td colspan="5">Implementation of Process Management Systems, Process State Management, CPU Scheduling Algorithms.</td><td>3</td><td></td></tr>
<tr><td colspan="5">Cooperating Processes, Process Synchronization. Producer-Consumer Problem.</td><td>3</td><td></td></tr>
<tr><td colspan="5">Test&Set Instruction, Mutex, Semaphores. Producer-Consumer Problem Solution by Semaphores.</td><td>3</td><td></td></tr>
<tr><td colspan="5">Deadlock Problem. Possible Solutions.</td><td>3</td><td></td></tr>
<tr><td colspan="5">Memory management system – Introduction to topic.</td><td>3</td><td></td></tr>
<tr><td colspan="5">Logical vs. Physical Address Space. Logical Address Space Creation.</td><td>3</td><td></td></tr>
<tr><td colspan="5">Paging</td><td>3</td><td></td></tr>
<tr><td colspan="5">Virtual Memory.</td><td>3</td><td></td></tr>
<tr><td colspan="5">I/O Subsystem Architecture</td><td>3</td><td></td></tr>
<tr><td colspan="5">Interrupt Driven I/O. DMA.</td><td>3</td><td></td></tr>
<tr><td colspan="5">File Subsystem.</td><td>3</td><td></td></tr>
<tr><td colspan="5">Disk Block Allocation.</td><td>3</td><td></td></tr>
<tr><td colspan="5">Real Time Operating Systems.</td><td>3</td><td></td></tr>
<tr><td colspan="6">List of laboratory or design exercises</td><td>LE or DE hours</td></tr>
<tr><td colspan="6">Introduction to Linux OS</td><td>2</td></tr>
<tr><td colspan="6">Linux OS Processes</td><td>2</td></tr>
<tr><td colspan="6">Linux Processes - Fork Command</td><td>2</td></tr>
<tr><td colspan="6">Linux processes - communication with pipelines</td><td>2</td></tr>
<tr><td colspan="6">Windows OS Multitasking</td><td>2</td></tr>
<tr><td colspan="6">Write multi-tasking programs for the Windows platform</td><td>2</td></tr>
</table>

<table>
<tr><td rowspan="7"></td><td colspan="5">Write multi-threading programs for the Windows platform</td><td>2</td></tr>
<tr><td colspan="5">Time control of thread execution within the process</td><td>2</td></tr>
<tr><td colspan="5">Thread Sync Synchronization (Intro, Event)</td><td>2</td></tr>
<tr><td colspan="5">Synchronization of thread execution (mutex, semaphores)</td><td>2</td></tr>
<tr><td colspan="5">Java multithreading</td><td>2</td></tr>
<tr><td colspan="5">Windows interprocess communication</td><td>2</td></tr>
<tr><td colspan="5">OS on a virtual machine</td><td>2</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">☒ independent assignments
☒ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">The presence on lectures in the amount of at least 70 % of the times scheduled.
Performed all required laboratory exercises.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>2</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Laboratory exercises</td><td>2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Preparation for laboratory exercises</td><td></td></tr>
<tr><td>Tests</td><td>0,4</td><td>Oral exam</td><td></td><td>Self-study</td><td>0,5</td></tr>
<tr><td>Written exam</td><td>0,1</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">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 lasts 60 minutes and consists of 5 to 7 theoretical questions and numerical problems and final tests consist of 6 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(%) = 0,33 LV + 0,33 (M1 + M2)
the activities in percentage:
• LV – laboratory assessment,
• M1, M2 – test results.
The final grade will be determined after the first test term by applying a relative ECTS grading system in accordance with the Regulations on the study and study system of the University of Split. The group of students who passed the exam is divided into four groups: 15% of the best gets the grade A (excellent), 35% of the following B (very good), the next 35% rating C (good), and the last 15% rating D, E). A group of students who did not pass the exam gains FX score (additional work is required), or F (significant additional work is required). In accordance with the Rulebook for Exam, only two exam periods are organized in the exam period after the completion of classes.
According to Article 65 of the Statute of the Faculty, the student is obliged to participate in all forms of teaching and attend: lectures at least 70% of teaching hours and laboratory exercises 100% of teaching hours. If you do not meet these conditions, the student will not be able to access the exam</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">Tanenbaum, A.S.: Woodhull, A.S.: Operating Systems: Design and Implementation, (3rd Edition) Prentice Hall, 2006.</td><td>2</td><td>Electronic copy on e-learning</td></tr>
<tr><td colspan="4">S.Gotovac Autorizirana predavanja iz Operacijskih sustava</td><td></td><td>e-learning</td></tr>
<tr><td>Optional literature (at the time of</td><td colspan="6">Stalings, W.: Internals and Design Principles (7th Edition), 2011.</td></tr>
</table>

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

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="6">PHYSICS 1</td></tr>
<tr><td>Code</td><td>FEMA01</td><td>Year of study</td><td colspan="5">1</td></tr>
<tr><td>Course teacher</td><td>Ivica Puljak, Ph.D., Full Professor, Nikola Godinović, Ph.D., Associate Professor, Ilja Doršner, Ph.D., Associate Professor, Damir Lelas, Ph.D., Assistant Professor</td><td>Credits (ECTS)</td><td colspan="5">7</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Dunja Polić, Ivica Sorić
Toni Šćulac, Darko Zarić,
Toni Vrdoljak</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>45</td><td>0</td><td>30</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="5">20%</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- uderstanding of basic laws of classical physics;
- ability to apply laws of classical physics to real-life problems.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- define fundamental physical variables and laws of classical physics;
- calculate position of a point-like particle while it moves with i) constant velocity, ii) constant acceleration, iii) constant angular velocity and iv) constant angular acceleration;
- apply laws of classical physics to evaluate trajectory of a point-like particle under the influence of external forces;
- apply relevant laws of conservation to the elastic and inelastic collisions;
- analyse simple systems of point-like particles and calculate coordinates of associated centers of mass;
- explain laws of thermodynamics and associated fundamental physical quantities;
- describe how the refrigerators and heat pumps work;
- apply laws of thermodynamics to calculate work of circular thermodynamic processes.</td></tr>
</table>

Course content broken down in detail by weekly class schedule (syllabus)	Course content	L or S hours	AE hours
	Introductory lecture. About physics. Dimensions and measurement of physical quantities. Scalars and vectors.	3	2
	Kinematics of point-like particles. Constant velocity motion. Motion along straight line with variable velocity. Constant acceleration motion. Free fall.	3	2
	Rotational motion with constant or arbitrary angular velocity. Projectile motion. Arbitrary two-dimensional motions.	3	2
	Particle dynamics. Mass and force. Newton's laws of motion. Momentum and impulse. Law of momentum conservation.	3	2
	Particle dynamics. Point-like particle system. Center of mass. Friction. Centripetal force.	3	2
	Statics. Rotations.	3	2
	Work. Energy. Law of energy conservation. Power. Collisions.	3	2
	Inertial and non-inertial systems. Gravity.	3	2
	Fluid statics. Fluid dynamics.	3	2
	Heat and temperature.	3	2
	Thermodynamical processes. First law of thermodynamics.	3	2
	Thermodynamical work. Second law of thermodynamics. Carnot's cycle. Entropy. Refregerator and heat pump.	3	2

<table>
<tr><td rowspan="15"></td><td colspan="5">Kinetic-molecular theory of heat.</td><td>3</td><td>2</td></tr>
<tr><td colspan="6">List of laboratory exercises</td><td>LE hours</td></tr>
<tr><td colspan="6">Measurement of length and mass</td><td>1</td></tr>
<tr><td colspan="6">Measurement of Earth’s gravitation field strength</td><td>1</td></tr>
<tr><td colspan="6">Friction</td><td>1</td></tr>
<tr><td colspan="6">Torque</td><td>1</td></tr>
<tr><td colspan="6">Venturi’s law</td><td>1</td></tr>
<tr><td colspan="6">Density of rigid bodies with Achimed’s law</td><td>1</td></tr>
<tr><td colspan="6">Density of liquids with Achimed’s law</td><td>1</td></tr>
<tr><td colspan="6">Surface tension</td><td>1</td></tr>
<tr><td colspan="6">Gas laws</td><td>1</td></tr>
<tr><td colspan="6">Specific heats of rigid bodies</td><td>1</td></tr>
<tr><td colspan="6">Specific heats of liquids</td><td>1</td></tr>
<tr><td colspan="6">Latent heats</td><td>1</td></tr>
<tr><td colspan="7"></td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ <u>lectures</u>
☐ seminars and workshops
☒ <u>exercises</u>
☐ on line in entirety
☒ partial e-learning
☐ field work</td><td colspan="4">☒ independent assignments
☐ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="7">The presence on lectures in the amount of at least 70 % of the times scheduled.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>2,0</td><td>Research</td><td></td><td>Practical training</td><td colspan="2"></td></tr>
<tr><td>Experimental work</td><td>1,0</td><td>Report</td><td></td><td>Individual work</td><td colspan="2">3,6</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(Other)</td><td colspan="2"></td></tr>
<tr><td>Tests</td><td>0,2</td><td>Oral exam</td><td></td><td>(Other)</td><td colspan="2"></td></tr>
<tr><td>Written exam</td><td>0,2</td><td>Project</td><td></td><td>(Other)</td><td colspan="2"></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="7">There are two midterm exams, two final exams and one make-up exam. The first midterm exam is after 7 weeks of lectures and the second one is after the next 6 weeks. Each midterm test lasts for 105 minutes and consists of the following 6 questions:
- 2 obligatory questions (basic course questions);
- 4 additional questions that test the theory and problem solving knowledge.
The requirement for passing grade at the midterm exams is to have at least 90% from each obligatory question and at least 50% from each of remaining 4 questions. Students that do not pass one of the midterm exams can retake it during the final exams. Final exams lasts 165 minutes each and consist out of the following 12 questions:
- 4 obligatory questions (basic course questions);
- 8 additional questions that test the theory and problem solving knowledge.
The requirement for passing grade at the final exam is to have at least 90% from each of obligatory questions and at least 50% from each of remaining 8 questions. Final grade is determined using the relative grading system based on the arithmetic mean of the per cents of each of the additional questions. Obligatory questions do not enter the arithmetic mean. Students that have passed both midterm exams or final exams are grouped in four categories: 15% of the students with the highest arithmetic means are assigned grade A (excellent), 35% of the students with the next best arithmetic means are assigned grade B (very good), 35% of the students with the next to next best arithmetic means are assigned grade C (good), and 15% of the students with the lowest passing arithmetic means are assigned grade D (satisfactory).
Students who fail to pass the course through midetrms and/or final exams have one make-up exam at the beginning of fall. This exam features the same format as the final exam.
Exam schedule is predetermined through the academic calendar.
Laboratory exercises are obligatory and have to be passed with success too.</td></tr>
</table>

Required literature (available in the library and via other media)	Title	Number of copies in the library	Availability via other media
	P. Kulišić: Mehanika i toplina, Školska knjiga, Zagreb, 2004.		
	M. Grbac, L. Rađa-Ljubić: Zadaci iz mehanike i hidromehanike, FESB, Split, 1991.		
	P. Kulišić i suradnici: Riješeni zadaci iz mehanike i topline, Školska knjiga, Zagreb, 1996.		
Optional literature (at the time of submission of study programme proposal)	- D. Halliday, R. Resnick, J. Walker: Fundamental of Physics, 7th Edition, John Wiley & Sons, Inc., 2005; N. Cindro: Fizika 1, Školska knjiga, Zagreb, 1991; C. Kittel, W. D. Knight, M. A. Ruderman: Udžbenik Sveučilišta u Berkeleyu, Svezak 1, Mehanika, Tehnička knjiga, Zagreb, 1992.		
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)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">PHYSICS 2</td></tr>
<tr><td>Code</td><td>FEMA02</td><td>Year of study</td><td colspan="5">2</td></tr>
<tr><td>Course teacher</td><td>Ivica Puljak, Ph.D., Full Professor, Nikola Godinović, Ph.D., Associate Professor, Ilja Doršner, Ph.D., Associate Professor, Damir Lelas, Ph.D., Assistant Professor</td><td>Credits (ECTS)</td><td colspan="5">7</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Dunja Polić, Ivica Sorić
Toni Šćulac, Darko Zarić,
Toni Vrdoljak</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>45</td><td>0</td><td>30</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- understanding of basic laws of classical and quantum physics;
- ability to apply laws of classical and quantum physics to real-life problems.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- define fundamental physical variables and equations that are used to describe simple harmonic oscillations, dumped harmonic oscillations and forced harmonic oscillations;
- name types of mechanical waves and provide associated examples;
- apply superposition principle to evaluate interference between two or more coherent waves;
- describe Maxwell’s equations;
- define fundamental quantities and laws that are used in geometric and physical optics;
- explain quantum nature of light using the example of photoelectric effect;
- name quantum numbers of atoms;
- describe wave nature of matter.</td></tr>
<tr><td rowspan="8">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="3">Course content</td><td colspan="2">L or S hours</td><td colspan="2">AE hours</td></tr>
<tr><td colspan="3">Matter elasticity. Simple harmonic motion. Mathematical and physical pendulum. Dumped oscillations. Resonant oscillations.</td><td colspan="2">3</td><td colspan="2">2</td></tr>
<tr><td colspan="3">Interference of harmonic oscillations. Mechanical waves: nomenclature, simple harmonic wave, wave equation, wave equation of transversal wave on a wire, energy of mechanical waves.</td><td colspan="2">3</td><td colspan="2">2</td></tr>
<tr><td colspan="3">Wave superposition. Reflection and transmition of waves. Standing waves. Wave interference. Wave packets. Phase and group wave speed. Spherical waves, plane waves.</td><td colspan="2">3</td><td colspan="2">2</td></tr>
<tr><td colspan="3">Sound waves. Sound intensity and loudness. Doppler's effect. Ultrasound.</td><td colspan="2">3</td><td colspan="2">2</td></tr>
<tr><td colspan="3">Gauss' law for electric and magnetic fields, Amper's law. Biot-Savart's law. Electromagnetic oscillations..</td><td colspan="2">3</td><td colspan="2">2</td></tr>
<tr><td colspan="3">Maxwell's equations. Electromagnetic waves.</td><td colspan="2">3</td><td colspan="2">2</td></tr>
<tr><td colspan="3">Geometrical optics. Laws of geometrical optics. Mirrors. Lenses. Magnifying glass. Microscope. Physics of human eye.</td><td colspan="2">3</td><td colspan="2">2</td></tr>
</table>

	Physical optics. Interference. Young's experiment. Optical lattice.	3	2
	Heat radiation. Ultraviolet catastrophe. Planck's law of black body radiation. Quanta of light. Photoelectric effect. Compton's effect.	3	2
	Atomic structure. Line spectra. Rutherford's model of atom. Bohr's model of atom.	3	2
	Quantum numbers. Periodic system of elements. Roentgen's radiation. Lasers.	3	2
	Wave nature of matter.	3	2
	Atomic nucleus.	3	2
	List of laboratory or design exercises		LE hours
	Mathematical pendulum		1
	Physical pendulum		1
	Addition of harmonic oscillations		1
	Knut’s tube experiment		1
	Quink's tube experiment		1
	Standing wave		1
	Measurements of the earth magnetic dipole moment		1
	Demonstrations of magnetism and Faraday law		1
	Lenses and mirrors		1
	Optical grid experiments		1
	Spectral lines of gasses		1
	Measurement of the ratio of electron charge and mass		1

Format of instruction	☒ **lectures** ☐ seminars and workshops ☒ **exercises** ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia ☒ **laboratory** ☐ work with mentor ☐ (other)
Student responsibilities	The presence on lectures in the amount of at least 70 % of the times scheduled.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	3,0	Research		Practical training	
	Experimental work		Report		Individual work	3,6
	Essay		Seminar essay		(Other)	
	Tests	0,2	Oral exam		(Other)	
	Written exam	0,2	Project		(Other)	

Grading and evaluating student work in class and at the final exam	There are two midterm exams, two final exams and one make-up exam. The first midterm exam is after 7 weeks of lectures and the second one is after the next 6 weeks. Each midterm test lasts for 105 minutes and consists of the following 6 questions: - 2 obligatory questions (basic course questions); - 4 additional questions that test the theory and problem solving knowledge. The requirement for passing grade at the midterm exams is to have at least 90% from each obligatory question and at least 50% from each of remaining 4 questions. Students that do not pass one of the midterm exams can retake it during the final exams. Final exams lasts 165 minutes each and consist out of the following 12 questions: - 4 obligatory questions (basic course questions); - 8 additional questions that test the theory and problem solving knowledge.

	The requirement for passing grade at the final exam is to have at least 90% from each of obligatory questions and at least 50% from each of remaining 8 questions. Final grade is determined using the relative grading system based on the arithmetic mean of the per cents of each of the additional questions. Obligatory questions do not enter the arithmetic mean. Students that have passed both midterm exams or final exams are grouped in four categories: 15% of the students with the highest arithmetic means are assigned grade A (excellent), 35% of the students with the next best arithmetic means are assigned grade B (very good), 35% of the students with the next to next best arithmetic means are assigned grade C (good), and 15% of the students with the lowest passing arithmetic means are assigned grade D (satisfactory). Students who fail to pass the course through midterms and/or final exams have one make-up exam at the beginning of fall. This exam features the same format as the final exam. Exam schedule is predetermined through the academic calendar.		
Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	V. Henč-Bartolić, P. Kulišić: Valovi i optika, Školska knjiga Zagreb, 1989.		
	V. Henč-Bartolić i suradnici: Riješeni zadaci iz valova i optike, Školska knjiga, Zagreb 1992.		
	J. Vuletin: Zadaci iz Fizike (Titraji i valovi, Toplina, Atomi), FESB, Split, 1996.		
Optional literature (at the time of submission of study programme proposal)	- N. Cindro: Fizika 2, Školska knjiga, Zagreb, 1991; D. Halliday, R. Resnick, J. Walker: Fundamentals of Physics, 7th Edition, John Wiley & Sons, Inc., 2005; E. M. Purcell: Udžbenik fizike Sveučilišta u Berkeleyu, Svezak 2., Elektricitet i magnetizam, Tehnička knjiga, Zagreb, 1988; E. V. Wichmann: Udžbenik fizike Sveučilišta u Berkeleyu, Svezak 4., Kvantna Fizika, Tehnička knjiga, Zagreb, 1988.		
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	**POWER ELECTRONICS**						
Code	FENA09	Year of study	3				
Course teacher	Dinko Vukadinović, Ph.D., Full Professor	Credits (ECTS)	6				
Associate teachers	Mateo Bašić, Ph.D. Assistant Professor Ivan Grgić, Assistant	Type of instruction (number of hours)	L	S	AE	LE	DE
			30	0	0	30	0
Status of the course	Obligatory	Percentage of application of e-learning	0				

COURSE DESCRIPTION

Course objectives	Training students for: - understanding of basic principles of power electronics devices switching, - understanding of power converters operating principles - analysis of rectifiers, inverters and non-isolated DC-DC converters
Course enrolment requirements and entry competences required for the course	Theory of Systems and Mathematics 3
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: 1) define ways of power electronics devices switching 2) explain the natural commutation in phase-controlled rectifiers 3) analyze the operation of rectifiers, inverters and non-isolated DC-DC converters 4) make the simulation model of the natural commutation in the phase-controlled converter 5) make the simulation model of the phase-controlled three-phase converter 6) make the simulation model of the buck non-isolated DC-DC converter 7) calculate the power factor of the load connected to the electric grid via the power converter 8) specify ways of power electronics devices protection

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

Course content	L hours	AE hours
Introduction and basic principles of power electronics devices	4	
Ways of power electronics devices turning-off and natural commutation	2	
Diode rectifiers	2	
Thyristor-based converters	2	
Power flow in electric grids with power electronics converters and effects of current distortion	2	
AC converters	2	
Inverters	4	
Non-isolated DC-DC converters	4	
Direct AC-AC converters	2	
Heat transfer in power electronics devices and power electronics devices protection	2	

List of laboratory exercises	LE hours
Resistor and inductor with a power electronics device (simulation)	3
Natural commutation (simulation)	3
Single-phase full-controlled bridge converter for the DC motor supply (simulation)	6
Three-phase full-controlled bridge converter (simulation and experiments)	6
Single-phase AC voltage controller (experiment)	6
Buck non-isolated DC-DC converter (simulation and experiments)	6

<table>
<tr><td>Format of instruction</td><td colspan="4">x lectures
☐ seminars and workshops
☒ exercises
☐ *on line* in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">x independent assignments
☒ multimedia
x laboratory
☐ work with mentor
☐ **(other)**</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">The presence on lectures in the amount of at least 70 % of the times scheduled.
Performed all required laboratory exercises.</td></tr>
<tr><td rowspan="5">Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*</td><td>Class attendance</td><td>1</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work</td><td>3</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Laboratory exercises</td><td>1</td></tr>
<tr><td>Midterm exams</td><td>0.3</td><td>Oral exam</td><td></td><td>Auditory exercises</td><td>0.5</td></tr>
<tr><td>Written exam</td><td>0.2</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">During the semester, two midterm exams are held - the first after 7 weeks of lectures and the second after 13 weeks of lectures. Each midterm exam consists of 4 problems, either theoretical or numerical. In the final exams, students take those parts of the course which they did not pass in the midterm exams.

The requirement for passing grade is that the sum of the laboratory exercises' grade (L) and the midterms' grades (M1 and M2), expressed as a percentage, is 50% or more. The sum is calculated as
Grade (%) = 0.25L + 0.375(M1 + M2)
where the number of points achieved in each midterm exam has to be at least 50%.
The students that do not pass the midterm exams take the final written exam which consists of 4 problems. The requirement for a positive evaluation of the final exam is at least 50% points achieved. In the final exam, the students that did not pass one of the midterm exams are presented with 4 problems from the corresponding part of the course. Subsequently, the grade is determined as follows:
Grade (%) = 0.25L + 0.75(I)
where I is the number of points achieved in the final written exam (at least 50%).
The final grade for the course is determined as follows:
50% to 61% - Sufficient (2)
62% to 74% - Good (3)
75% to 87% - Very good (4)
88% 100% - Excellent (5)</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="4">**Title**</td><td>**Number of copies in the library**</td><td>**Availability via other media**</td></tr>
<tr><td colspan="4">D. Vukadinović, Lj. Kulišić: Predavanja iz energetske elektronike za šk. god. 2013/14</td><td></td><td>e-learning portal</td></tr>
<tr><td colspan="4">D. W. Hart: Power Electronics, McGraw-Hill, 2011.</td><td></td><td>e-learning portal</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">N. Mohan, T. N. Undeland, T. N. Robbins, Power Electronics: Converters, Applications, and Design, 3nd Edition, John Wiley & Sons, 2003.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Keeping records of student attendance
- Annual analysis of the performance at midterm exams and final exams
- Feedback from students via surveys
- Self-evaluation of teachers
- Feedback from graduated students</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

NAME OF THE COURSE	**PROBABILITY AND STATISTICS**						
Code	FEMX04	Year of study	2				
Course teacher	Ante Rozga, Ph. D., Full Professor	Credits (ECTS)	5				
Associate teachers	Marina Mandić	Type of instruction (number of hours)	L	S	AE	LE	DE
			30	0	30	0	0
Status of the course	Obligatory	Percentage of application of e-learning	20				
COURSE DESCRIPTION							
Course objectives	Getting to know the importance of statistical methods in the professional and scientific work. Independent analysis and interpretation of data obtained through statistical surveys. Statistical way of thinking with the help of probability theory. Qualification for independent reasoning with statistical estimation and hypothesis testing.						
Course enrolment requirements and entry competences required for the course	None.						
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After completing the course, students will be able to: • Choose and apply methods of descriptive and inferential statistics. • Calculate and interpret indicators of descriptive statistics. • Estimate parameters, point estimate and interval estimate. • Calculate the accuracy and reliability of statistical estimates. • Set up and test the statistical hypothesis. • Connect variable correlation analysis and regression analysis. • Analyze and interpret the results of statistical surveys.						

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

Course content	L hours	AE hours
The Scales of Measurement. Grouping and Presentation of data.	2	2
Measures of Central Tendency. Measures of Variability. Measures of Skewness and Kurtosis.	2	2
Probability. Addition and Multiplication law. Conditional probability. Bayes theorem.	2	2
Discrete Random Variables. Discrete Probability Distributions.	2	2
Continuous Random Variable. Continuous Probability Distributions.	2	2
Sample Design. Point and Interval Estimation of Population Parameters.	2	2
Hypothesis Testing of One Mean. Hypothesis Testing of One Proportion.	2	2
First Midterm Exam.		
Errors in Hypothesis Testing. Sample Size Design.	2	2
Hypothesis Testing of Difference between Two Population Means. Hypothesis Testing of Difference between Two Population Proportions. Dependent and Independent Samples.	2	2
Distribution Fitting. Goodness-of-Fit Tests.	2	2
Contingency Tables Tests.	2	2
Analysis of Variance.	2	2
Correlation.	2	2
Second midterm exam		

Format of instruction	☒ lectures	☐ independent assignments

	☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ multimedia ☐ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	The presence on lectures in the amount of at least 70 % of the times scheduled..	

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

Grading and evaluating student work in class and at the final exam	There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. Each midterm test consists of 2 theoretical questions and 8 numerical problems and final tests consist of 4 theoretical questions and 10 numerical problems. Final grade is as follows: 50% - 61% sufficient 62% - 74% good, 75% - 87% very good, 88% - 100% excellent. 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.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	A.Rozga: Statistika za ekonomiste. Ekonomski fakultet 2009.	2	
	I.Pavlić: Statistička teorija i primjena. Tehnička knjiga. Zagreb. 1985.	5	

Optional literature (at the time of submission of study programme proposal)	V.Vranić: Vjerojatnost i statistika. Tehnička knjiga 1971.
Quality assurance methods that ensure the acquisition of exit competences	- Evaluation of results in accordance with the above learning outcomes - Feedback from students via surveys - Self-evaluation of teachers - Institutional and non-institutional evaluations
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="8">PROFESSIONAL TRAINING</td></tr>
<tr><td>Code</td><td>FEXX06</td><td>Year of study</td><td colspan="6">3</td></tr>
<tr><td>Course teacher</td><td>Head of the professional training from the Faculty</td><td>Credits (ECTS)</td><td colspan="6">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Head of the professional training from the private institution</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td colspan="2">DE</td></tr>
<tr><td></td><td></td><td></td><td></td><td colspan="2"></td></tr>
<tr><td>Status of the course</td><td>Elective</td><td>Percentage of application of e-learning</td><td colspan="6"></td></tr>
<tr><td colspan="9">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="8">Training students for:
- consolidating theoretical knowledge and practical skills in solving highly complex engineering problems
- acquaintance with the organization, work and business of the receiving institution,
- solving practical problems,
- inclusion in the labour market,
- writing technical reports</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="8">Acquired 120 ECTS credits</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="8">Students will be able to:
- consolidate theoretical knowledge and practical skills in solving problems
- use literature, databases and other sources of information
- select appropriate methods and procedures for solving practical problems
- apply technical knowledge and skills to effectively solve engineering problems
- prepare a written report on the work results</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="8">Professional training is the independent work of the student performed in the receiving institution in accordance with the plan and programme agreed between the head of the professional training from the receiving institution and the head of professional training from the Faculty.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☐ lectures
☐ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☒ field work</td><td colspan="5">☒ independent assignments
☐ multimedia
☐ laboratory
☒ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="8">Independent work</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td></td><td>Research</td><td></td><td>Practical training</td><td colspan="3">4</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Independent work</td><td colspan="3"></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Report writing</td><td colspan="3">1</td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>(Other)</td><td colspan="3"></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td colspan="3"></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="8">Professional training is not evaluated. Students are obliged to complete professional training in accordance with the Regulation on professional training and to write a Professional training report. Professional training report is validated by the head of professional training from the receiving institution and the head of professional training from the Faculty.</td></tr>
</table>

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other 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	**PROGRAMMING**		
Code	FELA04	Year of study	1
Course teacher	Marjan Sikora; Ph.D., Assistant Professor	Credits (ECTS)	6
Associate teachers		Type of instruction (number of hours)	L: 30; S: ; AE: ; LE: 30; DE:
Status of the course	Obligatory	Percentage of application of e-learning	30

Type of instruction (number of hours)	L	S	AE	LE	DE
	30			30	

COURSE DESCRIPTION

Course objectives	Training students for: - programming with C language, - understanding the basic aspects of algorithms and data structures
Course enrolment requirements and entry competences required for the course	None
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - define the scope and the lifetime of variables, - create functions with pointers as arguments - perform the dynamic allocation of memory, - create recursive functions, - use data input/output, - determine the algorithm complexity, - create and use a self-referenced data structure.

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

Course content	L or S hours	AE hours
Introduction to class.	2	
Recapitulation: program, algorithm, abstraction, coding, data types, standard I/O, addressing the memory	2	
Recapitulation: operators, type conversion, simple and structured instructions, loops, branching, functions	2	
Variable scope and lifetime, arrays	2	
Pointers, arrays as pointers	2	
Dynamic memory allocation, strings	2	
User defined data structures, lexical preprocessor	2	
Recursion, I/O	2	
Algorithm complexity	2	
Lists	2	
Trees	2	
Abstract data types	2	
Recapitulation and preparation for exam	2	

List of laboratory or design exercises	LE or DE hours
Compilation, debugging, functions	2
Loops, branching, arrays, scope and lifetime of variables	2
Pointers, function arguments, function pointers	2
Dynamic memory allocation	2
Data structures, lexical preprocessor	2
Recursion, I/O	2
Algorithm complexity	2
Lists	2
Trees	2
Abstract data types	2

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

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

Grading and evaluating student work in class and at the final exam	Grade (%) = 0,25L + 0,75(M1+2*M2)/3 Two mid-term exams (M); Laboratory (L) Relative grading.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	I. Mateljan: Računala, programiranje i jezik C, FESB - Sveučilište u Splitu, 2010.	1	
	Kernigham, B.; Ritchie, D.: The C Programming Language, Prentice Hall, 1988.		

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

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">PULSE AND DIGITAL CIRCUITS</td></tr>
<tr><td>Code</td><td>FELA18</td><td>Year of study</td><td colspan="5">3</td></tr>
<tr><td>Course teacher</td><td>Tihomir Betti, Ph.D., Assistant Professor</td><td>Credits (ECTS)</td><td colspan="5">4</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Ivan Marasović, Ph.D., Assistant Professor
Joško Šoda, Ph.D., Assistant Professor</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td></td><td>15</td><td>15</td><td></td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="5"></td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- Understanding the operating principles of the most important pulse and digital circuits.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">Successfully completed course „Electronic Devices and Circuits“.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- Calculate and sketch the RC circuit response for various input signal waveforms.
- Describe the construction and explain the operating principle of three types of multivibrator circuits (astable, monostable, bistable).
- Explain the operating principle of basic logic circuits.
- Test the operation of basic pulse and digital circuits in the laboratory.</td></tr>
</table>

Course content broken down in detail by weekly class schedule (syllabus)		
Course content	L hours	AE hours
Introduction. Linear waveshaping: High-pass RC circuit (differentiator).	2	1
Low-pass RC circuit (integrator). Attenuators.	2	1
Non-linear waveshaping. Diode and diode models. Clipper circuits. Clamper circuits.	2	1
Pulse transfer over transmission lines.	2	1
Bipolar junction transistor model. The transistor switch and transistor switching times.	2	1
Operational amplifier.	2	1
Multivibrator circuits. Bistable: static conditions and bistable switching. Monostable.	2	1
Astable. Astable and monostable realized with operational amplifier. Schmitt trigger.	2	1
Sawtooth and pulse waveform generators: the Miller integrator and the diode pump.	2	1
Logic circuits. Basic logic circuits.	2	1
Advanced logic circuits: DTL, TTL, CMOS logic circuits.	2	1
Analog-to-digital conversion circuits.	2	1
DC-DC switching voltage converters.	2	1

List of laboratory exercises	LE hours
Waveform generation.	3
Differentiator and integrator circuits.	3
Clipping and clamping circuits.	3
Schmitt trigger.	3
Multivibrators.	3

Format of instruction		
	☒ lectures	☒ independent assignments
	☐ seminars and workshops	☒ multimedia
	☒ exercises	☒ laboratory
	☐ *on line* in entirety	☐ work with mentor

<table>
<tr><td></td><td colspan="3">☐ partial e-learning
☐ field work</td><td colspan="3">☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Students should attend at least 70% of the lectures and exercises. Students must complete all laboratory assignments.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1.5</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work</td><td>1.5</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Laboratory exercises</td><td>0.5</td></tr>
<tr><td>Tests</td><td>0.15</td><td>Oral exam</td><td></td><td>Preparation for laboratory exercises</td><td>0.25</td></tr>
<tr><td>Written exam</td><td>0.1</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">There are two midterm exams and final exams. The first midterm exam is scheduled after 7 weeks of classes and the second one after the following 6 weeks. Each midterm exam is written and consists of theoretical questions and numerical problems. To pass an exam, the student should score at least 50% both from theoretical questions and numerical problems in the midterms and also have a positive assesment of the laboratory exercises.
The final grade (in percentage) is determined according to the formula:
Grade(%)=0.375(M1+M2)+0.25L,
where:
• M1, M2 – grade from midterm exams given in percentage,
• L – grade from laboratory exercises given in percentage.
Students not passing the midterm exams take part in the final exams. For passing the final exam, students must score at least 50% both from theoretical part and from numerical problems, as well as have a positive assesment of the laboratory exercise.
The grade on final exams is determined by the formula:
Grade(%) = 0.75F+0.25L,
where:
• T – grade from F final exam given in percentage.</td></tr>
<tr><td rowspan="4">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">P. Slapničar: Impulsna i digitalna tehnika, FESB, Split, 2001.</td><td></td><td></td></tr>
<tr><td colspan="4">J. Šoda: Impulsni i digitalni sklopovi – prvi dio, Zbirka riješenih zadataka, autorizirana interna skripta, FESB, Split, 2010.</td><td></td><td>e-learning portal</td></tr>
<tr><td colspan="4">P. Slapničar, S. Gotovac: Elektronički sklopovi, FESB, Split, 1999.</td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">- J. Millman, H. Taub: Pulse, Digital and Switching Waveforms, McGraw-Hill, 1965.
- P. Horowitz, W. Hill: The Art of Electronics, Cambridge University Press, 2015.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Record of number of students attending the classes
- Evaluation of results in accordance with expected learning outcomes
- Feedback from students via student surveys
- Teachers self-evaluation
- Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

NAME OF THE COURSE	**SEMICONDUCTOR ELECTRONIC COMPONENTS**						
Code	FELA34	Year of study	3.				
Course teacher	Antonio Šarolić, Ph.D., Full Professor	Credits (ECTS)	5				
Associate teachers	Niko Ištuk, mag. ing. el.	Type of instruction (number of hours)	L	S	AE	LE	DE
			30			30	
Status of the course	elective	Percentage of application of e-learning	0				

COURSE DESCRIPTION

Course objectives	Training students for: - understanding the working principles of semiconductor devices as components of circuits, sensors and optoelectronics - understanding of complex electronic circuits and systems
Course enrolment requirements and entry competences required for the course	Competencies and skills acquired by completing the first two years of undergraduate study (all courses of mathematics and physics).
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: - analyze, describe and explain the working principles of various types of diodes - analyze, describe and explain the working principles of various types of bipolar and unipolar transistors - analyze, describe and explain the working principles of optoelectronic components - analyze, describe and explain the working principles of semiconductor sensors - use the acquired knowledge for electronic circuits and systems design

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

Course content	L or S hours	AE hours
Introduction. Properties and phenomena in semiconductor materials. Mechanisms of conduction.	2	0
Planar technology on silicon. Physics of PN junction.	2	0
Semiconductor diode: Types of diodes.	2	0
Dynamic properties.	2	0
Bipolar transistor: Characteristics. Dynamic properties.	2	0
Unipolar transistors: Basic properties and characteristics of JFET.	2	0
MOS structure. Working principles and properties of MOSFET. MOSFET in digital integrated circuits.	2	0
Thyristors: Classification. Basic working principles. Characteristics.	2	0
Components of optic communication systems: Semiconductor sources and detectors. LED and lasers.	2	0
Components of integrated circuits.	2	0
Components of "smart" electronic systems. Development of "smart" semiconductor materials and structures.	2	0
Metals. Ceramics. Polymers.	2	0
Basic working principles of sensors. Types and applications of sensors in "smart" systems.	2	0

List of laboratory or design exercises	LE or DE hours
Introduction. Properties and phenomena in semiconductor materials. Mechanisms of conduction.	2
Planar technology on silicon. Physics of PN junction.	2
Semiconductor diode: Types of diodes.	2
Dynamic properties.	2
Bipolar transistor: Characteristics. Dynamic properties.	2
Unipolar transistors: Basic properties and characteristics of JFET.	2

<table>
<tr><td rowspan="7"></td><td colspan="5">MOS structure. Working principles and properties of MOSFET. MOSFET in digital integrated circuits.</td><td>2</td></tr>
<tr><td colspan="5">Thyristors: Classification. Basic working principles. Characteristics.</td><td>2</td></tr>
<tr><td colspan="5">Components of optic communication systems: Semiconductor sources and detectors. LED and lasers.</td><td>2</td></tr>
<tr><td colspan="5">Components of integrated circuits.</td><td>2</td></tr>
<tr><td colspan="5">Components of "smart" electronic systems. Development of "smart" semiconductor materials and structures.</td><td>2</td></tr>
<tr><td colspan="5">Metals. Ceramics. Polymers.</td><td>2</td></tr>
<tr><td colspan="5">Basic working principles of sensors. Types and applications of sensors in "smart" systems.</td><td>2</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">☐ independent assignments
☐ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Student is required to attend the lectures and auditory exercises in the amount of at least 70% of the schedule. Student is required to attend the laboratory exercises in the amount of 100% of the schedule and to complete all tasks associated with laboratory exercises.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>2</td><td>Research</td><td></td><td>Practical training</td><td>0,5</td></tr>
<tr><td>Experimental work</td><td>0,5</td><td>Report</td><td></td><td>Laboratory exercises</td><td>0,5</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>1</td><td>Individual work</td><td></td></tr>
<tr><td>Mid-exam</td><td></td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>0,5</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Written exam, seminar essay presentation</td></tr>
<tr><td rowspan="4">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">P. Biljanović: Poluvodički elektronički elementi, Školska knjiga, Zagreb 1996., 3. izdanje 2004.</td><td></td><td></td></tr>
<tr><td colspan="4">B. Juzbašić: Elektronički elementi, Školska knjiga, Zagreb 1984.</td><td></td><td></td></tr>
<tr><td colspan="4">V. Roje: Elektronički elementi, Zapisi s predavanja, FESB, 2004.</td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">- V.K. Varadan, K.J. Vinoy, S. Gopalakrishnan: Smart Material Systems and MEMS, John Wiley and Sons, 2006
- L. Ibbotson: Introduction to Solid State Devices, Arnold, London 1997</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">Surveys providing student feedback</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">SENSORS AND ACTUATORS</td></tr>
<tr><td>Code</td><td>FELA24</td><td>Year of study</td><td colspan="5">3</td></tr>
<tr><td>Course teacher</td><td>Tihomir Betti, Ph.D., Assistant Professor</td><td>Credits (ECTS)</td><td colspan="5">4</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td></td><td></td><td>15</td><td></td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="5"></td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- Understanding types and operation principles of sensors and actuators.
- Application of adequate sensors and actuators in proces control systems.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- Explain the operating principle of sensors.
- Describe the procedures of signal protection and transmission from sensor.
- Select the adequate sensor for measurement of certaing physical quantity.
- Classify actuators used in process control.
- Use the software for data acquisition, processing and display.</td></tr>
<tr><td rowspan="20">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Course content</td><td>L hours</td></tr>
<tr><td colspan="6">Introduction. Process measurement and control systems.</td><td>2</td></tr>
<tr><td colspan="6">Distributed measurement and control.</td><td>2</td></tr>
<tr><td colspan="6">Process communication systems and standars. Structure and hierarchy of process networks. The structures of local process networks. AS standard.</td><td>2</td></tr>
<tr><td colspan="6">Signal protection. Sensor precision and error. Standard voltage and current signals.</td><td>2</td></tr>
<tr><td colspan="6">Communication PC and PLC measurement and control units. Process sensors and modules.</td><td>2</td></tr>
<tr><td colspan="6">Pressure sensors, temperature sensors, volume sensors, pH sensors, force sensors, flow sensors.</td><td>2</td></tr>
<tr><td colspan="6">Motion and vibration sensors. Electromagnetic sensors. Ultrasonic sensors.</td><td>2</td></tr>
<tr><td colspan="6">Data acquisition.</td><td>2</td></tr>
<tr><td colspan="6">Types and application of output control devices.</td><td>2</td></tr>
<tr><td colspan="6">Electrical motors. Heaters.</td><td>2</td></tr>
<tr><td colspan="6">Hydraulic and pneumatic valves. Standard and differential valves.</td><td>2</td></tr>
<tr><td colspan="6">Operating range and limitations. Compensation limitations in nonlinear control systems.</td><td>2</td></tr>
<tr><td colspan="6">Software for data acquisition and supervision. Technical visualization of measured data.</td><td>2</td></tr>
<tr><td colspan="6">List of laboratory or design exercises</td><td>LE hours</td></tr>
<tr><td colspan="6">Working with analog signals.</td><td>3</td></tr>
<tr><td colspan="6">Weighing using straing gauge load cells.</td><td>3</td></tr>
<tr><td colspan="6">Temperature and pressure sensors.</td><td>3</td></tr>
<tr><td colspan="6">Motor control.</td><td>3</td></tr>
<tr><td colspan="6">Human-machine interface (HMI).</td><td>3</td></tr>
<tr><td>Format of instruction</td><td colspan="2">☒ lectures
☐ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning</td><td colspan="5">☐ independent assignments
☒ multimedia
☒ laboratory
☐ work with mentor</td></tr>
</table>

<table>
<tr><td></td><td colspan="3">☐ field work</td><td colspan="3">☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">At least 70% of lectures attendance. Completed all laboratory assignments.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work</td><td>2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Laboratory exercises</td><td>0.5</td></tr>
<tr><td>Tests</td><td>0.15</td><td>Oral exam</td><td></td><td>Preparation for laboratory exercises</td><td>0.25</td></tr>
<tr><td>Written exam</td><td>0.1</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">There are two midterm exams and final exams. The first midterm exam is scheduled after 7 weeks of classes and the second one after the following 6 weeks. Each midterm exam is written and consists of theoretical questions and numerical problems. To pass an exam, the student should score at least 50% and also have a positive assesment of the laboratory exercises.
The final grade (in percentage) is determined according to the formula:
Grade(%)=0.4(M1+M2)+0.2L,
where:
• M1, M2 – grade from midterm exams given in percentage,
• L – grade from laboratory exercises given in percentage.
Students not passing the midterm exams take part in the final exams. For passing the final exam, students must score at least 50% as well as have a positive assesment of the laboratory exercises. The grade on final exams is determined by the formula:
Grade(%) = 0.8F+0.2L,
where:
• T – grade from F final exam given in percentage.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">J. Božičević: Temelji automatike – Mjerni pretvornici i mjerenje, Školska knjiga, Zagreb</td><td></td><td></td></tr>
<tr><td colspan="4">C.W. de Silva: Sensors and Actuators – Control System Instrumentation, CRC Press</td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">- J.G. Webster, H. Eren: Measurement, Instrumentation, and Sensors Handbook, 2nd Edition, CRC Press</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Record of number of students attending the classes
- Evaluation of results in accordance with expected learning outcomes
- Feedback from students via student surveys
- Teachers self-evaluation
- Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">SIMULATION MODELLING</td></tr>
<tr><td>Code</td><td>FELA12</td><td>Year of study</td><td colspan="5">3.</td></tr>
<tr><td>Course teacher</td><td>Jadranka Marasović, Ph.D., Full Professor</td><td>Credits (ECTS)</td><td colspan="5">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Višeslav Čelan, mag.ing.</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>45</td><td>0</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Obligatory/Elective</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
To enable students through practices to understand the importance of modeling and simulation for engineering practice and research. By gaining knowledge about the basic concepts (quantitative and qualitative models, strategy of developing models and simulation, planning events and activities, interaction of complex processes, checking the validity of the model, analysis of input-output data), students are trained to underrstand that the application of the models and simulation deliberate someone of the risk of potentially neglect solutions and their application.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">After completing the course students will be able :
1. to implement models of different systems, quantitative (math) and qualitative (graphs, tables, text) models,
2. to apply mathematical conversion to the original models and to understand the purpose of these conversions for the system analysis and synthesis,
3. to perform various simulation models and to choose the appropriate approach, taking into account the tasks, but also the advantages and / or disadvantages of different simulation methods and helping devices- computers,
4. to apply the simulation softwares VISSIM and MATLAB - Simulink,
5. to describe the basic procedures of systems simulation using the entity classes, attributes and their interconnections,
6. to solve complex tasks of modeling and simulation of various systems</td></tr>
<tr><td rowspan="5">Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Course content</td><td>L or S hours</td><td>AE hours</td></tr>
<tr><td colspan="5">Introduction: Systems approach and purpose of modeling (in the analysis and understanding of systems acting and in the problems with the synthesis of the "living" systems acting). The model is an approximation of the system and it can be designed as a thought model, as a scale model (as the simple robot from RoboLab kit) or as a symbolic notation. Modeling is an iterative process during which resolves a compromise between complex model and quality of approximation.</td><td>3</td><td>0</td></tr>
<tr><td colspan="5">Quantitative models, difference of the systems characteristics: deterministic, stochastic, static, dynamic, continuous, discrete, linear and nonlinear mathematical models. The selection of input and output variables and their impact on the complexity of the model.</td><td>3</td><td>0</td></tr>
<tr><td colspan="5">Physical, economic and other laws as a basis for building models. The impact of constraints on the behavior of the system and how to add them to the original model. The parameter identification as a part of the modeling procedures.</td><td>3</td><td>0</td></tr>
<tr><td colspan="5">Mathematical transformation of quantitative models that facilitate the analysis and synthesis: the transition from differential equations in the Laplace area and in the state</td><td>3</td><td>0</td></tr>
</table>

	space. Linearization. Generating the specific function using the basis of mathematical models.		
	Simulation is a kind of model approximation and one of the possibilities to improve systems analysis and synthesis. Simulation on a digital computer with created software solutions or with own programming: numerical integration, time discretization, rectangular rule, Runge-Kutte coefficients. Introduction and preparation for laboratory exercises.	3	0
	Simulation with the analog computer: characteristics of an operational amplifier and simulation elements derived by it. Electrical scheme and execution of complex tasks.	3	0
	A typical example of methods of modeling and simulation in the design of the regulated DC motor and understabding the impact of permissible or impermissible approximation to the final operation of the engine.	3	0
	Qualitative models and different systems to which they belong. Modeling based on graph theory: events, activities, structure analysis system.	3	0
	Network planning: Simulation of qualitative models at the digital computer.	3	0
	Application examples: linguistic models, population models, problems with cyclic tasks.	3	0
	The basic ideas of discrete event simulation, application examples. Extracting elements of the system and method of their simulation connectivity: entities, classes, attributes, interaction. Methods of building simulation models the system described in that way.	3	0
	Comparison of methods and possibly used simulation between quantitative and qualitative tasks. An example of possible adjustments of quantitative tasks to simulate using that exclusively recognize entities, classes, attributes, and their interconnections.	3	0
	System Dynamics and examples of classes of problems to which it applies.	3	0

	List of laboratory or design exercises	LE or DE hours
	How to translate mathematical models in software language VisSim? The choice of linear simulation elements and their connections.	2
	Testing the influence of discretization time (step size) and the final simulation time (end range) on the quality of simulation results.	2
	Simulation of nonlinear systems described mathematicaly with nonlinear differential equations. Comparison of results between the original non-linear and linearized models. Drawing phase curve.	2
	Simulation of the same system mathematically written in several ways, after the allowed transformation. Comparison of the results.	2
	Simulation of the nonlinearity that are described using static characteristics (saturation, dead zones, ON-OFF). Drawing static characteristics of simulation models.	2
	Simulation of logic circuits Generating a different set of functions.	2

Format of instruction	☒ lectures ☐ seminars and workshops ☐ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☒ independent assignments ☐ multimedia ☒ laboratory ☐ work with mentor ☒ seminar essay (other)
Student responsibilities	Minimum of 70 percent lecture attendance. Completing all the required laboratory exercises.	

Screening student work *(name the proportion of ECTS*	Class attendance	1.5	Research		Practical training	
	Experimental work		Report		Individual work	0.5

<table>
<tr><td rowspan="3">credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Essay</td><td></td><td>Seminar essay</td><td>1</td><td>Laboratory exercises</td><td>1</td></tr>
<tr><td>Tests</td><td>0.5</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>0.5</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">During semester, there will be two mid-term exams (tests) – according to the class schedule. The requirement for the positive grade is the attendance and commitment at the laboratory exercises, minimum of 40 percent correct answers at one mid-term and a final grade is determined with minimum of 50 percent total correct answers. It is necessary during the semester to resolve homework and one seminar to be recognized (enrolled) score achieved by tests and exams.

The final grade is determined based on the total number of points earned, which is calculated as follows:

Grade [%] = 0.5 * M1 + 0.5*M2

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

The final exam encompasses the entire course load or selected parts of it that students' did not pass at either of mid-term exams. The correction exam encompasses the entire course load. The requirement for passing the exam is minimum of 50 percent correct answers. The exams are held according to the class schedule.</td></tr>
<tr><td rowspan="4">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">J. Marasović: "Quantitative and Qualitative Modelling and Simulations" (in Croatian: Kvantitativno i kvalitativno modeliranje i simuliranje), FESB, Split, ISBN-6114-67-4, 2004.</td><td></td><td></td></tr>
<tr><td colspan="4">V. Čerić: "Simulation Modelling" (in Croatian: Simulacijsko modeliranje), Školska knjiga, Zagreb, 1993.</td><td></td><td></td></tr>
<tr><td colspan="4">D. Stipaničev, J. Marasović.: "Digital Control" laris.fesb.hr/digitalno_vodjenje, on-line udžbenik "Digitalno vođenje", 2004.</td><td></td><td>e-learning portal</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">- Law, A., Kelton, D.: Simulation Modelling and Analysis, McGraw Hill, 2000.
- Boffey, T.B.: Graph Theory in Operations Research, McMillan Press, Hong Kong, 1982.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Keeping records on class attendance
- Annual analysis of exam results
- Student survey on teaching performance
- Teacher self-evaluation
- Feedback information from graduates regarding course content relevancy</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="6">SYSTEMS THEORY</td></tr>
<tr><td>Code</td><td>FELA09</td><td>Year of study</td><td colspan="5">2.</td></tr>
<tr><td>Course teacher</td><td>Vladan Papić, Ph.D., Full Professor</td><td>Credits (ECTS)</td><td colspan="5">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Tea Marasović, Ph.D., Assistant Professor
Ivo Stančić, Ph.D., Assistant Professor</td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>45</td><td>0</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Training students for:
- Understanding and application of basic principles used in analysis and synthesis of technical systems,
- Describing and analysing of simple linear dynamical systems,
- Permanent acquiring and deepening of knowledge in the area of theory of technical systems.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Students will be able to:
- Explain fundamental principles of systems theory and basic features of systems,
- Use standard software packages for analysis of systems,
- Apply methods and techniques for descripton of behaviour of linear dynamical systems in time and frequency domain,
- Mathematically formulate simple electrical and mechanical systems,
- Analyze stability and steady-state errors of linear dynamical systems,
- Interprete system using the state variables.</td></tr>
</table>

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

Course content	L hours	AE hours
Introduction to systems	3	
Linear, nonlinear, variable and non-variable systems, examples	2	
Transfer function	3	
Laplace transform, examples	4	
Block diagrams and signal-flow graphs.	3	
First order systems. Examples.	2	
Second order systems. Examples.	5	
Syste description in frequency domain.	3	
Nyquist and Bode dijagrams. Examples.	4	
Graphoanalytical criterium of stability.	3	
Analitical criterium of stability.	2	
Steady-state errors.	2	
Description of system with state variables.	3	

List of laboratory exercises	LE hours
Introduction to MATLAB, Laplace transform in solving differential equations.	1
Transfer functions and time response.	2
Modelling and system simulation with Simulink	2
Time response of first and second order systems.	2
Frequency analysis: polar and Nyquist plots.	2
Frequency analysis: Bode plots	2
Modelling with state variables.	2

Format of instruction	☒ lectures ☐ seminars and workshops ☐ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☒ multimedia ☒ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	1,5	Research		Practical training	
	Experimental work		Report		Individual work	2,2
	Essay		Seminar essay		Laboratory exercises	0,5
	Tests	0,2	Oral exam		Preparation for laboratory exercises	0,5
	Written exam	0,1	Project		(Other)	

Grading and evaluating student work in class and at the final exam	There are two midterms and final exams. The first midterm exam is after 7 weeks of lecturing and the second one is after the next 6 weeks. In the final exams students are answering parts they did not pass in the midterms. The midterm and final exams are carried out as written tests and it lasts for max. 75 minutes. The requirement for passing grade is 50% points on each midterm exam or final exam and positive assessment of laboratory exercises. In final grading (in percentage), each midterm exam contributes with max. 40%, lab. exercises with max. 20% out of total possible points (40%+40%+20%). Final grade is formed in the following way: Percentage Grade 50% to 61% sufficient (2) 62% to 74% good (3) 75% to 87% very good (4) 88% to 100% excellent (5)

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Papić, V. Teorija sustava, predavanja. Interna skripta.		e-learning portal
	Zanchi, V. : Automatika, 3rd edition, FESB, Split, 2003./2004.	5	
	Zanchi, V., Cecić M., Šupuk T. : MATLAB podrška u analizi regulacijskih sustava, FESB, Split, 2006.	5	

Optional literature (at the time of submission of study programme proposal)	Hohn Van de Vegte: Feedback Control System, Prentice Hall Inc., 1986. Gugić, P.: Teorija automatskog reguliranja I, FESB-Split, 1981.
Quality assurance methods that ensure the acquisition of exit competences	- Evaluation of results in accordance with the above learning outcomes - Feedback from students via surveys - Self-evaluation of teachers - Institutional and non-institutional evaluations
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="7">WIRELESS SENSOR NETWORKS</td></tr>
<tr><td>Code</td><td>FELA43</td><td>Year of study</td><td colspan="5">3.</td></tr>
<tr><td>Course teacher</td><td>Mario Čagalj, Ph.D., Full Professor</td><td>Credits (ECTS)</td><td colspan="5">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>AE</td><td>LE</td><td>DE</td></tr>
<tr><td>30</td><td>0</td><td>0</td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>Elective</td><td>Percentage of application of e-learning</td><td colspan="5">0</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Introduce students to fundamentals of wireless sensor networks. Provide students with insight into basic aspects of design and implementation of wireless sensor / sensing networkster systems.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">After successfully mastering a course, students will be able to:
• state the basic features of wireless sensors
• explain the most important energy saving mechanisms in wireless sensors
• review the energy efficiency of communication algorithms in wireless sensors
• establish a simple wireless sensor network
  ○ set up various sensors on the sensor node
  ○ establish a radio communication between two sensor nodes
  ○ connect the sensor network to the Internet
• plan more complex sensor networks</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="7">
<table>
<tr><td>Course content</td><td>L hours</td><td>AE hours</td></tr>
<tr><td>Introduction to sensor networks</td><td>2</td><td></td></tr>
<tr><td>Wireless sensor node architecture</td><td>2</td><td></td></tr>
<tr><td>Basic Network Architecture</td><td>2</td><td></td></tr>
<tr><td>Physical layer: wireless (radio) communication channel</td><td>4</td><td></td></tr>
<tr><td>Data link layer: MAC protocols for access to a shared / shared channel</td><td>4</td><td></td></tr>
<tr><td>First midterm exam</td><td></td><td></td></tr>
<tr><td>Data link layer: channel management, encoding and error control</td><td>4</td><td></td></tr>
<tr><td>Network layer: data routing protocols</td><td>4</td><td></td></tr>
<tr><td>Protocols for controlling network topology control</td><td>2</td><td></td></tr>
<tr><td>Applications: e-health, tracking of objects, remote measurements</td><td>2</td><td></td></tr>
<tr><td>Second midterm exam</td><td></td><td></td></tr>
<tr><td colspan="2">List of laboratory exercises</td><td>LE hours</td></tr>
<tr><td colspan="2">Intro to Arduino, Nordic nRF24L01+ platforms</td><td>6</td></tr>
<tr><td colspan="2">Work on project</td><td>20</td></tr>
<tr><td colspan="2">Project presentations</td><td>4</td></tr>
</table>
</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="4">☐ independent assignments
☐ multimedia
☒ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="7">The presence on lectures in the amount of at least 70 % of the times scheduled. Performed all required laboratory exercises.</td></tr>
</table>

<table>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0,7</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual work</td><td>2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Laboratory exercises</td><td>0,1</td></tr>
<tr><td>Tests</td><td>0,2</td><td>Oral exam</td><td></td><td></td><td></td></tr>
<tr><td>Written exam</td><td>0,1</td><td>Project</td><td>1,9</td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">There are two midterms and final exams. 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 a laboratory project.

The final grade is formed as follows:
Grade = Round[0,05 P + 0,35 PR + 0,25 M1 + 0,35 M2]
where:
• P – is a grade based on attendance at lectures,
• PR – 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.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">Lecture notes and presentations</td><td></td><td>e-learning portal</td></tr>
<tr><td colspan="4">Holger K., Andreas W.: Protocols and Architectures for Wireless Sensor Networks, Willey, 2005.</td><td></td><td>Amazon</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">Buttyan, J.-P. Hubaux, Security and Cooperation in Wireless Networks (Thwarting Malicious and Selfish Behavior in the Age of Ubiquitous Computing), Cambridge University Press, 2007.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">- Evaluation of results in accordance with the above learning outcomes
- Feedback from students via surveys
- Self-evaluation of teachers
- Institutional and non-institutional evaluations</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

NAME OF THE COURSE	**FINAL THESIS**							
Code	FEXX01	Year of study	3					
Course teacher		Credits (ECTS)	12					
Associate teachers		Type of instruction (number of hours)	L	S	AE	LE	DE	
Status of the course	Mandatory	Percentage of application of e-learning						

COURSE DESCRIPTION	
Course objectives	Training students for: - consolidating theoretical knowledge and practical skills in solving highly complex engineering problems - being independent in solving problems under the given conditions - writing and presenting the project results
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 - give public presentation, to prepare written report and present project results
Course content broken down in detail by weekly class schedule (syllabus)	Final thesis is the independent work of the student produced according to the task and instructions given by the supervisor
Format of instruction	☐ lectures ☐ seminars and workshops ☐ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work ☐ independent assignments ☐ multimedia ☐ laboratory ☒ work with mentor ☐ (other)
Student responsibilities	Independent work

Screening student work (*name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course*)						
	Class attendance		Research		Practical training	
	Experimental work		Report		Individual work	12
	Essay		Seminar essay		(Other)	
	Tests		Oral exam		(Other)	
	Written exam		Project		(Other)	

Grading and evaluating student work in class and at the final exam	Final thesis is evaluated by the supervisor based on the student's achievements during the process of the final thesis production and on written and oral presentation.

Required literature (available in the	**Title**	**Number of copies in the library**	**Availability via other media**

library and via other media)	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.		
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	FESB
Location of building	R. Boškovića 32
Year of completion	2008.
Total square area in m^2	29.477

3.2. List of teachers and associate teachers

CODE	Course	Teachers and associate teachers
FELA19	Automatic Control 1	Mojmil Cecić, Ph.D., Full Professor Associate teacher: Marija Jukić, mag. ing.
FELA38	Automatic Control 2	Darko Stipaničev, Ph.D., Full Professor Associate teacher: Josip Musić, Ph.D., Assistant Professor Ivo Stančić, Ph.D., Assistant Professor
FEOA03	Communication skills	Mirjana M. Kovač, Ph.D., Assistant Professor
FELA30	Communication Systems and Protocols	Matko Šarić, Ph.D., Assistant Professor Associate teacher: Tomislav Odrljin, dipl.ing
FELA40	Computer and Data Security	Mario Čagalj, Ph.D., Full Professor
FELA17	Computer Architectures	Sven Gotovac, Ph.D., Full Professor Associate teacher: Dunja Gotovac, Assistant
FELA47	Computer Based Analysis of Electric Circuits and Transmission Lines	Dragan Poljak, Ph.D., Full Professor Associate teacher: Anna Šušnjara
FELA60	Computer Methods in Biomechanics	Vladan Papić, Ph.D., Full Professor Josip Musić, Ph.D., Assistant Professor Associate teacher: Ivo Stančić, Ph.D., Assistant Professor
FELA28	Computer Networks	Julije Ožegović, Ph.D., Full Professor Associate teacher: Vesna Pekić, Ph.D., Ante Kristic, Ph.D.
FELA01	Computers and Programming	Mirjana Bonković, Ph.D., Full Professor Ranko Goić, Ph.D., Full Professor
FENA10	Control Engineering	Dinko Vukadinović, Ph.D., Full Professor Associate teacher: Mateo Bašić, Ph.D. Assistant Professor Ivan Grgić, Assistant
FENA16	Control of Power Electronics Systems	Dinko Vukadinović, Ph.D., Full Professor Associate teacher: Mateo Bašić, Ph.D. Assistant Professor Ivan Grgić, Assistant
FELA26	Databases	Zoraja Ivan, Ph.D., Associate Professor
FELB08	Databases	Vladan Papić, Ph.D., Full Professor Associate teacher: Tea Marasović, Ph.D., Assistant Professor

FELA05	Digital Electronics	Julije Ožegović, Ph.D., Full Professor Associate teacher: Josip Musić, Ph.D., Assistant Professor; Duje Čoko, Ph.D., Assistant Professor, Vesna Pekić, Ph.D., Ante Kristic, Ph.D.
FELA20	Digital Instrumentation 1	Ivan Marasović, Ph.D., Assistant Professor
FELA29	Digital Signal Processing	Dinko Begušić, Ph.D., Full Professor Associate teacher: Maja Stella, Ph.D., Assistant Professor
FETA01	Economics and Production Organization	Ivica Veža, Ph.D., Full Professor
FENA15	Electrical Distribution Networks	Damir Jakus, Ph.D. Assistant Professor Associate teacher: Josip Vasilj, Ph.D.
FENA11	Electrical Drives	Božo Terzić, Ph.D., Full Professor Associate teacher: Marin Despalatović, Ph.D., Associate Professor Goran Majić, Ph.D.
FENA13	Electrical Installations and Lighting	Tonći Modrić, Ph.D., Assistant Professor Matislav Majstrović, Ph.D., Full Professor
FENA07	Electrical Machines	Marin Despalatović, Ph.D., Associate Professor Ivica Jurić-Grgić, Ph.D., Associate Professor Associate teacher: Goran Majić, Ph.D.
FENA03	Electrical Measurements	Tomislav Kilić, Ph.D., Full Professor Associate teacher: Tonko Garma, Ph.D. Assistant Professor
FENA06	Electrical Networks	Damir Jakus, Ph.D. Assistant Professor Associate teacher: Josip Vasilj, Ph.D.
FENA14	Electrical Safety	Rino Lucić, Ph.D., Full Professor
FELA32	Electromagnetic Fields	Dragan Poljak, Ph.D., Full Professor Associate teacher: Anna Šušnjara, Assistant
FELA10	Electronic Circuits	Ivan Marinović, Ph.D., Full Professor Associate teacher: Duje Čoko, Ph.D.
FENA17	Electronic Converters for Power Supplies	Dinko Vukadinović, Ph.D., Full Professor Associate teacher: Mateo Bašić, Ph.D. Assistant Professor Ivan Grgić, Assistant
FELA03	Electronic Devices and Circuits	Tihomir Betti, Ph.D., Assistant Professor Ivan Marasović, , Ph.D., Assistant Professor
FELA02	Electrotechnical Materials and Technology	Maja Stella, Ph.D., Assistant Professor Associate teacher: Prof. dr. sc. Dinko Begušić, Ph.D., Full Professor Josip Lörincz, Ph.D., Assistant Professor
FELA23	Elemens of Industrial Automation	Ozren Bego, Ph.D., Associate Professor Associate teacher: Danijel Jolevski, Ph.D., Assistant Professor
FENA08	Elements of Electrical Power Switchgears	Tonći Modrić, Ph.D., Assistant Professor
FELA08	Engineering Graphics and Presentation	Dinko Begušić, Ph.D., Full Professor Associate teacher: Maja Stella, Ph.D., Assistant Professor Srđana Dragičević, M.Sc., Ivan Teklić, dipl. ing.
FESA01	Engineering Mechanics	Željan Lozina, Ph.D., Full Professor Damir Sedlar, Ph.D., Assistant Professor Associate teacher: Tomac Ivan, Ph.D.
FEOA04	English language 1	Nina Sirković, Ph.D., Assistant Professor
FEOA05	English language 2	Nina Sirković, Ph.D., Assistant Professor

FEOA06	English language 3	Daniela Matić, Ph.D., Assistant Professor
FENA01	Fundamentals of Electrical Engineering 1	Nikša Kovač, Ph.D., Full Professor Associate teacher: Mario Cvetković, Ph.D. Nedjeljka Grulović-Plavljanić, M.Sc., Senior Lectuter
FENA04	Fundamentals Of Power Engineering	Slavko Vujević, Ph.D., Full Professor Ranko Goić, Ph.D., Full Professor Associate teacher: Tonći Modrić, Ph.D., Assistant Professor Mate Dabro, Ph.D., Assistant Professor Dino Lovrić, Ph.D., Research Assistant Mišo Šanić, B.Sc.E.E.
FENA02	Fundamentals of Electrical Engineering 2	Silvestar Šesnić, Ph.D., Assistant Professor Associate teacher: Nikša Kovač, Ph.D., Full Professor Mario Cvetković, Ph.D. Ivana Zulim, Ph.D. Nedjeljka Grulović-Plavljanić, M.Sc., Senior Lectuter
FELA07	Information and Communications	Joško Radić, Ph.D., Associate professor Mladen Russo, Ph.D., Assistant professor Associate teacher: Petar Šolić, Ph.D., Assistant professor
FELA33	Information Theory	Mladen Russo, Ph.D., Assistant Professor Associate teacher: Petar Šolić, Ph.D., Assistant Professor
FENA22	Instrumentation and Testing In Work Environment	Tonko Garma, Ph.D. Assistant Professor
FENA23	Instrumentation for Smart Grid	Goran Petrović, Ph.D., Associate Professor Associate teacher: Juraj Alojzije Bosnić, assistant
FELA14	Internet Programming	Prof.dr.Darko Stipaničev, Ph.D., Full Professor Ljiljana Šerić, Ph.D., Assistant Professor Associate teacher: Marin Bugarić, Ph.D., Senior Research Assistant Andrija Sommer, mag.ing
FELA46	Introduction to Wireless Communications	Antonio Šarolić, Ph.D., Full Professor Associate teacher: Niko Ištuk, mag. ing. el.
FENA18	Maintenance and Testing of Electrical Power Equipment	Božo Terzić, Ph.D., Full Professor Associate teacher: Goran Majić, Ph.D.
FENA20	Marine Electrical Engineering	Slavko Vujević, Ph.D., Full Professor
FEMX01	Mathematics 1	Ivan Slapničar, Ph.D., Full Professor, Anita Matković, Ph.D., Associate Professor, Josipa Barić, Ph.D., Assistant Professor. Associate teacher: Ph.D. Nevena Jakovčević Stor, Irena Bego, Anita Carević, Marija Čatipović, Lea Dujić, Ivana Grgić, Lana Periša, Marina Mandić, Dajana Radišić, Mirjana Strukan, Stjepan Vedran Vukasović, Vanja Županović
FEMX02	Mathematics 2	Ivan Slapničar, Ph.D., Full Professor, Anita Matković, Ph.D., Associate Professor, Josipa Barić, Ph.D., Assistant Professor. Associate teacher: Ph.D. Nevena Jakovčević Stor, Irena Bego, Anita Carević, Marija Čatipović, Lea Dujić, Ivana

		Grgić, Lana Periša, Marina Mandić, Dajana Radišić, Mirjana Strukan, Stjepan Vedran Vukasović, Vanja Županović
FEMX03	Mathematics 3	Ivan Slapničar, Ph.D., Full Professor, Anita Matković, Ph.D., Associate Professor, Josipa Barić, Ph.D., Assistant Professor. Associate teacher: Ph.D. Nevena Jakovčević Stor, Irena Bego, Anita Carević, Marija Čatipović, Lea Dujić, Ivana Grgić, Lana Periša, Marina Mandić, Dajana Radišić, Mirjana Strukan, Stjepan Vedran Vukasović, Vanja Županović
FELA11	Network Analyis	Matko Šarić, Ph.D., Assistant Professor Associate teacher: Tomislav Odrljin, dipl.ing Mijo Vrvilo, mag. ing.
FELA15	Numerical Methods in Electrcal Engineering	Vicko Dorić, Ph.D., Associate Professor
FELA13	Object Oriented Programming	Ivo Mateljan, Ph.D., Professor Marjan Sikora, Ph.D., Assistant Professor
FELA27	Operating systems	Sven Gotovac, Ph.D., Full Professor Associate teacher: Petra Lončar, Assistant
FEMA01	Physics 1	Ivica Puljak, Ph.D., Full Professor, Nikola Godinović, Ph.D., Associate Professor, Ilja Doršner, Ph.D., Associate Professor, Damir Lelas, Ph.D., Assistant Professor Associate teacher: Dunja Polić, Ivica Sorić Toni Šćulac, Darko Zarić, Toni Vrdoljak
FEMA02	Physics 2	Ivica Puljak, Ph.D., Full Professor, Nikola Godinović, Ph.D., Associate Professor, Ilja Doršner, Ph.D., Associate Professor, Damir Lelas, Ph.D., Assistant Professor Associate teacher: Dunja Polić, Ivica Sorić Toni Šćulac, Darko Zarić, Toni Vrdoljak
FENA09	Power Electronics	Dinko Vukadinović, Ph.D., Full Professor Associate teacher: Mateo Bašić, Ph.D. Assistant Professor Ivan Grgić, Assistant
FEMX04	Probability and Statistics	Ante Rozga, Ph. D., Full Professor Associate teacher: Marina Mandić
FEXX06	Professional Training	
FELA04	Programming	Marjan Sikora; Ph.D., Assistant Professor
FELA18	Pulse and Digital Circuits	Tihomir Betti, Ph.D., Assistant Professor Associate teacher: Ivan Marasović, Ph.D., Assistant Professor Joško Šoda, Ph.D., Assistant Professor
FELA34	Semiconductor Electronic Components	Antonio Šarolić, Ph.D., Full Professor Associate teacher: Niko Ištuk, mag. ing. el.
FELA24	Sensors And Actuators	Tihomir Betti, Ph.D., Assistant Professor
FELA12	Simulation Modelling	Jadranka Marasović, Ph.D., Full Professor Associate teacher: Višeslav Čelan, mag.ing.
FELA09	Systems Theory	Vladan Papić, Ph.D., Full Professor Associate teacher: Tea Marasović, Ph.D., Assistant Professor Ivo Stančić, Ph.D., Assistant Professor
FELA43	Wireless Sensor Networks	Mario Čagalj, Ph.D., Full Professor
FEXX01	Final 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	Digital signal processing, Engineering graphics and presentation
GENERAL INFORMATION ON COURSE TEACHER	
Address	Trondheimska 4d, Split
Telephone number	021305637
E-mail address	begusic@fesb.hr
Personal web page	www.fesb.hr/~begusic
Year of birth	1960.
Scientist ID	129685
Research or art rank, and date of last rank appointment	Scientific advisor, scientific field of electrical engineering Scientific advisor, scientific field of computing
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full professor, permanent position (date of election Spetember 11, 2008)
Area and field of election into research or art rank	Scientific area of technical sciences, scientific field of electrical engineering Scientific area of technical sciences, scientific field of computing
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	University of Split, Faculty of electrical engineering, mechanical engineering and naval architecture
Date of employment	1985.
Name of position (professor, researcher, associate teacher, etc.)	Full professor, permanent position
Field of research	Information and communication technology, Telecommunications and informatics, Information processing, Networking technologies, Digital signal processing
Function	Chair of communication technologies and signal processing
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	University of Zagreb, Faculty of electrical engineering and computing
Place	Zagreb
Date	1992.
INFORMATION ON ADDITIONAL TRAINING	
Year	1990.
Place	Bruxelles, Belgija
Institution	Universite Libre de Bruxelles
Field of training	Telecommunications and informatics, Digital signal processing
Year	1992.
Place	London
Institution	King's College London
Field of training	Telecommunications and informatics, Digital signal processing
Year	1998.
Place	Dallas, SAD
Institution	University of Texas at Dallas
Field of training	Telecommunications and informatics, Digital signal processing
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian

Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English, 5
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Digital signal processing, Engineering graphics (bachelor study of electrical engineering)
Authorship of university/faculty textbooks in the field of the course	D.Begušić: "Digital signal processing", handouts 2016. D.Begušić: "Engineering graphics and presentation", Digital textbook, 2014.
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	T 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, “*Heuristic Algorithms for Optimization of Energy Consumption in Wireless Access Networks*”, KSII Transactions on Internet and Information Systems (ISSN: 1976-7277), svezak 5, broj 5, April 2011., str.: 514-540 M.Stella, D.Begušić, M.Russo:"Adaptive noise cancellation based on neural network", Proceedings of the 14th international conference on Telecommunications, Software, and Computer Networks SoftCOM 2006, pp.306-309, Split-Dubrovnik, 2006. M.Vojnovic, N.Rozic, D.Begusic, J.Ursic, H.Dujmic: "Multimedia Dictionary Network Application: Design and Implementation", IEEE Communications Magazine, ISSN 0163-6804, Vol.38 No.2, pp.130-137, February 2000. 1.4.8. B.Raghothaman, D.Linebarger, D.Begušić: "A New Method for Low Rank Transform Domain Adaptive Filtering", IEEE Transactions on Signal Processing, ISSN 1053-587X, Vol.48, No.4, pp.1097-1109, April 2000.
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	T.Kilić, I.Puljak, D.Begušić: "*Studying electrical engineering and information technology at the University of Split, Croatia*", International Journal of Electrical Engineering Education, Manchester University Press, ISSN 0020-7209, Vol. 44, No. 2; pp.175-183, Manchester, UK, 2007. D.Begušić, B.Bilić, T.Kilić, I.Puljak:"*Bolonjski proces na Fakultetu elektrotehnike, strojarstva i brodogradnje u Splitu*", Zbornik sažetaka Obrazovanje inženjera Bolonjski proces 3 godine kasnije, Hrvatska akademija tehničkih znanosti, pp.38-39, Zagreb, 2007.
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	Advanced networking technologies and systems, project FESB Advanced heterogeneous networking technologies, project MZOS Collaborative internationalization of software engineering in Croatia j, project TEMPUS

	Research in the area fo telecommunications, joint project FESB - Ericsson Nikola Tesla International conference on Software, Telecommunications and Computer Networks SoftCOM Journal of Communications Software and Systems
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	Member of Croatain Academy of Engineering, Department of Information systems
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	**Tihomir Betti, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Electronic devices and circuits, Pulse and digital circuits, Sensors And Actuators
GENERAL INFORMATION ON COURSE TEACHER	
Address	Kaštelanska 2, HR-21000, Split
Telephone number	091 4305 889
E-mail address	betti@fesb.hr
Personal web page	
Year of birth	1977
Scientist ID	248722
Research or art rank, and date of last rank appointment	Assistant research fellow, 22.11.2012.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant professor, 18.09.2013.
Area and field of election into research or art rank	Technical sciences, electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	08.06.2001.
Name of position (professor, researcher, associate teacher, etc.)	Assistant professor
Field of research	Electronics, Nanoelectronics, Photovoltaics
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	04.12.2009.
INFORMATION ON ADDITIONAL TRAINING	
Year	2013. (7 weeks)
Place	Freiburg, Germany
Institution	Fraunhofer ISE
Field of training	Photovoltaics
Year	2011. (3 weeks)
Place	Ljubljana, Slovenia
Institution	Institute „Jožef Stefan“
Field of training	Hybrid polymer solar cells
Year	2007-2009. (several visits, 4 weeks in total)
Place	Munich, Germany
Institution	Walter Schottky Institute
Field of training	Application of semiconductor nanostructures in third generation photovoltaics
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English, 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian, 2
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme	Electronic devices and circuits, Undergraduate study of Electrical Engineering and Information Technology

where it is/was offered, and level of study programme)	Pulse and digital circuits, Undergraduate study of Control Engineering and Automation, Electronic and Computer Engineering and Communication and Information Technology Digital instrumentation 1, Undergraduate study of Control Engineering and Automation, Electronic and Computer Engineering and Communication
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. I. Marasović, Ž. Milanović, T. Betti, “Resistance Fluctuations in GaAs Nanowire Grids”, Journal of Nanomaterials, (2014), 428390 2. I. Marasović, T. Garma, T. Betti, “Modelling a nanowire grid for light-sensing applications”, Journal of Physics D: Applied Physics 45 (2012)
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	**Ozren Bego, Ph.D., Associate Professor**
The course he/she teaches in the proposed study programme	Elemens of Industrial Automation
GENERAL INFORMATION ON COURSE TEACHER	
Address	Trondheimska 4C, 21000 Split, Croatia
Telephone number	+385 21 305605
E-mail address	obego@fesb.hr
Personal web page	
Year of birth	1966.
Scientist ID	186161
Research or art rank, and date of last rank appointment	Research Scientist, November 2017.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Associate Professor, December 2017.
Area and field of election into research or art rank	Technical Sciences, Field Automation and Robotics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	1991.
Name of position (professor, researcher, associate teacher, etc.)	Associate Professor
Field of research	Automation, Digital Control Systems
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering and Computing
Place	Zagreb
Date	24. 2. 2005.
INFORMATION ON ADDITIONAL TRAINING	
Year	
Place	
Institution	
Field of training	
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
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)	Elements of industrial automation, Undergraduate study: Electrical Engineering and Information Technology.
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)	Jolevski, Danijel; Bego, Ozren; Sarajcev, Petar: **Control structure design and dynamics modelling of the organic Rankine cycle system** // *Energy (Oxford)*. **121** (2017) ; 193-204.

	Jolevski, Danijel; Bego, Ozren. **Model predictive control of gantry/bridge crane with anti-sway algorithm**. // *Journal of mechanical science and technology*. **29** (2015) , 2; 827**-**834 Jolevski, Danijel; Bego, Ozren; Grgat, Frano. **GA Optimized AVR Controller with Higher Degree of Freedom of Tuning of Wanted Response**. // *International Review of Automatic Control (IREACO)*. **8** (2015) , 1; 72**-**79
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)	Nacional research project: Safer and more efficient cogeneration / trigeneration plants, 2015. -2016., project financed from the EU fond. Development project: Control system for small hydro power plants, project leader, 2010.-2017., project realized for Sintaksa d.o.o.
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	**Mirjana Bonković, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Computers and Programming
GENERAL INFORMATION ON COURSE TEACHER	
Address	R. Boškovića 32, 21 000 Split, HR
Telephone number	+385 91 4 305 641
E-mail address	mirjana.bonkovic@fesb.hr
Personal web page	
Year of birth	
Scientist ID	190481
Research or art rank, and date of last rank appointment	
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full professor, 2016.
Area and field of election into research or art rank	Technical Sciences, Field Electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	01/7/1991
Name of position (professor, researcher, associate teacher, etc.)	Full professor, 2016.
Field of research	control systems, robotics, computer vision, optimization
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	10/3/2000.
INFORMATION ON ADDITIONAL TRAINING	
Year	1995
Place	Oxford, UK
Institution	Robotics Research Group
Field of training	Robot production lines optimization
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	German (2)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Programming, Undergraduate professional study program Object oriented programming, Undergraduate study program Introduction to Computer Science and Programming, Undergraduate study program
Authorship of university/faculty textbooks in the field of the course	Zbirka riješenih zadataka iz programiranja u Cu, upute za laboratorijske vježbe, Interna skripta, FESB Split

	Mikroregulatori i ugradbeni mrežni sustavi, Interna skripta, FESB Split, 2014
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Kuzmanić Skelin, Ana; Grujić, Tamara; Bonković, Mirjana, Visual Peoplemeter: A Vision-based Television Audience Measurement System. // Advances in Electrical and Computer Engineering. 14 (2014) , 4; 73-80 2. Mazić Igor, Bonković Mirjana, Džaja Barbara. Two-Level Coarse-to-Fine Classification Algorithm for Asthma Wheezing Recognition in Children's Respiratory Sounds. //Biomedical Signal Processing and Control. 5 (2015) ; 105-118 (članak, znanstveni). 3. Džaja, Barbara; Bonković, Mirjana; Malešević, Ljubomir. Solving a two-colour problem by applying probabilistic approach to a full-colour multi- frame image super-resolution. // Signal processing. Image communication. 28 (2013) , 5; 509-521 (članak, znanstveni). 4. Čić, Maja; Šoda, Joško; Bonković, Mirjana. Automatic classification of infant sleep based on instantaneous frequencies in a single-channel EEG signal. // Computers in biology and medicine. 43 (2013) , 12; 2110-2117 (članak, znanstveni). 5. Music, Josip; Bonković, Mirjana; Cecić, Mojmil. Comparison of uncalibrated model-free visual servoing methods for small amplitude movement: a simulation study. //International journal of advanced robotic systems. 11 (2014) , 108; 1-16 (članak, znanstveni).
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	Provjera inovativnog koncepta, Alarm astmatičnog napada, projekt HAMAG-BICRO, agencija za malo gospodarstvo, inovacije i investicije., 2014. /2015. "Virtual CulTourist - Razvoj korisničkog sučelja za virtualno predstavljanje kulturne baštine kroz integraciju inovativnih 3D tehnologija", 2016-2017. Programa tehnološkog razvoja, istraživanja i primjene inovacija (2014.-2017.), SDŽ "Napredne metode 3D virtualizacije – na putu prema virtualnom turizmu i digitalizaciji splitske kulturne baštine", 2015-2016. Programa tehnološkog razvoja, istraživanja i primjene inovacija (2014.-2017.), SDŽ
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	**Mojmil Cecić, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Automatic Control 1
GENERAL INFORMATION ON COURSE TEACHER	
Address	Slavonska 6, Split
Telephone number	091 4 305 828
E-mail address	mcecic@fesb.hr
Personal web page	-
Year of birth	1960.
Scientist ID	122922
Research or art rank, and date of last rank appointment	Scientific Adviser, 20th November, 2007.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full professor; 20th March, 2014.
Area and field of election into research or art rank	Technical Science, Electrotehnics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	15th January, 1985.
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Control Systems, Robotics
Function	Head of the Department of Electronics and Computer Science
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD.
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	25th June, 1999.
INFORMATION ON ADDITIONAL TRAINING	
Year	1988.
Place	Budapest, Hungary
Institution	Budepest University of Technology and Economics
Field of training	Industrial robotics
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (4)
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	1. Automatics I (Vocational Study Programme) 2. Automatics II (Vocational Study Programme) 3. Automatic Control I (Undergraduate Study Programme) 4. Automatic Control II (Undergraduate Study Programme) 5. System Theory (Undergraduate Study Programme) 6. Nonlinear Control Systems (Graduate Study Programme)
Authorship of university/faculty textbooks in the field of the course	1. V. Zanchi, M. Bonković, M. Cecić, Programska podrška linearnoj teoriji automatskog upravljanja, FESB, Split.
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Stančić, Ivo; Cecić, Mojmil; Ljubičić, Ante; Identification of UAV Engine Parameters. // WSEAS TRANSACTIONS ON SYSTEMS AND CONTROL. 10 (2015) ; 179-185 (članak, znanstveni).

	2. Musić, Josip; Bonković, Mirjana; Cecić, Mojmil; Comparison of uncalibrated model-free visual servoing methods for small amplitude movement: a simulation study. // International journal of advanced robotic systems. 11 (2014) , 108; 1-16 (članak, znanstveni) 3. Cecić, Mojmil; Papić, Vladan; Bonković, Mirjana; Grujić, Tamara; Musić, Josip; Kuzmanić Skelin, Ana; Stančić, Ivo; Marasović, Tea; Čić, Maja; Pleština, Vladimir; Science and Technology in Biomedical Engineering: LaBACS Case Example. // Physical Medicine and Rehabilitation - International. 1 (2014) , 2; 1-11 (članak, znanstveni). 4. Stančić, Ivo; Musić, Josip; Cecić, Mojmil; A Novel Low-Cost Adaptive Scanner Concept for Mobile Robots. // Ingeniería e Investigación. 34 (2014) , 3; 37-43 (članak, znanstveni). 5. Cecić, Mojmil; Krajči, Vesna; Bonković, Mirjana; Optimization of Model-Reference Variable-Structure Controller Parameters for Direct-Current Motor. // Journal of Computations and Modelling. 2 (2012.) , 3; 67-88 (članak, znanstveni).
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	1. Stančić, Ivo; Cecić, Mojmil; Ljubičić, Ante; Identification of UAV Engine Parameters. // WSEAS TRANSACTIONS ON SYSTEMS AND CONT ROL. 10 (2015) ; 179-185 (članak, znanstveni). 2. Musić, Josip; Bonković, Mirjana; Cecić, Mojmil; Comparison of uncalibrated model-free visual servoing methods for small amplitude movement: a simulation study. // International journal of advanced robotic systems. 11 (2014) , 108; 1-16 (članak, znanstveni) 3. Cecić, Mojmil; Papić, Vladan; Bonković, Mirjana; Grujić, Tamara; Musić, Josip; Kuzmanić Skelin, Ana; Stančić, Ivo; Marasović, Tea; Čić, Maja; Pleština, Vladimir; Science and Technology in Biomedical Engineering: LaBACS Case Example. // Physical Medicine and Rehabilitation - International. 1 (2014) , 2; 1-11 (članak, znanstveni). 4. Stančić, Ivo; Musić, Josip; Cecić, Mojmil; A Novel Low-Cost Adaptive Scanner Concept for Mobile Robots. // Ingeniería e Investigación. 34 (2014) , 3; 37-43 (članak, znanstveni). 5. Cecić, Mojmil; Krajči, Vesna; Bonković, Mirjana; Optimization of Model-Reference Variable-Structure Controller Parameters for Direct-Current Motor. // Journal of Computations and Modelling. 2 (2012.) , 3; 67-88 (članak, znanstveni).
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	1. Projekt 0023022: Biomechanics of Human Walking, Control and Rehabilitation, MZT RH, 2008.-2013. 2. Computer Intelligence in Recognition and Support of Human Activities (RIPrePAkt), project FESB.
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	**Mario Čagalj, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Computer and Data Security Wireless Sensor Networks
GENERAL INFORMATION ON COURSE 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 EMPLOYMENT	
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 TRAINING	
Year	
Place	
Institution	
Field of training	
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (5)
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	1. Cryptography and Network Security, (FELK10, 250), graduate study, FESB 2. Wireless Security (FELK19, 250), graduate study, FESB
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)	1. 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). 2. 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). 4. 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 at most)	1. EU FP7 projekt „EPISECC: Establish Pan-European Information Space to Enhance Security of Citizens“ (2014 - 2017) 2. 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?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	**Marin Despalatović, Ph.D., Associate Professor**
The course he/she teaches in the proposed study programme	Electrical Machines
GENERAL INFORMATION ON COURSE TEACHER	
Address	R. Boškovića 32, HR-21000 Split
Telephone number	+385 (0)21 305 813
E-mail address	marin.despalatovic@fesb.hr
Personal web page	
Year of birth	1976.
Scientist ID	248733
Research or art rank, and date of last rank appointment	Senior scientific associate, November 22nd, 2012.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Associate professor, September 20th, 2016.
Area and field of election into research or art rank	Technical Sciences – Field Electrical Engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	University of Split, Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	May 10th, 2001.
Name of position (professor, researcher, associate teacher, etc.)	Associate professor
Field of research	Research and teaching in electrical machines and drives
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD (in Electrical Engineering)
Institution	University of Split, Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	April 24th, 2009.
INFORMATION ON ADDITIONAL TRAINING	
Year	
Place	
Institution	
Field of training	
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Electrical Machines – 113 – Undergraduate Study: Electrical Engineering and Information Technology Modeling of Electromechanical Systems – 231 – Graduate Study: Electrical Engineering Transients in Electrical Machines – 231, 232 – Graduate Study: Electrical Engineering Electrical Drives – 261, 262, 263 – Graduate Study: Mechanical Engineering

	Electrical Drives – 511 – Vocational Study: Electrical Engineering Design of Low Voltage Facilities – 511 – Vocational Study: Electrical Engineering
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Majić, G.; Despalatović, M.; Terzić, B.; Slutej, A.: Influence of Dead-time on Design of LCL-filter for Three-phase Voltage Source Converter, EDPE Conference Proceedings, 2013. 2. Despalatović, M.; Jadrić, M.; Terzić, B.: Modeling of Saturated Synchronous Generator Based on Steady-State Operating Data, IEEE Transactions on Industry Applications, 48(1), 2012. 3. Terzić, B.; Despalatović, M.; Slutej, A.: Magnetization Curve Identification of Vector-Controlled Induction Motor at Low-Load Conditions, Automatika, 53, 2012. 4. Jadrić, M.; Terzić, B.; Despalatović, M.; Majić, G.; Slutej, A.; Šimić, T.: Identification of Rotor Resistance and Transient Inductance of Induction Motors Using Frequency Selection Criterion, Proc. of the XXth International Conference on Electrical Machines, 2012. 5. Jadrić, M.; Despalatović, M.; Terzić, B.: Development of synchronous generator saturation model from steady-state operating data, Electric Power Systems Research, 80(11), 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)	1. Smart Grid Metrology Infrastructure, HRZZ 2. A safer and more efficient cogeneration / trigeneration facilities, co-financing EU fund for science and innovation 3. Development of electrical drives for large industrial cranes working in heavy duty conditions, collaboration with ABB Crane Systems 4. On-line parameter identification of synchronous generator, MZOŠ 5. State and parameter estimation of electrical machines, MZT
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)	Evaluation organizer University of Split Scale from 2 (sufficient) to 5 (excellent) Course: Electrical Drives – 511, average grade 4.0 Electrical Machines – 113, average grade 4.2 Modeling of Electromechanical Systems – 231, average grade 4.5

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 Electrcal Engineering
GENERAL INFORMATION ON COURSE TEACHER	
Address	Matoševa 1, Split
Telephone number	021305694
E-mail address	vdoric@fesb.hr
Personal web page	https://nastava.fesb.hr/nastava/nastavnici/detalji/vdoric
Year of birth	1974.
Scientist ID	248744
Research or art rank, and date of last rank appointment	higher scientific collaborator, February 2013.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Associate Professor, September 2016.
Area and field of election into research or art rank	Technical sciences, Electrical Engineering, Radio communications
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	20.01.2001.
Name of position (professor, researcher, associate teacher, etc.)	Associate Professor
Field of research	Technical sciences
Function	ERASMUS coordinator
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Phd
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	02.02.2009.
INFORMATION ON ADDITIONAL TRAINING	
Year	
Place	
Institution	
Field of training	
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English +4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	
Authorship of university/faculty textbooks in the field of the course	1. Poljak, D., Dorić, V., Antonijević S.: Modeliranje žičanih antena primjenom računala, Kigen, Zagreb, 2009.

	D.Poljak N.Kovač, V. Dorić, Numeričke metode u elektrotehnici – interna skripta, FESB-Split 2006.
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. D.Čavka, D. Poljak, V. Dorić, R. Goić, Transient analysis of grounding systems for wind turbines, Renewable energy, 43, 2012 2. D. Poljak, R. Lucić, V. Dorić, S. Antonijević, Frequency domain boundary element versus time domain finite element model for the transient analysis of horizontal grounding electrode, Engineering analysis with boundary elements, 35, 3, 2011 3. D. Poljak, V. Dorić, D. Čavka, On the use of isoparametric elements for BEM modeling of arbitrarily shaped thin wires in electromagnetic compatibility applications, Boundary Elements and other Mesh Reduction Methods XXXIV, 2012. 4. D. Čavka, D. Poljak, V. Dorić, S. Antonijević, Some Computational Aspects of Using Current and Voltage Sources in Electromagnetic Models of Lightning Return Strokes, ICLP 2012, CONFERENCE PROCEEDINGS, 2012. V. Dorić, D. Poljak, K. El Kamichi Drissi, Human Exposure to Outdoor PLC System, PIERS 2011 Marrakesh Progress In Electromagnetics Research Symposium, 2011.
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	EUROfusion – Code Development for Integrated Modelling 2014.- Electromagnetic Interference (EMI) Study of Power Line Communications (PLC) Services 2011.-2012.
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	**Tonko Garma, Ph.D. Assistant Professor**
The course he/she teaches in the proposed study programme	Instrumentation and testing in the working environment Power engineering in buildings
GENERAL INFORMATION ON COURSE TEACHER	
Address	Getaldićeva 9
Telephone number	091-4305-803
E-mail address	garma@fesb.hr
Personal web page	-
Year of birth	1983.
Scientist ID	325635
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	Assistant Professor , june 2014
Area and field of election into research or art rank	Electrical Engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	FESB
Date of employment	August 25, 2014
Name of position (professor, researcher, associate teacher, etc.)	professor
Field of research	Science and education
Function	Assistant Professor
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Dr.-Ing.
Institution	TU Muenchen
Place	Muenchen
Date	1.2.2011.
INFORMATION ON ADDITIONAL TRAINING	
Year	
Place	
Institution	
Field of training	
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English, 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian, 3
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	German, 1/2
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)	Professional work in field related to proposed subject
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five	1. Garma, Tonko; Krstulović-Opara, Lovre. Nalaz termovizijskih mjerenja TS VE Jelinak 12/110 kV/kV, 2014. (izvješće).

years in the field of the course (5 works at most)	2. Garma, Tonko; Krstulović-Opara, Lovre. Nalaz termovizijskih mjerenja u pogonu tvornice Omial Novi d.o.o., 2014. (izvješće). 3. Krstulović-Opara, Lovre; Garma, Tonko. Izvješće o termografskom ispitivanju zgrade DV "Cvrčak" Kaštela, 2014. (izvješće). 4. Garma, Tonko; Perković, Toni. Izvješće o ispitivanju otpora izolacije i dielektrične čvrstoće uređaja za transkranijalnu stimulaciju, 2014. (izvješće). 5. Perković, Toni; Garma, Tonko. Izvješće o ispitivanju kabliranja LAN instalacije u laboratoriju Sveučilišnog odjela za stručne studije, 2014. (izvješće).
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	1. Bilušić, Ante; Garma, Tonko; Budimir, Marko. Building MEMS infrastructure in Croatia // Building MEMS infrastructure in Croatia. Blois : INSA-CVL, Blois, 2014. (poster,međunarodna recenzija,sažetak,znanstveni). 2. Colombo, Carlo; Dufouleur, Joseph; Garma, Tonko; Ketterer, Bernt; Uccelli, Emanuele; Fontcuberta i Morral, Anna. P-doping Mechanism in Catalyst-free MBE Grown GaAs Nanowires // . (predavanje,međunarodna recenzija,sažetak). 3. Hofmann, Martina; Garma, Tonko; Cattani-Scholz, Anna; Dalmau Mallorqui, Anna; Fontcuberta i Morral, Anna; Moreno i Codinachs, Lia. Development and characterization of EIS structures based on micro and nano SiO2 pores before and after its functionalization with silanes and phosphonate films // Engineering of functional interfaces. (predavanje,međunarodna recenzija,sažetak,znanstveni). URL link to work 4. Colombo, Carlo; Spirkoska, Danče; Garma, Tonko; Heiss, Martin; Vialla, Fabien; Dufouleur, Joseph; Abstreiter, Gerhard; Fontcuberta i Morral, Anna. 'Doping of catalyst-free MBE grown GaAs nanowires, transport properties and related devices // . (predavanje,međunarodna recenzija,sažetak). 5. Moreno i Codinachs, Lia; Birkenstock, Christopher; Garma, Tonko; Zierold, Robert; Bachmann, Julien; Nielsch, Kornelius; Schoening, Michael; Fontcuberta i Morral, Anna. A micron-sized nanoporous multifunction sensing device // . 2008. (predavanje,međunarodna recenzija,sažetak,znanstveni).
The name of the programme and the volume in which the main teacher passed exams in/acquired	

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

First and last name and title of teacher	**Nikola Godinovic, Ph.D., Associate Professor**
The course he/she teaches in the proposed study programme	Physics 2
GENERAL INFORMATION ON COURSE TEACHER	
Address	Omiška 20, 21000 SPLIT
Telephone number	0915195314
E-mail address	nikola.godinovic@fesb.hr
Personal web page	
Year of birth	1959
Scientist ID	129696
Research or art rank, and date of last rank appointment	
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Associate professor, 11.3.2016.
Area and field of election into research or art rank	Area of natural sciences, field of physics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	University of Split *Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture* R. Boškovića 32 21000 Split Croatia
Date of employment	1.1.1985.
Name of position (professor, researcher, associate teacher, etc.)	professor
Field of research	Physics
Function	Head of the Department of Mathematichs and Physics
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	University of Zagreb
Place	Croatia, Zagreb
Date	30.11.2003.
INFORMATION ON ADDITIONAL TRAINING	
Year	1995. – 2017. god.
Place	Geneva
Institution	CERN
Field of training	Experimenatal Elementary Particle Physics
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	German 2
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Nuclear physcis, Experimtnal Methods of Moderan Physics, graduate program, University of Split, Fcaulty of Scince.

Authorship of university/faculty textbooks in the field of the course	Faculty text book*:* *Instructions for laboratory exercises in Physics 1* *Instructions for laboratory exercises in Physics 1*
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. *Teraelectronvolt pulsed emission from the Crab Pulsar detected by MAGIC,* MAGIC Collaboration, Ansoldi, S.; et al., . (Authors: MAGIC collaboration), Astronomy and Astrophysics 585, Article Number: A133 (2016) IF: 4.479. 2. *The major upgrade of the MAGIC telescopes, Part I: The hardware improvements and the commissioning of the system*, (Authors: MAGIC Collaboration,) Astroparticle Physics 72, pages: 61-75 (2016) IF: 3.584. 3. *The major upgrade of the MAGIC telescopes, Part II: A performance study using observations of the Crab Nebula*, (Authors: MAGIC Collaboration), Astroparticle Physics 72, pages: 76-94 (2016) IF: 3.584. 4. *Measurement of the properties of a Higgs boson in the four-lepton final state*, By: Chatrchyan, S.; Khachatryan, V.; Sirunyan, A. M.; et al., Group Author(s): CMS Collaboration, Physical Review D 89, Issue: 9, Article Number: 092007 (2014) IF: 4.506 5. *Study of the Mass and Spin-Parity of the Higgs Boson Candidate via Its Decays to Z Boson Pairs*, S. Chatrchyan et al. (CMS Collaboration), Physical Review Letters 110, 081803 – Published 21 February 2013; Erratum Phys. Rev. Lett. 110, 189901 (2013). IF: 7.512.
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	None
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	***HRZZ Research Projects* (IP-11-2013)**, Croatian Sicnece Foundation zaklada za znanost (1.10.2014. god. – 30.9.2018. god.). ***HRZZ Research Projects* (Very high energy gamma ray astronomy with the MAGIC telescopes)**, Croatian Sic nece Foundation zaklada za znanost (1.7.2012. god. – 31.12.2016.)
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
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	**Ranko Goić, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Computers and Programming, Fundamentals of Power Engineering
GENERAL INFORMATION ON COURSE TEACHER	
Address	Put Žnjana 14G, 21000 Split, HR
Telephone number	+385 21 305604
E-mail address	rgoic@fesb.hr
Personal web page	www.fesb.hr/~rgoic
Year of birth	1969.
Scientist ID	207263
Research or art rank, and date of last rank appointment	Senior scientific associate, 2011
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full Professor, 2017
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	1993
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Transmission and distribution networks, Power system analysis, Energy economics
Function	Head of Chair of Electrical Networks and Substations
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	11/July/2002
INFORMATION ON ADDITIONAL TRAINING	
Year	2002
Place	Tokyo, Japan
Institution	JICA
Field of training	Energy efficiency
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Electrical networks (undergraduate), Basics of Energy Engineering (undergraduate)

Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Sarajčev, Petar; Goić, Ranko: Assessment of the backflashover occurrence rate on HV transmission line towers, European transactions on electrical power (2011) 2. Vasilj, Josip; Sarajcev, Petar; Goic, Ranko: Modeling of current-limiting air-core series reactor for transient recovery voltage studies, Electric power systems research, 117 (2014) 3. Sarajčev, Petar; Goić, Ranko: Assessment of lightning current parameters suitable for wind turbine overvoltage protection analysis, Wind energy (2011) 4. Parida, B.; Iniyan, S.; Goić, Ranko: A review of solar photovoltaic technologies, Renewable & sustainable energy reviews 15 (2011), 3 5. Goić, Ranko; Krstulović-Opara, Jakov; Jakus, Damir: Simulation of aggregate wind farm short-term production variations, Renewable energy 35 (2010), 11
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	1. Development of mid-voltage distribution grid for next 20 years for Zadar county, 2014 2. Engineering studies (short circuit, load flow, overvoltage protection, earthing system). – basis for design of new submarine cable 110 kV Dugi rat – Postire and reconstruction of substation Dugi rat", 2014 3. Energy-economic analysis of construction of small HPP Peruća, 2013 4. Engineering studies (short circuit, load flow, overvoltage protection, earthing system) – basis for design of refurbishment of HPP Ozalj 1, 2013 5. Schedule for energization of new substation 220/110/35/20(10) kV Plat and connection power lines, 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?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	4,6/5

First and last name and title of teacher	**Sven Gotovac, PH.D., Full Professor**
The course he/she teaches in the proposed study programme	Computer Architecture 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-teaching or teaching rank, and date of last rank appointment	Senior Full Professor/2009.
Area and field of election into research or art rank	Technical Sciences, Field Electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	December, 1983
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Computer architecture, Implementation of Computer Vison Algorithms on Advanced Computer Architecture.
Function	Head of Chair of Computer Architecture and Operating Systems, Dean of Faculty
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Tehnical University Berlin, Germany
Place	Berlin, Germany
Date	24.5.1994.
INFORMATION ON ADDITIONAL TRAINING	
Year	From 2004.
Place	CERN, Genève, Switzerland
Institution	Genève, Switzerland
Field of training	Distributed Computer Architecture
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	German 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian 3
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Digital circuits Impulse electronics
Authorship of university/faculty textbooks in the field of the course	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)	1. Vicković, Tomislav. Razvoj i realizacija digitalnog uređaja za mjerenje jakosti treperenja napona/znanstveni magistarski rad. Split : Fakultet elektrotehnike, strojarstva i brodogradnje, 08.11. 2010, 161 str. Voditelj: Gotovac, Sven. 2. Vicković, Linda; Mudnić, Eugen; Gotovac, Sven. Parity information placement in the disk array model. //COMPEL: The International Journal for Computation and Mathematics in Electrical and Electronic Engineering. 28 (2009) , 6; 1428-1441
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	1. ALICE experiment CERN, Modelling of the distributed computing system for storage and retrieval of mass data for high energy physics. – HPC Systems. International scientific project since 2004. 2. Computing system of the University of Mostar.
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	Special award for the development of the University of Mostar Award for Scientific Achievements from University of Split
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	4.7/5

First and last name and title of teacher	**Damir Jakus, Ph.D. Assistant Professor**
The course he/she teaches in the proposed study programme	Electrical networks Electrical distribution networks
GENERAL INFORMATION ON COURSE TEACHER	
Address	Ruđera Boškovića 32, Split
Telephone number	021 305 807
E-mail address	damir.jakus@fesb.hr
Personal web page	-
Year of birth	1984.
Scientist ID	292324
Research or art rank, and date of last rank appointment	Research associate – 06/06/2013
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant professor - 17/07/2013
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	15.01.2007.
Name of position (professor, researcher, associate teacher, etc.)	Assistant professor
Field of research	electric power systems, renewable energy, power system economics, power system optimization
Function	Assistant professor
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	09.11.2012.
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English(5)
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	***Electrical distribution networks*** – Professional study program in Electrical Engineering ***Electrical distribution networks*** – University Department of Professional Studies
Authorship of university/faculty textbooks in the field of the course	Goić R., Jakus D., Penović, I., „Distribucija električne energije“ Goić R., Jakus D., Penović, I., „Električne mreže“ Goić R., Jakus D., „Osnove elektroenergetike“
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Jakus, D; Krstulović Opara, J; Vasilj, J. ,“**Algorithm for optimal wind power plant capacity allocation in areas with limited transmission capacity**“, International Transactions on Electrical Energy Systems, 24, 2013. 2. Jakus, D.; Goić, R.; Krstulović Opara, J., „**The impact of wind power plants on slow voltage variations in distribution networks**“, Electric power systems research, 81, 2011. 3. Jakus, D.; Vasilj, J.; Goić, R.,“**Impact of PV Power Plants on the Voltage Conditions and Power System Losses**

	in MV Distribution Network“, Proceedings of the 4th International Workshop on Integration of Solar into Power Systems, Berlin, 2014. 4. Jakus, D.; Vasilj, J.; Tutavac, H.,“**Coordinated Control of Renewable Energy Sources in Distribution Networks**“, Proceedings of the 4th International Workshop on Integration of Solar into Power Systems, Berlin, 2014. 5. Jakus, D; Krstulović Opara, J.; Vasilj, J.; Goić, R., „**Analiza mogućnosti integracije vjetroelektrana u postojeću prijenosnu mrežu analizom karakterističnih pogonskih stanja**“, 11.savjetovanje HRO CIGRÉ, Cavtat, Hrvatska, 2013.
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	-
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	1. ***Razvoj i pogon elektroenergetskog sustava s visokim udjelom vjetroelektrana*** – MZOŠ (scientific) 2. ***Podloge za izradu Mrežnih pravila prijenosnog sustava,-***HOPS d.o.o. (expert) 3. ***Studija razvoja distribucijske mreže za razdoblje narednih 20 godina za distribucijsko područje Elektre Zadar*** – HEP ODS d.o.o. (expert) 4. ***Razvoj distribucijske mreže Elektrojug Dubrovnik u razdoblju 2011-2031. godine*** – HEP ODS d.o.o. (expert) 5. ***Elaborat o pomoćnim uslugama u EES-u***, HOPS d.o.o. (expert)
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	-
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	-
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	4.4/5

First and last name and title of teacher	**Ivica Jurić-Grgić, Ph.D., Associate Professor**
The course he/she teaches in the proposed study programme	Electrical Machines
GENERAL INFORMATION ON COURSE TEACHER	
Address	Pujanke 59, 21000 Split, Croatia
Telephone number	+385 21 305-811
E-mail address	ijuricgr@fesb.hr
Personal web page	-
Year of birth	1977.
Scientist ID	248792
Research or art rank, and date of last rank appointment	Senior scientific associate, 12/7/2012
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Associate Professor, 20/9/2016
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	23/9/2001
Name of position (professor, researcher, associate teacher, etc.)	Associate Professor
Field of research	Power engineering
Function	-
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	10/3/2008
INFORMATION ON ADDITIONAL TRAINING	
Year	-
Place	-
Institution	-
Field of training	-
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (4)
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)	Electrical Machines 1, Graduate study programme. Electrical Machines and Transformers, Vocational 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)	• Jurić-Grgić, I.; Lucić, R.; Dabro, M.: "A coupled nonuniform transmission line analysis using FEM", International Transactions on Electrical Energy Systems, Vol.23 (8), 2013, pp. 1365–1372. • Lucić, R.; Jurić-Grgić, I.; Balaž, Z.: " Grounding grid transient analysis using the improved transmission

	line model based on the finite element method", ETEP: European Transactions on Electrical Power, Vol.23 (2), 2013, pp. 282–289. • Dabro, M.; Jurić-Grgić, I.; Martinović, M.: "Improvement of Synchronous Generator Power Stability Using Hydraulic Digital Governor", International Journal on Engineering Applications (IREA), Vol. 1 (5), 2013, pp. 263-267. • Dabro, M.; Jurić-Grgić, I.; Lucić, R.: "Optimization of Hydraulic Digital Governor parameters using EMTP-RV", International Journal on Engineering Applications (IREA), Vol. 1 (2), 2013, pp. 90-93. • Dabro, M.; Jurić-Grgić, I.; Lucić, R.: "EMTP-RV Model of Hydraulic Digital Governor", International Review on Modelling and Simulations (IREMOS), Vol. 4 (6), 2011, pp. 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)	• Study: Elaborat iznošenja potencijala i izračun napona dodira i koraka za EVP 110/25 kV Novska, Naručitelj: Projektni biro Split, 2010. • Project: 023 0231581-1610, "Numeričko modeliranje elektroenergetskog sustava tehnikom konačnih elemenata", br. 023 0231581-1610, Ministarstvo znanosti, obrazovanja i športa Republike Hrvatske, 2007.-2011. • Study: Izrada pravila i mjera sigurnosti za osiguranje mjesta rada na elektroenergetskim vodovima, Naručitelj: HEP OPS d.o.o., Prijenosno područje Split, 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?-pedagoške kompetencije?	-
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	-
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	-

First and last name and title of teacher	**Tomislav Kilić, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Electrical Measurements
GENERAL INFORMATION ON COURSE TEACHER	
Address	Put borika 17, 21000 Split, HR
Telephone number	+385 21 305733
E-mail address	tkilic@fesb.hr
Personal web page	
Year of birth	1961.
Scientist ID	142496
Research or art rank, and date of last rank appointment	Scientific Adviser, 9/7/2009
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Senior Full Professor, 18/9/2014
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	1/10/1987
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Electrical Measurement, Power Quality
Function	Head of Chair of Electrical Measurement
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	9/11/2001
INFORMATION ON ADDITIONAL TRAINING	
Year	1996
Place	Toronto, Canada
Institution	GEM Systems
Field of training	Research and development of instruments for magnetic field measurement
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)	Fundamentals of Electrical Engineering, Undergraduate study programme, Electrical Measurements, Undergraduate study programme
Authorship of university/faculty textbooks in the field of the course	Kilić, Tomislav: Električna mjerenja - upute za laboratorijske vježbe, Skripta, FESB Split, ISBN 953-6114-62-3, Split, 2003.

Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Petrović, Goran; Kilić, Tomislav; Garma, Tonko. Measurement and Estimation of the Extremely Low Frequency Magnetic Field of the Overhead Power Lines. // Journal Elektronika ir elektrotechnika. 19 (2013), 7; 33-36. 2. Kovač, Nikša; George, J. Anders; Tomislav Kilić. Sheath Loss Factors Taking Into Account the Proximity Effect for Cable Lineand Touching Flat Formation. // IEEE Transactions on Power Delivery, 30 (2015), 3, 1363-1371.
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	3. Marian-Silviu Poboroniuc, Gheorghe Livint, F. Maciel Barbosa, Wojciech Mysiński, Anna Friesel, Bahar Karaoglan, Yoana Ruseva, Dorin Popescu, Tomislav Kilic, Tony Ward, Noel Jackson, Ian Grout: *Developing New Electrical and Information Engineering Related Curricula to Respond to the Actual Global Challenges*, EAEEIE 2015, Denmark
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	1. HRZZ Istraživački projekt: Mjeriteljska infrastruktura za pametne mreže, 2015. - 2018. 2. LLP - ERASMUS: Strategic Alignment of Electrical and Information Engineering in European Higher Education Institutions, 2012. -2014. 3. TEMPUS: Creation of the third cycle studies-doctoral studies in metrology Trajanje projekta: 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)	4,8/5

First and last name and title of teacher	**Mirjana M. Kovač, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Communication skills
GENERAL INFORMATION ON COURSE TEACHER	
Address	Put sv. Lovre 35, 21215 Kaštel Lukšić
Telephone number	021 305715
E-mail address	Mirjana.kovac@fesb.hr
Personal web page	
Year of birth	1971
Scientist ID	297 640
Research or art rank, and date of last rank appointment	Research Associate
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant Professor, February, 2012
Area and field of election into research or art rank	Humanities and Social Sciences; Philology
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, Split
Date of employment	June, 2006
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Communication skills, speech production and speech disfluencies, communication strategies
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Philosophy, University of Zagreb
Place	Zagreb
Date	10th March, 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 (5)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	
Authorship of university/faculty textbooks in the field of the course	1.Kovač, M.M.; Sirković, N. Presentation, Writing and Interpersonal Communication Skills. FESB, Split, 2014.

	2.Kovač, Mirjana M.; Sirković, Nina. Strategije rješavanja poteškoća u komunikaciji na stranom jeziku. Hrvatska sveučilišna naklada, Zagreb (2015)
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1.Kovač, Mirjana Matea; Sirković, Nina. Peer Evaluation of Oral Presentations in Croatia. // *English Language Teaching*. 5 (2012) , 7; 8-17 (scientific paper). 2.Kovač, Mirjana Matea. Utjecaj kognitivne složenosti zadatka na samoispravljanja. // *Linguistica Copernicana*. 5 (2011) , 1; 269-300 (scientific paper). 3.Kovač, Mirjana Matea; Horga, Damir. Ponavljanja kao oblik govorne disfluentnosti. // *Linguistica Copernicana*. 5 (2011) , 1; 245-267 (scientific paper). 4. Kovač, Mirjana Matea. The Influence of Task Type on Perceived Fluency. // *Studies in English Language Teaching.* 4 (2016), 2; 241-253 (scientific paper). 5. Kovač, Mirjana Matea. Repetition as a Communication Strategy. // *Studies in English Language Teaching.* 4 (2016), 1; 87-104 (scientific paper).
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	1.Kovač, Mirjana Matea; Sirković, Nina. Peer Evaluation of Oral Presentations in Croatia. // *English Language Teaching*. 5 (2012) , 7; 8-17 (scientific paper).
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?-pedagoškekompetencije?	Graduate study program in English Language and Literature; Graduate study program in German Language and Literature
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	**Nikša Kovač, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Fundamentals of Electrical Engineering 1
GENERAL INFORMATION ON COURSE TEACHER	
Address	Put sv. Lovre 35, 21215 Kaštel Lukšić, HR
Telephone number	+385 21 305732
E-mail address	nkovac@fesb.hr
Personal web page	
Year of birth	1968.
Scientist ID	211370
Research or art rank, and date of last rank appointment	Scientific Adviser, 4/3/2010
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Senior Full Professor, 16/12/2015
Area and field of election into research or art rank	Technical Sciences, Field of Electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	26/10/1994
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Power Cables, Extremely Low Frequency Electromagnetic Fields
Function	Head of Chair of Fundamentals of Electrical Engineering
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	6/12/2002
INFORMATION ON ADDITIONAL TRAINING	
Year	
Place	
Institution	
Field of training	
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian (2)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Fundamentals of Electrical Engineering 2, Professional study programme of electrical engineering Electrical Engineering, Professional study programme of computing
Authorship of university/faculty textbooks in the field of the course	*Fundamentals of Electrical Engineering 1*, lectures, 2012, course: *Fundamentals of Electrical Engineering 1*, published on web pages: https://elearning.fesb.unist.hr/

Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. N. Kovač, G. J. Anders, T. Kilić, Sheath Loss Factors Taking Into Account the Proximity Effect for Cable Line in a Touching Flat Formation, *IEEE Transactions on Power Delivery*, vol. 30, no. 3, pp. 1363-1371, Jun. 2015. 2. N. Kovač, N. Grulović-Pavljanić, A. Kukavica, Generated heat within power cable sheaths per unit time and volume, *Applied Thermal Engineering*, vol. 52, pp. 90-96, Apr. 2013. 3. N. Kovač, M. Cvetković, Analiza zagrijavanja kabelskog raspleta 10(20) kV uz TS 110/10(20) kV Visoka, *Elaborat za HEP Operater distribucijskog sustava d.o.o., DP Elektrodalmacija – Split*, Split, 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)	Scientific project “Modeling and Environmental Aspects of ENF Electromagnetic Fields“
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	4,7/5

First and last name and title of teacher	**Željan Lozina, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Engineering Mechanics
GENERAL INFORMATION ON COURSE TEACHER	
Address	Rendićeva 18
Telephone number	021-305-968
E-mail address	zeljan.lozina@fesb.hr
Personal web page	http://marjan.fesb.hr/~lozina/
Year of birth	1956.
Scientist ID	96925
Research or art rank, and date of last rank appointment	Scientific Adviser, 21.06.2000.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Senior Full Professor, 09.03.2005.
Area and field of election into research or art rank	Engineering Sciences, Field Engineering mechanics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	22.10.1982
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Dynamics/Vibration, Numerical methods, FEM
Function	Head of Chair of Dynamics and Vibration
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	FSB – Univerity of Zagreb
Place	Zagreb
Date	05.04.1989.
INFORMATION ON ADDITIONAL TRAINING	
Year	
Place	Udine, Italy
Institution	CISM
Field of training	Engineering Mechanics
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 (3)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	French (2)
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Mechanics of materials, Programming, Mechanisms, Vehicle (ship) systems,…
Authorship of university/faculty textbooks in the field of the course	Finte element method, Univerity of Split Kinematics, Univerity of Split Dynamics, Univerity of Split

	Programming, Univerity of Split
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. 1. Sedlar, Damir; Lozina, Željan; Vučina, Damir: An implementation of structural change detection procedure based on experimental and numerical model correlation. // Journal of sound and vibration. 331 (2012) , 13; 3068-3082 2. Vučina, Damir; Lozina, Željan; Pehnec, Igor.: Ad-Hoc Cluster and Workflow for Parallel Implementation of Initial-Stage Evolutionary Optimum Design. // Structural and multidisciplinary optimization. 45 (2012) , 2; 197-222 3. Vučina, Damir; Lozina, Željan; Pehnec, Igor.: Computational procedure for optimum shape design based on chained Bezier surfaces parameterization. // Engineering applications of artificial intelligence. 25 (2012) , 3; 648-667 4. Vučina, Damir; Lozina, Željan; Vlak, Frane.: NPV-based decision support in multi-objective design using evolutionary algorithms. // Engineering applications of artificial intelligence. 23 (2010) , 1; 48-60 5. Lozina, Željan; Sedlar, Damir; Vučina, Damir.: Model Update with Observer/Kalman Filter and Genetic Algorithm Approach. // Transactions of FAMENA. 36 (2012)
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	4. Cvitanić, Vedrana; Duplančić, Igor; Lozina, Željan; Ivandić, Daniel.:Earing predictions for Al2008-T4 sheet. // Aluminium and its alloys. 3 (2011) ; 73-77 5. Sedlar, Damir; Lozina, Željan; Vučina, Damir. 6. Comparison of Genetic and Bees Algorithm in the Finite Element Model Update. // Transactions of FAMENA. 35 (2011) , 1; 1-12
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	4. HRZZ Istraživački projekt: Mjeriteljska infrastruktura za pametne mreže, 2015. - 2018. 5. LLP - ERASMUS: Strategic Alignment of Electrical and Information Engineering in European Higher Education Institutions, 2012. -2014. 6. TEMPUS: Creation of the third cycle studies-doctoral studies in metrology Trajanje projekta: 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?-pedagoške kompetencije?	Me4
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	**Rino Lucić, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Electrical Safety
GENERAL INFORMATION ON COURSE TEACHER	
Address	Split, Duplančića dvori 3
Telephone number	091/ 4 305 611
E-mail address	Rino.Lucic@fesb.hr
Personal web page	-
Year of birth	1957
Scientist ID	154916
Research or art rank, and date of last rank appointment	Scientific Adviser, 18/1/2010
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Senior Full Professor, 18/1/2016
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	25/9/1987
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Numerical modeling of electromagnetic fields and transients
Function	-
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	16/09/1999.
INFORMATION ON ADDITIONAL TRAINING	
Year	1992
Place	Swansea (GB)
Institution	The University College of Swansea, University of Walles
Field of training	Numerical modeling of electromagnetic fields
Year	2001./ 2002.
Place	Amiens, San Quentin (France)
Institution	The University of P Picardie
Field of training	Numerical modeling of electrical machines by the finite element method and by permeance network method
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name	Electrical safety (Undergraduate study programme),FESB Electrical installations (vocational study programme),FESB

title of course, study programme where it is/was offered, and level of study programme)	Marine electrical systems (vocational study programme MCAST-Malta) Electrical technology (vocational study programme MCAST-Malta)
Authorship of university/faculty textbooks in the field of the course	-
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1) R. Lucić, et al. ' Grounding grid transient analysis using the improved transmission line model based on the finite element method', Int. Trans. on El. Energy Systems, 2013. 2) S. Vujević, R. Lucić, et. al. 'Creating rules and safety measures to ensure the place of work on power lines', Study report for HEP OPS, Split, 2013.
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 MZOŠ 023-0000000-3271 Project MZOŠ 023-0231581-1610 IPA projekt 'Professional development programs for MCAST students and lecturers', Malta, 2011/2012.
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	**Ivan Marasović, , Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Electronic devices and circuits, Digital instrumentation 1
GENERAL INFORMATION ON COURSE TEACHER	
Address	Jurja Šižgorića 14, 21000 Split
Telephone number	+385 21 305826
E-mail address	Ivan Marasovic@fesb.hr
Personal web page	
Year of birth	1983.
Scientist ID	297561
Research or art rank, and date of last rank appointment	Assistant research fellow, 07.07.2015.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assitant professor, 01.10.2015.
Area and field of election into research or art rank	Technical Sciences, Field electrical Engineering, Branch Electronics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	01/09/2007
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Electronics, Micro and nano electronics, Solar cells and photovoltaics, Embedded systems
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	11/05/2012
INFORMATION ON ADDITIONAL TRAINING	
Year	2011. (1 weeks)
Place	Freiburg, Germany
Institution	Fraunhofer ISE
Field of training	Photovoltaics
Year	2011. (2 weeks)
Place	Ljubaljana, Slovenia
Institution	Fakultet za elektrotehniko
Field of training	Semiconductor nanoelectronics
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Electronic devices and circuits, Undergraduate study of Electrical Engineering and Information Technology Basic electronics, Undergraduate study in Computing

	Digital instrumentation 1, Undergraduate study of Control Engineering and Automation, Electronic and Computer Engineering and Communication
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. L. Mainetti, I. Marasović, L. Patrono,P. Šolić, M.L. Stefanizzi, R. Vergallo “A Novel IoT-aware Smart Parking System based on the integration of RFID and WSN technologies., (2016), 833257 2. I. Marasović, Ž. Milanović, I. Zulim, “Modelling and detection of failure in medical electrodes”, (2015), 789296 3. S. Nižetić, I. Marasović, D. Čoko, “Experimental study on a hybrid energy system with small-and medium-scale applications for mild climates., (2014), 694087 4. I. Marasović, Ž. Milanović, T. Betti, “Resistance Fluctuations in GaAs Nanowire Grids”, Journal of Nanomaterials, (2014), 428390 5. I. Marasović, T. Garma, T. Betti, “Modelling a nanowire grid for light-sensing applications”, Journal of Physics D: Applied Physics 45 (2012)
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	4,0

First and last name and title of teacher	**Jadranka Marasović, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Simulation Modelling
GENERAL INFORMATION ON COURSE TEACHER	
Address	Split, Zagrebačka 21
Telephone number	385 021 305 830 (institution)
E-mail address	jmar@fesb.hr
Personal web page	/
Year of birth	1955.
Scientist ID	080633
Research or art rank, and date of last rank appointment	Senior Research Scientist, 09. July 2007.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full professor, 01. March 2009.
Area and field of election into research or art rank	Technical science, field of electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Machine Engineering and Naval Architecture, University of Split
Date of employment	04. May 1978.
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Science and Education
Function	/
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Doctor of science
Institution	Faculty of Electrical Engineering, Machine Engineering and Naval Architecture, University of Split
Place	Split
Date	11. July 1997.
INFORMATION ON ADDITIONAL TRAINING	
Year	/
Place	/
Institution	/
Field of training	/
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (excellent -5)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian (sufficient-2)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	**Undergraduate studies:** Mjerenje i vođenje procesa (Measurements and Process Control), Automatizacija industrijskih procesa (Industrial Process Control)

	Graduate studies: Automatsko reguliranje procesa (Automatic Control), Identifikacija sustava (System Identification), Praktikum iz vođenja procesa (Process Control Laboratory Exercises) Metode optimizacije (Optimization Methods), Operacijska istraživanja (Operations Research) Automatizacija (Automation) **Postgraduate study:** Optimization Techniques for Environmental Studies (Wessex Institute of Tecnology, UK i FESB) Game theory and optimization methods (FESB) Complex systems modelling and simulation (FESB)
Authorship of university/faculty textbooks in the field of the course	- (autor) Kvantitativno i kvalitativno modeliranje i simuliranje (Quantitative and Qualitative Modelling and Simulation) (ISBN 953-6114-67-4), - (koautor) On-line (web) udžbenik, Informatički projekt MZT-a, http://laris.fesb.hr/digitalno_vodjenje (Digital Control) - (autor) Predavanja iz kolegija Metode optimizacije (Lessons for Optimizaion Methods) (FESB, e-learning). - (autor) Predavanja iz kolegija Modeliranje i simuliranje sustava (Lessons for Modelling and Simulations) (FESB, e-learning).
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	- Marasović, Tea; Papić, Vladan; **Marasović, Jadranka**. *Motion-based Gesture Recognition Algorithms for Robot Manipulation*. // International Journal of Advanced Robotic Systems. 12 (2015), 51; 1-13, doi: 10.5772/60077. - **Marasović, Jadranka**; Marasović, Tea; Đapić, Marija. *Fair Division Methods Approach as the Option of Learning Process Modeling*. // Proceedings of 18th IEEE International Symposium on Computers and Communications (ISCC). 2013; 735-739. - Mance, Davor; **Marasović, Jadranka**. *EMC in Electronic System Developed to Support Measurements in Space Environment*. // Proceedings of 20th International Conference on Software, Telecommunications and Computer Networks (SoftCOM). 2012; 1-5.
Professional and scholarly articles published in the last five years in subjects of teaching methodology	/

and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	Associated member in scientific projects: - Računalna inteligencija za prepoznavanje i potporu ljudskih aktivnosti (RIPrePAkt), - GRS Front End Electronics Characterization for LISA, - Agentski orijentirani inteligentni sustavi za nadzor i zaštitu okoliša (Agents Oriented Intelligent Systems for Environment Control and Protection), - Inteligentni agenti u modeliranju i vođenju kompleksnih sustava (Intelligent Agents used for Complex Systems Modelling and Control), - Vođenje složenih sustava inteligentnim metodama (Intelligent Methods for Complex Systems Control).
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	/
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	/
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

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

years in the field of the course (5 works at most)	
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	4.8

First and last name and title of teacher	**Daniela Matić, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	English Language
GENERAL INFORMATION ON COURSE TEACHER	
Address	Matice hrvatske 23, 21000 Split
Telephone number	098/ 1766010
E-mail address	daniela.matic@fesb.hr
Personal web page	/
Year of birth	1967
Scientist ID	332846
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	Assistant professor; January 23, 2013
Area and field of election into research or art rank	Humanities; philology
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	November 11, 2005
Name of position (professor, researcher, associate teacher, etc.)	English teacher
Field of research	ESP, pragmatics, discourse analysis, contact linguistcs
Function	/
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Ph.D.
Institution	Faculty of Humanities and Social Sciences, University of Zagreb
Place	Zagreb
Date	December 12, 2011
INFORMATION ON ADDITIONAL TRAINING	
Year	1998
Place	Barnstaple, Velika Britanija
Institution	Services for Open Learning, Barnstaple, Inservice Course in Teacher Training
Field of training	English language teaching methodology
Year	2002.
Place	Gyula, Hungary
Institution	A.S.Hornby International Trust, British Council, "Teaching English through Culture"
Field of training	English language teaching methodology
Year	2003
Place	Krakow, Poland
Institution	A.S.Hornby International Trust, British Council, "Intercultural Studies on the Web: Methodology and Materials"
Field of training	English language teaching methodology
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English; 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	French; 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian; 3

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)	Course teacher of : - English Language 1, 2 and 3 courses at undergraduate studies of Computer Science, Electrical Engineering and IT and Naval Architecture; - English Language 1 and 2 courses at professional studies of Computer Science, Electrical Engineering and IT and Naval Architecture; - English Language for Academic purposes at graduate studies of Mechanical Engineering.
Authorship of university/faculty textbooks in the field of the course	/
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Matić, Daniela. (2012). Zamjenice u hrvatskim političkim govorima. *Filolog: časopis za jezik, književnost i kulturu*. V/2012, Univerzitet u Banjoj Luci, Filološki fakultet, ISSN 1986-5864. 2. Matić, Daniela. (2012). Jezične igre moći u drami Who's Afraid of Virginia Woolf? Edwarda Albeeja. *LINGUA MONTENEGRINA časopis za jezikoslovna, književna i kulturna pitanja,* god. V/2, br. 10. (2012). Podgorica: Institut za crnogorski jezik i književnost. ISSN 1800-7007. 3. Matić, Daniela. (2012). Ideological Discourse Structures in Political Speeches. *Komunikacija i kultura online. Elektronski časopis za jezik, komunikaciju i kulturu*. Godina III. Broj 3. http://www.komunikacijaikultura.org/KK3.html Beograd: FOKUS – Forum za interkulturnu komunikaciju. e-ISSN 2217-4257 (Online) UDC 8:008:316.7 4. Matić, Daniela. (2013). Pronouns in American Political Speeches. *LINGUA MONTENEGRINA časopis za jezikoslovna, književna i kulturna pitanja*, god. VI/1 br. 11. (2013). Podgorica: Institut za crnogorski jezik i književnost. ISSN 1800-7007. 5. Matić, Daniela, Nataša Stojan. (2013). Rodne oznake u oglasima za posao. Kroz jezike i kulture ; Across Languages and Cultures - *Zbornik radova sa Treće međunarodne konferencije Instituta za strane jezike (ICIFL3) i Treće međunarodne konferencije o interkulturnoj komunikaciji* / Lakić, Igor ; Kostić, Nataša (ur.). - Podgorica : Institut za strane jezike / Institute of Foreign Languages, 2013. 59-69 ISBN: 978-86-85263-10-1. 6. Matić, Daniela. (2014). Ideology Hidden in the Form of Croatian and American Political Speeches. *Teme. Časopis za društvene nauke.* Br.3 (2014). Niš: Univerzitet u Nišu. ISSN 0353-7919.
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	1. Matić, Daniela. (2014). Attitudes of computer science students to the English element in Croatian ICT magazines. *ESP Today. Journal of English for Specific Purposes at Tertiary Leve*l. Volume 2, Issue 2 (2014). http://www.esptodayjournal.org/index.html e-ISSN 2334-9050. 2. Matić, Daniela. (2015). Percepcija hrvatskih studenata računarstva o prihvatljivosti engleskoga elementa u glagolima, glagolskim imenicama i jukstaponiranim leksičkim segmentima u hrvatskim tekstovima iz područja računalnih i komunikacijskih tehnologija. *Od teorije do prakse u jeziku struke - Zbornik radova s 3. stručno-znanstvenog skupa Udruge nastavnika jezika struke na visokoškolskim ustanovama.*/ Cigan, Vesna; Omrčen,

	Darija (ur.) – Zagreb: Udruga nastavnika jezika struke na visokoškolskim ustanovama, 2015. 65-81.
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	Students' attitudes toward the English element in ICT terminology
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?	Regular four-year studies of the English language and literature and the French language and literature at Zagreb University.
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)	Positive

First and last name and title of teacher	**Anita Matković, Ph.D., Associate Professor**
The course he/she teaches in the proposed study programme	Mathematics 3
GENERAL INFORMATION ON COURSE TEACHER	
Address	FESB, R. Boškovića 32, B804
Telephone number	021 305894
E-mail address	anita.matkovic@fesb.hr
Personal web page	https://nastava.fesb.hr/nastava/nastavnici/detalji/amatkovi
Year of birth	1966
Scientist ID	180406
Research or art rank, and date of last rank appointment	higher scientific collaborator
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Associate Professor, 2011
Area and field of election into research or art rank	Area od Natural Sciences, Field of Mathematics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	FESB, Split
Date of employment	2006
Name of position (professor, researcher, associate teacher, etc.)	Associate Professor
Field of research	Mathematics
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Ph.D.
Institution	University of Zagreb, Faculty of Science
Place	Zagreb, Croatia
Date	October 2006
INFORMATION ON ADDITIONAL TRAINING	
Year	
Place	
Institution	
Field of training	
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Mathematics 1, Mathematics 2, Mathematics 3, Mathematics – selected topics, undergraduate studies of electrical engineering, mechanical engineering and naval archicecture.
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Matković, A., Generalization of the Jensen-Mercer inequality by Taylor's polynomial, Mathematical Inequalities and Applications, 19 (2016), 4; 1387-1398. 2. Matković, A.; Pečarić, Josip.; Perić, J., A refinement of the Jessen-Mercer inequality and a generalization on

	convex hulls in R^k, Journal of Mathematical Inequalities 9 (2015), 4; 1093-1114.
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	1. Convex functions and applications, project MZOS No. 177-1170889-1207, 2007- 2015, collaborator. 2. 2. Inequalities and Applications , HRZZ research project No. 5435, 2014- , collaborator.
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	Graduate teachers study of mathematics and informatics, University of Split, Faculty of Science.
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)	Evaluations organized by the Quality Enhancement Centre of the University of Split each semester. Average grade is 4.4 on the 1-5 scale.

First and last name and title of teacher	**Tonći Modrić, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Elements of Electrical Power Switchgears Electrical Installations and Lighting
GENERAL INFORMATION ON COURSE TEACHER	
Address	Tijardovićeva 14, 21000 Split, Croatia
Telephone number	+385 21 305-630
E-mail address	tmodric@fesb.hr
Personal web page	-
Year of birth	1982.
Scientist ID	325646
Research or art rank, and date of last rank appointment	Research associate, 20.11.2014.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant Professor, 17.12.2014.
Area and field of election into research or art rank	Technical Sciences, Electrical Engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	University of Split Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture (FESB)
Date of employment	1.12.2010.
Name of position (professor, researcher, associate teacher, etc.)	Assistant Professor
Field of research	Electric Power Engineering
Function	-
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Ph. D.
Institution	FESB
Place	Split
Date	5.5.2014.
INFORMATION ON ADDITIONAL TRAINING	
Year	-
Place	-
Institution	-
Field of training	-
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English, 4
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)	7. Lovrić, D.; Vujević, S.; Modrić, T.: "Comparison of different metal oxide surge arrester models", Proceedings of the International Conference on Applied Electromagnetics (PES 2011), Perić, Z. (ur.), Niš, Serbia: 2011, pp. (O1–2) 1–4. 8. Vujević, S.; Balaž, Z.; Modrić, T.; Sarajčev, P.: "Hybrid Model for Analysis of Ground Fault Current Distribution",

	International Review of Electrical Engineering, Vol. 7 (2), 2012, pp. 4035–4045. 9. Modrić, T.; Vujević, S.; Lovrić, D.: "Napredni algoritmi za analizu elektromagnetskih polja elektroenergetskih vodova i postrojenja", 11. savjetovanje HRO CIGRE / Filipović-Grčić, B. (ur.) - Zagreb: Hrvatski ogranak CIGRE, 2013. pp. (C4–18) 1–10. 10. Modrić, T.; Vujević, S.; Majić, T.: "Geometrical Approximation of the Overhead Power Line Conductors", International Review on Modelling and Simulations, Vol. 7(1), 2014, pp. 76–82. 11. Vujević, S.; Modrić, T.; Vukić, B.: "Internal Impedance of Two-Layer Cylindrical Conductors", International Review of Electrical Engineering, Vol. 9(1), 2014, pp. 235–243.
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	-
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	1. Vujević, S.; Lucić, R.; Jurić-Grgić, I.; Lovrić, D.; Modrić, T.; Balaž, Z.: "Izrada pravila i mjera sigurnosti za osiguranje mjesta rada na elektroenergetskim vodovima", 2013. 2. Vujević, S.; Lovrić, D.; Modrić, T.: "Mjerenje i analiza razine neionizirajućeg elektromagnetskog polja u okolišu TS 10/0,4 kV Brda 3", 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)	4,7/5

First and last name and title of teacher	**Josip Musić, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Digital electronics, Automatic control 2, Computer methods in biomechanics
GENERAL INFORMATION ON COURSE TEACHER	
Address	Ruđera Boškovića 32, Split
Telephone number	+ 385 (0)21 305 829
E-mail address	jmusic@fesb.hr
Personal web page	http://marjan.fesb.hr/~jmusic
Year of birth	1980
Scientist ID	272932
Research or art rank, and date of last rank appointment	Senior research associate (February 2013)
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant professor (July 2014)
Area and field of election into research or art rank	Technical sciences, Electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of electrical engineering, mechanical engineering and naval architecture, University of Split
Date of employment	September 2014
Name of position (professor, researcher, associate teacher, etc.)	Assistant professor
Field of research	Robotics and automatization
Function	/
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of electrical engineering, mechanical engineering and naval architecture, University of Split
Place	Split
Date	28.04.2010.
INFORMATION ON ADDITIONAL TRAINING	
Year	2012
Place	Glasgow, Scotland, UK
Institution	School of Computing, University of Glasgow
Field of training	human-computer interaction (HCI), signal processing
Year	2008
Place	Glasgow, Scotland, UK
Institution	Department of Computing, University of Glasgow
Field of training	human-computer interaction (HCI), signal processing
Year	2005.
Place	Ljubljana, Slovenia
Institution	Faculty of electrical engineering, University of Ljubljana
Field of training	robotics, biomechanics
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian (2)
COMPETENCES FOR THE COURSE	

Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Automation (412/512), Automatic control 2 (910,11), Digital electronics (110), Digital control (210), Sensors and transducers (512), Biomechanics Practicum (412/512), Programing mobile robots and drones (221/222/242/250), Computer methods in biomechanics (111), Computers and computer methods in biomechanics (310/330), Telemedicine and biocybernetics (210/220/242)m Introduction to system theory (330)
Authorship of university/faculty textbooks in the field of the course	M. Bonković, J. Music, I. Stančić, Microcontrollers and embedded network systems based on Arduino development environment, faculty script, 2014
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Music, Josip; Bonković, Mirjana; Cecić, Mojmil: "Comparison of uncalibrated model-free visual servoing methods for small amplitude movement: a simulation study", International Journal of Advanced Robotic Systems, 2014 (DOI: dx.doi.org/10.5772/58822) 2. Stančić, Ivo; Music, Josip; Cecić, Mojmil: "A Novel Low-Cost Adaptive Scanner Concept for Mobile Robots", Ingenieria e Investigacion, 34 (2014), 3; 37-43 3. Stančić, Ivo; Music, Josip; Zanchi, Vlasta: "Improved structured light 3D scanner with application to anthropometric parameter estimation", Measurement, 46 (2013), 1; 716-726 4. Music, Josip; Cecić, Mojmil; Zanchi, Vlasta: "Real-time body orientation estimation based on two-layer stochastic filter architecture", Automatika : časopis za automatiku, mjerenje, elektroniku, računarstvo i komunikacije, 51 (2010), 3; 264-274 5. Music, Josip; Murray-Smith, Roderick: "Virtual Hooping: teaching a phone about hula-hooping for Fitness, Fun and Rehabilitation", Proceedings of Mobile Human Computer Interaction (MobileHCI) 2010. 309-312
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	/
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	1. Compressive sensing and super-resolution in surveillance systems based on optical sensors and UAVs, 2015-2017, Bilateral Croatia-Montenegro cooperation, project lead 2. Supervised and unsupervised learning from imbalanced datasets for assistance in movement of persons with low vision, 2014-2015, Bilateral Croatia-Slovenia cooperation, project lead 3. Prototyping a module for automatization of industrial floor scrubbers, 2014-2016, Split-Dalmatia county and Odabir d.o.o., project lead 4. Computer intelligence for classification and support of human activities, 2014 - , Faculty/University project, researcher 5. Biomechanics of human motion, control and rehabilitation, 2007-2014, Ministry of science, education and sports, researcher

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

First and last name and title of teacher	**Julije Ožegović, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Digital Electronics Computer Networks
GENERAL INFORMATION ON COURSE TEACHER	
Address	Istarska 2, 21000 Split, HR
Telephone number	+385 21 305825
E-mail address	julije.ozegovic@fesb.hr
Personal web page	www.fesb.hr/~julije
Year of birth	1954.
Scientist ID	91795
Research or art rank, and date of last rank appointment	Scientific Advisor, 2008-03-12
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Senior Full Professor, 2013-09-15
Area and field of election into research or art rank	Technical Sciences, Field Electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	1979-10-01
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Digital electronics, Computer networks, Automata theory
Function	Head of Chair of Digital Systems and Computer Network
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	1998-02-27
INFORMATION ON ADDITIONAL TRAINING	
Year	
Place	
Institution	
Field of training	
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (5)
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)	Digital Electronics, Undergraduate study of Electrotechnics, 2006/2007 - today Discrete systems and structures, Undergraduate study of Computing, 2006/2007 - today Computer Networks, Undergraduate study of Electrotechnics, 2006/2007 - today Computer Networks, Undergraduate study of Computing, 2006/2007 - today Digital Electronics, Graduate study of Electrotechnics (pre-Bologna), 1998/1999 -2006/2007 Discrete systems and structures, Graduate study of Computing (pre-Bologna), 19982000/2001 - 2006/2007

	Computer Networks, Graduate study of Electrotechnics (pre-Bologna), 1998/1999 -2007/2008 Computer Networks, Graduate study of Computing (pre-Bologna), 1998/1999 -2007/2008
Authorship of university/faculty textbooks in the field of the course	Julije Ožegović, Digitalna i mikroprocesorska tehnika, ISBN 953-6806-26-6, Split University, 2000, several editions Julije Ožegović, Digital electronics, Discrete systems and structures, elearning.fesb.hr, updated from 1998 Julije Ožegović, Computer Networks, elearning.fesb.hr, updated from 1998
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	Kedžo, Ivan; Ožegović, Julije; Kristić, Ante: Contention Overhead — Adaptive Binary Priority Countdown protocol, SoftCOM 2013, ISBN 978-953-290-043-9 Kristić, Ante; Ožegović, Julije; Kedžo, Ivan: Mathematical model of simplified Constrained Priority Countdown Freezing protocol, The 18th IEEE Symposium on Computers and Communications (ISCC'13), 2013, ISBN 978-1-4673-2711 Kristić, Ante; Ožegović, Julije; Kedžo, Ivan: Improved mathematical model of simplified Constrained Priority Countdown Freezing protocol, SoftCOM 2013, ISBN 978-953-290-043-9 Kristić, Ante; Ožegović, Julije; Kedžo, Ivan: Mathematical model of Constrained Priority Countdown Freezing Protocol, SoftCOM 2014, ISBN 978-9-5329-0052-1 Ines Ramadza, Julije Ozegovic, Vesna Pekic: Class based tunnel exclusion router architecture, SoftCOM 2014, ISBN 978-9-5329-0052-1
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	12. Media access mechanism modelling for wireless local networks (MAMM), FESB Split, od 2014. 13. HGCAL - CERN CMS, from 2015.
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences.	Me4CataLOgue – Teaching and administrative personnel training
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	Coauthor of awarded paper - ISCC conference 2013.
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	4

First and last name and title of teacher	**Vladan Papić, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Databases Computer Methods in Biomechanics Systems Theory
GENERAL INFORMATION ON COURSE TEACHER	
Address	Makarska 2, 21000 Split
Telephone number	(021) 305649
E-mail address	vpapic@fesb.hr
Personal web page	www.fesb.hr/~vpapic
Year of birth	1968
Scientist ID	227412
Research or art rank, and date of last rank appointment	Scientific Adviser, 20/4/2010
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Senior Full Professor, 17/12/2015
Area and field of election into research or art rank	Technical Sciences, Field Computer science
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	1/7/20097
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Computer Vision, Expert Systems
Function	Vice-dean for bussines
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	12/2/2002
INFORMATION ON ADDITIONAL TRAINING	
Year	
Place	
Institution	
Field of training	
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian (2)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Computers in technical systems (PMF, Informatika i tehnička kultura, Undergraduate study programme, 2002-2009.) Electronics (PMF, Informatika i tehnička kultura, Undergraduate study programme 2002 – 2009.) Systems theory (FESB, EIT, Undergraduate study programme, 2009-)
Authorship of university/faculty textbooks in the field of the course	V.Papić, Lectures in electronics, University textbook, 2005. (in Croatian)

	V. Papić, Computer graphics, Faculty textbook, 2013. (in Croatian)
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. J. Musić, T. Marasović, V. Papić, I. Orović, S. Stanković, Performance of compressive sensing image reconstruction for search and rescue, IEEE Geoscience and Remote Sensing Letters, Volume 13, Issue 11, November 2016, Pages 1739-1743. 2. J. Musić, I. Orović, T. Marasović, V. Papić, S. Stanković, Gradient Compressive Sensing for Image Data Reduction in UAV Based Search and Rescue in the Wild, Mathematical Problems in Engineering, Volume 2016, 2016. 3. I. Orović, V. Papić, C. Ioana, X. Li, S. Stanković, Compressive Sensing in Signal Processing: Algorithms and Transform Domain Formulations, Mathematical Problems in Engineering, Volume 2016, 2016. 4. T. Marasović, V. Papić, V. Zanchi, LMNN metric learning and fuzzy nearest neighbour classifier for hand gesture recognition, Journal on Multimodal User Interfaces, Volume 9, Issue 3, 27 August 2015, Pages 211-221. 5. T. Marasović, V. Papić, J. Marasović, Motion-based gesture recognition algorithms for robot manipulation, International journal of advanced robotic systems. 12 (2015) , 51; 1-13.
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	-
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	1. »Technology transfer infrastructure in the Croatian Adriatic region« - TTAdria (IPA IIIc), 2013-2015. 2. "Computer intelligence for recognition and support of human activities " (RIPrePAkt) (FESB), 2013-. (lead researcher). 3. „Search and rescue system prototype based on image processing " (FESB - Statim d.o.o.), 2014-. (lead researcher) 4. „Advanced methods of 3D virtualization – towards virtual turism and digitalization of cultural heritage“ (FESB – Neir d.o.o.), 2015-. (researcer). 5. International bilateral project Croatia- ”Compressive sensing and superresolution in surveillance systems based on optical sensors and UAVs ", Contract with MZOS RH and MZT Republike Crne Gore, 2015-2016. (researcher)
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	Mentor of best student (Marko Trninić) in field of social and humanistic sciences (annual award HRZZ, 2010).
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)	4.1/5

First and last name and title of teacher	**Goran Petrović, Ph.D., Associate Professor**
The course he/she teaches in the proposed study programme	Instrumentation for Smart Grid
GENERAL INFORMATION ON COURSE TEACHER	
Address	Split, Ruđera Boškovića 32
Telephone number	+385 21 305 731
E-mail address	petrovic@fesb.hr
Personal web page	
Year of birth	1971
Scientist ID	248882
Research or art rank, and date of last rank appointment	Research scientist 19.12. 2012.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Associate professor 19.12. 2012.
Area and field of election into research or art rank	Technical sciences, electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	FESB
Date of employment	30. 03. 1998.
Name of position (professor, researcher, associate teacher, etc.)	professor
Field of research	Electrical and process measurement, Signal processing
Function	Head of Department for power engineering
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	FESB
Place	Split
Date	24. 03. 2006.
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; very good (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	1. Measurement and signal processing, Electrical engineering, graduate 2. Process measurement, Electrical engineering, graduate 3. Instrumentation in electrical engineering, Electrical engineering, undergraduate
Authorship of university/faculty textbooks in the field of the course	

Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Bosnić, Juraj Alojzije; Petrović, Goran; Malarić, Roman. Estimation of the wall thermal properties through comparison of experimental and simulated heat flux // 21ST IMEKO TC-4 measurement. Budapest, 2016. 2. Mostarac, Petar; Malarić, Roman; Petrović, Goran. Measurement of frequency spectrum with interpolated adaptive chirp-z transformation // XXI IMEKO world congres. Prag,: Czech Technical University in Prague, 2015. 2008-2011. 3. Petrović, Goran; Malarić, Roman; Ivana, Kardum. Matlab based flickermeter // 20th IMEKO TC4 International Symposium and 18th International Workshop on ADC Modelling and Testing. Benevento: University of Sannio, 2014. 31-34. 4. Lorincz, Josip; Matijević, Tončica; Petrović, Goran. On interdependence among transmit and consumed power of macro base station technologies. // Computer communications. 50 (2014) ; 10-28 5. Petrović, Goran; Kilić, Tomislav; Garma, Tonko. Measurement and Estimation of the Extremely Low Frequency Magnetic Field of the Overhead Power Lines. // Elektronika ir elektrotechnika. 19 (2013) , 7; 33-36.
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	1. Smart grid metrology infrastructure, HRZZ Research Projects 2015- 2. Extracting electric energy from human body for supplying autonomous biomedical devices and new PVDF transducer optimization, Bilateral Croatian Italian scientific project 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?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	**Dragan Poljak, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Computer Based Analysis of Electric Circuits and Transmission Lines, Electromagnetic Fields
GENERAL INFORMATION ON COURSE TEACHER	
Address	Vinka Milića 88, Split
Telephone number	0914305698
E-mail address	dragan.poljak @fesb.hr
Personal web page	
Year of birth	1965
Scientist ID	180803
Research or art rank, and date of last rank appointment	Scientific Adviser, 2005.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Senior Full Professor, 2010.
Area and field of election into research or art rank	Technical Sciences, Area Electronics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	September 1990.
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Classical electromagnetiism, Numerical methods in electromagnetics, Electromagnetic compatibility, Bioelectromagnetics, Magnetohydrodynamics
Function	Head of Group for Electriomagnetic Compatibility and Numerical Methods in Electronics
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	9/30/1996
INFORMATION ON ADDITIONAL TRAINING	
Year	
Place	
Institution	
Field of training	
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	French (3)
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Fundamentals of Electrical Engineering I and II, (Undergraduate study programme), Electromagnetic Waves, Fields and Waves in Electronics, Numerical Methods in Communications, Electromagnetic Ecology and Dosimetry, Electromagnetic Compatibility (Graduate study programme)

Authorship of university/faculty textbooks in the field of the course	1. D.Poljak, *Teorija elektromagnetskih polja s primjenama u inženjerstvu*, Šk. knjiga Zagreb, 2014. 2. D.Poljak i dr., *Modeliranje žičanih antena primjenom računala*, Kigen Zagreb 2009. 3. D. Poljak, *Advanced Modeling in Computational Electromagnetic compatibility*, Wiley Interscience, New York 2007.
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Poljak, Dragan; Antonijević, Siniša; Šesnić, Silvestar; Lallechere, S.; El Khamlichi Drissi, K., On deterministic-stochastic time domain study of dipole antenna for GPR applications. // *Engineering analysis with boundary elements*. 73 (2016) ; 14-20. 2. Poljak, Dragan; Šesnić, Silvestar; Drissi, Khalil El-Khamlichi; Kerroum, Kamal; Tkachenko, Sergey, Transient Electromagnetic Field Coupling to Buried Thin Wire Configurations: Antenna Model versus Transmission Line Approach in the Time Domain. // *International Journal of Antennas and Propagation*. (2016) ; 3943754-1-3943754-11. 3. Poljak, Dragan; Šesnić, Silvestar; Čavka, Damir; Drissi, Khalil El Khamlichi. On the use of the vertical straight wire model in electromagnetics and related boundary element solution. // *Engineering analysis with boundary elements*. 50 (2015) ; 19-28. 4. Poljak, Dragan; Čavka, Damir; Dodig, Hrvoje; Peratta, Cristina; Peratta, Andres. On the use of the boundary element analysis in bioelectromagnetics. // *Engineering analysis with boundary elements*. 49 (2014) ; 2-14. 5. Antonijevic, Sinisa; Poljak, Dragan. A Novel Time-Domain Reflection Coefficient Function: TM Case. // *IEEE transactions on electromagnetic compatibility*. 55 (2013) , 6; 1147-1153.
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	• ICES SC6 The IEEE International Committee on Electromagnetic Safety (ICES, Tecnical Committee 95), Subcommittee SC6 on Electromagnetic Field Dosimetry • COST Action BM1309: European network for innovative uses of EMFs in biomedical applications • COST Action TU1208: Civil Engineering Applications of Ground Penetrating Radar • COST ACTION IC 1407: Advanced characterisation and classification of radiated emissions in densely integrated technologies (ACCREDIT) • ITER Physics, EUROFusion, WPCD (Code development for Integrated Modeling)
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
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. Annualfor 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	**Ivica Puljak, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Physics 1
GENERAL INFORMATION ON COURSE TEACHER	
Address	Vinogradska 80, 21000 Split
Telephone number	0915389040
E-mail address	Ivica.Puljak@fesb.hr
Personal web page	
Year of birth	1969
Scientist ID	233396
Research or art rank, and date of last rank appointment	
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full professor, February 2017
Area and field of election into research or art rank	Area of natural sciences, field of physics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	University of Split *Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture* R. Boškovića 32 21000 Split Croatia
Date of employment	12.5.1994.
Name of position (professor, researcher, associate teacher, etc.)	professor
Field of research	Physics
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	University of Pierre and Marie Curie
Place	Paris, France
Date	September 2000
INFORMATION ON ADDITIONAL TRAINING	
Year	1994. – 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)	French 5
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Higgs boson physcis, doctoral program, Ecole Polytechnique, Palaiseau, France and ETH, Zurich, Switzerland Numerical method in high energy physics, graduate program, University of Split, Faculty of Scince
Authorship of university/faculty textbooks in the field of the course	Faculty text book*:* *Instructions for laboratory exercises in Physics 1*
Professional, scholarly and artistic articles published in the last five	1. **Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC**

years in the field of the course (5 works at most)	By: Chatrchyan, S.; Khachatryan, V.; Sirunyan, A. M.; et al., Group Author(s): CMS Collaboration PHYSICS LETTERS B Volume: 716 Issue: 1 Pages: 30-61 Published: SEP 17 2012 2. **Combined results of searches for the standard model Higgs boson in pp collisions at root s=7 TeV** By: Chatrchyan, S.; Khachatryan, V.; Sirunyan, A. M.; et al., Group Author(s): CMS Collaboration PHYSICS LETTERS B Volume: 710 Issue: 1 Pages: 26-48 Published: MAR 29 2012 3. **Study of the Mass and Spin-Parity of the Higgs Boson Candidate via Its Decays to Z Boson Pairs** By: Chatrchyan, S.; Khachatryan, V.; Sirunyan, A. M.; et al., Group Author(s): CMS Collaboration PHYSICAL REVIEW LETTERS Volume: 110 Issue: 8 Article Number: 081803 Published: FEB 21 2013 4. **Observation of a new boson with mass near 125 GeV in pp collisions at root s=7 and 8 TeV** By: Chatrchyan, S.; Khachatryan, V.; Sirunyan, A. M.; et al., Group Author(s): CMS Collaboration JOURNAL OF HIGH ENERGY PHYSICS Issue: 6 Article Number: 081 Published: JUN 2013 5. **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 Volume: 89 Issue: 9 Article Number: 092007 Published: MAY 14 2014
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 Science Foundation (1.10.2014. god. – 30.9.2018. god.). ***HRZZ Research Projects* (Very high energy gamma ray astronomy with the MAGIC telescopes)**, Croatian Science Foundation (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?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	2017 Science and art Award from the University of Split 2016 Award for the best presentation from "Društvo za promociju znanosti i kritičkog mišljenja" 2014 Croatian National Science Award 2014 Science Award from the University of Split 2013 European Physical Society Prize, The 2013 High Energy and Particle Physics Prize *Co-winner as a member of the CMS Collaboration* 2013 Croatian National Order of "Danica Hrvatska", with Ruđer Bošković, for scientific contribution 2011 Annual Science Award by the newspaper "Slobodna Dalmacija"

	2011 Distinguished Teaching Award by the student association 2001 Best Thesis Award by the CMS collaboration 2000 PhD from University «Pierre et Marie Currie», Paris VI, obtained with Honours *Très honorable, avec les félicitations du jury*
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	Information and Communications
GENERAL INFORMATION ON COURSE TEACHER	
Address	Put Pašika 5i, 21400 Supetar, HR
Telephone number	+385 21 305634
E-mail address	radic@fesb.hr
Personal web page	
Year of birth	1975.
Scientist ID	248893
Research or art rank, and date of last rank appointment	Senior Research Associate, March 10, 2016.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Associate professor, March 16, 2016.
Area and field of election into research or art rank	Technical Sciences, Field Electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	September 1, 2001.
Name of position (professor, researcher, associate teacher, etc.)	Associate professor
Field of research	Information an Communication technology, Digital Signal Processing, Coding Theory
Function	Head of Chair of Communication and Information Technology
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	July 15, 2001.
INFORMATION ON ADDITIONAL TRAINING	
Year	
Place	
Institution	
Field of training	
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (3)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Network Analysis, Undergraduate study programme,

Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Šolić, Petar; Maras, Josip; Radić, Joško; Blažević, Zoran. Comparing Theoretical and Experimental Results in Gen2 RFID Throughput. // Ieee transactions on automation science and engineering. 14 (2016) , 1; 349-357. 2. Šolić, Petar; Radić, Joško; Rožić, Nikola. Early Frame Break Policy for ALOHA-Based RFID Systems. // IEEE transactions on automation science and engineering. PP (2015) , 99; 1-6. 3. Šolić, Petar; Radić, Joško; Rožić, Nikola. Energy Efficient Tag Estimation Method for ALOHA-based RFID systems. // IEEE sensors journal. 14 (2014) , 10; 3637-3647. 4. 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. 5. 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)	14. Look into the Future. 15. 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?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	4,6/5

First and last name and title of teacher	**Ante Rozga, Ph. D., Full Professor**
The course he/she teaches in the proposed study programme	Probability and Statistics
GENERAL INFORMATION ON COURSE TEACHER	
Address	21000 Split, 166 Vukovarska
Telephone number	021 430-649
E-mail address	rozga@efst.hr
Personal web page	http://www.efst.unist.hr/o-fakultetu/fakultet/djelatnici/osoba/detalji/rozga
Year of birth	1951
Scientist ID	057876
Research or art rank, and date of last rank appointment	Scientific adviser, 2009
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full Professor Tenure, 2014.
Area and field of election into research or art rank	Social Sciences, Economics. Quantitative Methods.
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Economics, University of Split
Date of employment	1.10. 1977.
Name of position (professor, researcher, associate teacher, etc.)	Professor.
Field of research	Quantitative Methods, Statistics. Multivariate Analysis. Survival Analysis. Statistical Methodology in Scientific Research.
Function	Professor.
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Economics.
Place	Split
Date	2001
INFORMATION ON ADDITIONAL TRAINING	
Year	1985/86
Place	London. U.K.
Institution	The London School of Economics and Political Science, Department of Statistics. Graduate studies.
Field of training	Statistics. The Analysis of Time Series.
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, 5
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	French, 3
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	1. Statistics. Undergraduate studies. Faculty of Economics, University of Split. 2. Statistical Analysis. Undergraduate studies. Faculty of Economics, University of Split. 3. Biostatistics. Undergraduate and PhD studies. School of Medicine. University of Split.

	4. Statistics. Graduate Studies. Faculty of Mechanical Engineering. University of Split. 5. Probability and Statistics. Faculty of Electrical Engineering. University of Split. 6. Statistical Methodology in Scientific Research. PhD Studies. Faculty of Economics, University of Split. 7. Multivariate Analysis. PhD Studies. Faculty of Economics, University of Split. 8. Statistical Methods in Forensics. Graduate Studies. School of Forensic Sciences. University of Split.
Authorship of university/faculty textbooks in the field of the course	1. Rozga A., (1994): *Statistička analiza*. Ekonomski fakultet Split. X+148 pages. 2. Rozga A., (2009): *Statistika za ekonomiste*. Ekonomski fakultet Split. X+336 pages. 3. Rozga A. and B. Grčić., (2009): *Poslovna statistika*. Ekonomski fakultet u Splitu. IX + 271 pages. 4. Pivac S. and A. Rozga., (2007): *Statistika za sociološka istraživanja*. Filozofski fakultet Sveučilišta u Splitu. 264 pages. 5. Pivac S. and A. Rozga., (2008): *Statistika za sociologe*. Filozofski fakultet Sveučilišta u Splitu. 231 pages.
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Rozga A., E. Jurun and I. Šutalo (2013): *Correction od Chain-Linking Method by Means of Lloyd-Moulton-Fisher-Tornquist Index on Croatian GDP Data.* Croatian Operational Research Review. 2. Šerić N., A. Rozga and A. Luetić (2014): *Relationship between Business Intelligence and Supply Chain Management for Marketing Decisions.* Universal Journal of Industrial and Business Management, 2; 31-35. 3. Visković J., J. Arnerić and A. Rozga (2014): *Volatility Swiching Between Two Regimes.* International Journal of Social, Human Science and Engineering. Madrid. Spain. Madrid. ISNN: 1307-6892. Vol:9, no 3. 4. Arnerić, J., Čeh-Časni, A., Rozga, A. (2015): *Pre-adjustment Process of Real Retail Trade Series in Croatia*, The Business and Management Review, Vol. 6, No. 2, pp. 104-112, ISSN 2047-2854. 5. Poklepović, T., Aljinović, Z and Rozga, A (2016): *Moments Extraction from Implied Probability Distribution: Nonstructural Approach*. Proceedings of the 02nd International Conference on Business Management and Economics: 02nd ICBME 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	1. Project: *Building of Macro econometric Model of Croatian Economy*, (code of the project: 055-0551147-1146).

carried out in the last five years (5 at most)	2. Project *Quality Assurance in Higher Education.* UNESCO.
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	**Mladen Russo, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Multimedia
GENERAL INFORMATION ON COURSE TEACHER	
Address	Žnjanska 4, Split
Telephone number	091/2305-844
E-mail address	mrusso@fesb.hr
Personal web page	
Year of birth	1977.
Scientist ID	248902
Research or art rank, and date of last rank appointment	Senior scientific associate, 24.10.2013.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant professor, 01.01.2013.
Area and field of election into research or art rank	Technical sciences, electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	FESB - Split
Date of employment	08.06.2001.
Name of position (professor, researcher, associate teacher, etc.)	Assistant professor
Field of research	Signal processing, speech recognition, localization
Function	
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Ph.D.
Institution	FESB – Split
Place	Split
Date	29.06.2010.
INFORMATION ON ADDITIONAL TRAINING	
Year	
Place	
Institution	
Field of training	
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English, 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian, 2
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five	1. Sikora, Marjan; Grčić, Đana; Russo, Mladen. A tool for soundscape auralization of ancient archaeological sites //

years in the field of the course (5 works at most)	Proceedings of 7th congress of Alps Adria Acoustic Association Ljubljana, Slovenija, 2016. 2. 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. 3. Stella, Maja; Russo, Mladen; Begušić, Dinko. Fingerprinting based localization in heterogeneous wireless networks // Expert systems with applications, 41 (2014), 15; 6738-6747. 4. 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. 5. 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. 6. Primorac, Sanja; Russo, Mladen. Android Application for Sending SMS Messages with Speech Recognition Interface // Proceedings of the 35th International Convention MIPRO, 2012. 7. 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?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	**Marjan Sikora; Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Programming, Object Oriented Programming
GENERAL INFORMATION ON COURSE TEACHER	
Address	Gajeva 17, 21000 Split
Telephone number	0914305859
E-mail address	sikora@fesb.hr
Personal web page	www.fesb.hr/~sikora /
Year of birth	1972.
Scientist ID	238690
Research or art rank, and date of last rank appointment	Research Scientist, 3/2015.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant Professor, 3/2013.
Area and field of election into research or art rank	Technical Sciences, Computer Sciences, Information Systems
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	3/2006.
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Computer Science
Function	Assistant Professor
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	University of Zagreb
Place	Zagreb
Date	2010.
INFORMATION ON ADDITIONAL TRAINING	
Year	2015.-2016.
Place	Online
Institution	Stanford University
Field of training	Automata, Compilers
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	French (2)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Programming, Object oriented programming Geographic Information Systems
Authorship of university/faculty textbooks in the field of the course	

Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	- M. Sikora, H. Mihanović, I. Vilibić Paleo-coastline of the Central Eastern Adriatic Sea, and paleo-channels of the Cetina and Neretva rivers during the last glacial maximum, Acta Adriatica, Vol. 55, pp. 3-18, 2014. - M.Sikora, I. Mateljan, A Method for Speeding up Beam-tracing Simulation Using Thread-level Parallelization, Engineering with Computers, (DOI) 10.1007/s00366-013-0316-z, Vol., pp. 679-688, 2013. - M.Sikora, I. Mateljan, N. Bogunović, Beam Tracing with Refraction, Archives of Acoustics, Vol. 37, No. 3, pp. 301-316, 2012. - M. Sikora, I. Mateljan, Multithreaded beam tracing, Proceedings of 5rd Congress of Alps Adria Acoustics Association (AAAA 2012), Petrčane (Hrvatska), 12-14. rujan 2012., CD Proceedings - M.Sikora, I. Mateljan, N. Bogunović, Beam Division in Acoustic Simulation of Non-Homogenous Environments, Automatika, Vol. 52, No. 4, pp. 339-352, 2011.
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	- Visualization of wind-power plant, cooperation with PhD Antonio Šarolić - Study on use of GIS in Split city management, City of Split, 2012. - TGM - TIN & Grid Maker – Software for Digital Elevation Models, OBALA d.o.o. Split, 2011.
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	4,7/5; 5/5

First and last name and title of teacher	**Nina Sirković, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	English Language 1, English Language 2
GENERAL INFORMATION ON COURSE TEACHER	
Address	Vukovarska 117, Split
Telephone number	+385 21 305 716
E-mail address	nina.sirkovic@fesb.hr
Personal web page	
Year of birth	1964
Scientist ID	297651
Research or art rank, and date of last rank appointment	Scientific Associate, 21 November 2012
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant Professor, 21 November 2012
Area and field of election into research or art rank	Humanities, Philology
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	1 June 2007
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Philology
Function	Head of General Course Department
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Philosophy, University of Zagreb
Place	Zagreb
Date	7 December 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 (5)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	English Language 1 and English Language 2, Undergraduate study programme Communication Skills in English, Undergraduate study programme
Authorship of university/faculty textbooks in the field of the course	Kovač, Mirjana M.; Sirković, Nina (2014*). Presentation, Writing and Interpersonal Communication Skills.* Split, FESB.

	Kovač, Mirjana, M..Sirković, N.(2015) *Strategije rješavanja poteškoća u komunikaciji na stranom jeziku*. Hrvatska sveučilišna naklada, Zagreb
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	Kovač, Mirjana, Sirković, Nina, „Peer Evaluation of Oral Presentations in Croatia“, in: *English Language teaching,* Canadian Center of Science and Education, Vol. 5, No. 7, Toronto, 2012. (8-16)
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	Kovač, Mirjana Matea, Sirković Nina, Attitudes towards Communication Skills among Engineering Students, in: *English Language Teaching*, Canadian Center of Science and Education ,Vol.10, No. 3, Toronto, 2017.(111-117)
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	University degree at the Faculty of Philology – pedagogical group
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	**Ivan Slapničar, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Mathematics 1, Mathematics 2
GENERAL INFORMATION ON COURSE TEACHER	
Address	FESB, R. Boškovića 32, B803
Telephone number	021 305893
E-mail address	ivan.slapnicar@fesb.hr
Personal web page	http://www.fesb.hr/~slap
Year of birth	1961
Scientist ID	30650
Research or art rank, and date of last rank appointment	scientific counselor
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full Professor, permanent position, since 2008
Area and field of election into research or art rank	Area od Natural Sciences, Field of Mathematics
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	FESB, Split
Date of employment	1985
Name of position (professor, researcher, associate teacher, etc.)	Full Professor
Field of research	Mathematics
Function	Head of the Chair of Mathematics
INFORMATION ON EDUCATION – Highest degree earned	
Degree	dr. sc. (dr. rer. Nat.)
Institution	Fernuniversität Hagen
Place	Hagen, Germany
Date	October 1992
INFORMATION ON ADDITIONAL TRAINING	
Year	2014
Place	Cambridge, MA, USA
Institution	Massachusetts Institute of Technology
Field of training	Fulbright-Schuman International Educator/Lecturer Grant
Year	2009/2010
Place	Berlin, Germany
Institution	Technische Universität Berlin
Field of training	FP7 People "Marie Curie" Intra European Fellowship
Year	2001/2002
Place	Logan, UT, SAD
Institution	Utah State University
Field of training	Visiting Professor of Mathematics
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	German (5)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name	Lecturer of various courses since 1992.

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	Ivan Slapničar, Matematika 1, FESB, Split, 2002. (Manualia Universitatis studiorum Spalatensis) Ivan Slapničar, Josipa Barić i Marina Ninčević, Matematika 2 – zbirka zadataka, FESB, Split, 2010. (Manualia Universitatis studiorum Spalatensis)
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Jakovčević Stor, Nevena; Slapničar, Ivan; Barlow, Jesse L. **Forward stable eigenvalue decomposition of rank-one modifications of diagonal matrices,** *Linear Algebra and its Applications*. **487** (2015) 301-315. 2. Jakovčević Stor, Nevena; Slapničar, Ivan. **Forward Stable Computation of Roots of Real Polynomials with Real Simple Roots**, *Applied Mathematics and Information Sciences*. **11** (2017) 33-41. 3. Jakovčević Stor, Nevena; Slapničar, Ivan; Barlow, Jesse L. **Accurate eigenvalue decomposition of real symmetric arrowhead matrices and applications,** *Linear algebra and its applications*. **464** (2015) 62-89. 4. Slapničar, Ivan. **Symmetric matrix eigenvalue techniques,** Handbook of Linear Algebra, Hogben, Leslie (ed.). Chapman & Hall / CRC, Boca Raton, 2013, pp. 55-1-55-23. 5. Slapničar, Ivan. **On the spectra of generalized Fibonacci and Fibonacci-like operators**., *Operators and Matrices. **6*** (2012) 49-62.
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	1. Accurate and fast matriox algorithms and applications, project MZOS No. 372783-1289, 2007- 2013, principal investigator. 2. Optimization of parameter dependent mechanical systems, HRZZ research project No. 9540, 2015-2019, collaborator.
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	Prize of the Fernunivesität Hagenu for the best disseration, 1992. Prize of the Croatian Mathematical Society Nagrada for the young scientist, 1996.
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	Evaluations organized by the Quality Enhancement Centre of the University of Split each semester. Average grade is 4.5 on the 1-5 scale.

First and last name and title of teacher	**Maja Stella, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Electrotechnical Materials and Technology
GENERAL INFORMATION ON COURSE 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 EMPLOYMENT	
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 – Highest degree earned	
Degree	Ph.D.
Institution	FESB
Place	Split
Date	20.05.2011.
INFORMATION ON ADDITIONAL TRAINING	
Year	
Place	
Institution	
Field of training	
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English, 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian, 2
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five	Stella, Maja; Russo, Mladen; Begušić, Dinko. Fingerprinting based localization in heterogeneous wireless networks. // Expert systems with applications. 41 (2014) , 15; 6738-6747.

years in the field of the course (5 works at most)	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?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	**Darko Stipaničev, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Automatic Control 2 Internet Programming
GENERAL INFORMATION ON COURSE TEACHER	
Address	Matoševa 26, 21000 Split
Telephone number	+385 91 4305 643
E-mail address	darko.stipanicev@fesb.hr
Personal web page	http://laris.fesb.hr/dstip-e.html
Year of birth	1955
Scientist ID	44861
Research or art rank, and date of last rank appointment	Scientific Adviser in Computer Science, 2006 Scientific Adviser in Electrical Engineering, 1997
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Senior Full Professor, 2002
Area and field of election into research or art rank	Technical Systems, Field Electrical engineering Technical Systems, Fireld Computer sciences
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	1981
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Computer Science – Artificial Intelligence, Electrical Engineering - Automatic Control
Function	Head of Chair of Modelling and Intelligent Systems
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Electrotechnical Faculty University of Zagreb
Place	Zagreb
Date	1987
INFORMATION ON ADDITIONAL TRAINING	
Year	1988-89
Place	London
Institution	Queen Mary College
Field of training	post-doctoral specialisation
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Italian (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	Discrete regulation systems (1988-2005) Automatic control 2 (2005-danas) Digital control (2005-today) Intelligent control of complex systems (1991-1995)
Authorship of university/faculty textbooks in the field of the course	D.Stipaničev, J.Marasović, Digitalno vođenje on-line (Digital control on-line), on-line (Web) book, MZT – Informatički projekt, 2004. http://laris.fesb.hr/digitalno_vodjenje

Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. D.Stipaničev, J.Božičević, Fuzzy Feedforward and Composite Control, **Transaction Inst. Measurement and Control (UK)**, 8(2), 1986, pp. 67-75 2. D.Stipaničev, Vođenje i zaštita vjetroelektrana u autonomnom elektro-energetskom sistemu, **Sunčana energija**, 8(2), 1987, pp.91-96 3. D.Stipaničev, Diskretno vođenje složenih sustava adaptivnim, nelinearnim PID regulatorima, **Elektrotehnika**, 34(3-4), 1991, pp.153-161 4. D.Stipaničev, Fuzzy Relational Models for Intelligent Control, u knizi R. Hanus, P.Kool, S.Tzafestas(ed) **"Mathematical and Intelligent Models in System Simulation"**, J.C.Baltzer AG Scientific Pub.Co., 1991, pp.275-279 5. M.De Neyer, D.Stipaničev, R.Gorez, Intelligent Self-organising Controllers and their Application to the Control of Dynamic Systems, u knjizi R.Hanus, P.Kool, S.Tzafestas(ed) **"Mathematical and Intelligent Models in System Simulation"**, J.C.Baltzer AG Scientific Pub.Co., 1991, pp.287-292
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	1. Project Vision based intelligent observers (ViO) (2012 – 2016) 2. Project 023-0232005-2003 – AgISEco – Agent based intelligent systems for environmental monitoring, Contract with Ministary of Science RH (2006 - 2012)
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	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	Communication Systems and Protocols Network Analyis
GENERAL INFORMATION ON COURSE 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 EMPLOYMENT	
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 – Highest 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 TRAINING	
Year	
Place	
Institution	
Field of training	
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English - 4
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	German - 2
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	• Multimedia systems, graduate study of electrical engineering • Signals and systems, undergraduate study of electrical engineering and information technology • Algorithms, , undergraduate study of compter science
Authorship of university/faculty textbooks in the field of the course	

Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. 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 2. 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 3. 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 4. 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 - Proceeedings of the 5th European conference of compute science (ECCS'13). 2013. 136-141 5. 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“ (2007.-2012.) • 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?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

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

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

First and last name and title of teacher	**Ljiljana Šerić, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Internet programming
GENERAL INFORMATION ON COURSE TEACHER	
Address	FESB, Ruđera Boškovića 32, 21000 Split
Telephone number	+385 (0)21 305 651
E-mail address	ljiljana.seric@fesb.hr
Personal web page	http://www.fesb.hr/~ljiljana
Year of birth	1979.
Scientist ID	272906
Research or art rank, and date of last rank appointment	Senior Research Associate, 14.02.2013.
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Assistant professor, 02.12.2013.
Area and field of election into research or art rank	Technical sciencies, Computer Science
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	University of Split, Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	02.12.2013.
Name of position (professor, researcher, associate teacher, etc.)	Assistant professor
Field of research	Science and education
Function	Assistant professor
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	University of Split, Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	06.10.2010.
INFORMATION ON ADDITIONAL TRAINING	
Year	
Place	
Institution	
Field of training	
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	German (3)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	
COMPETENCES FOR THE COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme where it is/was offered, and level of study programme)	1. Course name: Artificial Intelligence Name of the study programme in which the course is offered: Automation and Systems, Electrical Engineering, Computer Engineering, Telecommunications and Computer Science, Computer Science The level of the study programme: Graduate study 2. Course name: Intelligent Systems Name of the study programme in which the subject is taught: Electrical Engineering and Information Technology The level of the study programme: Postgraduate study

	3. Course name: Web intelligence and large data sets Name of the study programme in which the subject is taught: Electrical Engineering and Information Technology The level of the study programme: Postgraduate study
Authorship of university/faculty textbooks in the field of the course	1) Stipaničev Darko, Šerić Ljiljana. Artificial intelligence. Split, FESB - Internal script, 2012. 2) Bodrožić Ljiljana. Programming languages of artificial intelligence. Split, FESB - Internal script, 2007.
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1) Doko Alen, Štula Maja, Šerić Ljiljana. Improved sentence retrieval using local context and sentence length. Information processing & management, 49 (2013), 6, 1301-1312. 2) Šerić Ljiljana, Stipaničev Darko, Štula Maja. Engineering of holonic multi agent intelligent forest fire monitoring system. AI communications, 26 (2013), 3; 303-316. 3) Šerić Ljiljana, Krstinić Damir, Braović Maja, Milatić Ivan; Mirčevski Aljoša, Stipaničev Darko. Holonic Multi Agent System for Data Fusion in Vehicle Classification. Proceedings of 10th International KES Conference on Agents and Multi-Agent Systems: Technologies and Applications (KES-AMSTA-16). 2016. 4) Stipaničev Darko, Šerić Ljiljana, Krstinić Damir, Bugarić Marin. Wildfire video observers network with physical and virtual sensors. Proceeding of 10th EARSeL Forest Fire Special Interest Group Workshop - Sensors, Multi-Sensor Integration, large Volumes: New opportunities and Challanges in Forest Fire Research, Themistocleous, Kyriacos ; Hadjimitsis, Diofantos; Gitas, Ioannios ; Boschetti, Luigi (ur.). Limassol, Cyprus, 2015. 5) Ukić Nenad, Maras Josip, Šerić Ljiljana. The influence of cyclomatic complexity distribution on the understandability of xtUML models, Software quality journal, PP (2016)
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	AgiSeco – Agent Oriented Intelligent Systems for Environement Monitoring and Control, MZOS, 2007-2012 HOLISTIC – Adriatic Holistic Forest Fire Protection , IPA, 2014- in progres Wind Risk Prevention Projekt – ECHO, Civil Protection Automatic vehicle classification based on computer vision and data fusion
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences.	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	20 best junior reasearchers, 2013
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

First and last name and title of teacher	**Silvestar Šesnić, Ph.D., Assistant Professor**
The course he/she teaches in the proposed study programme	Fundamentals of Electrical Engineering 2
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	01.01.2005.
Name of position (professor, researcher, associate teacher, etc.)	Assistant Professor
Field of research	Electromagnetic theory
Function	-
INFORMATION ON EDUCATION – Highest 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 TRAINING	
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)	-
Authorship of university/faculty textbooks in the field of the course	-
Professional, scholarly and artistic articles published in the last five	• Poljak, Dragan; Šesnić, Silvestar; Drissi, Khalil El-Khamlichi; Kerroum, Kamal; Tkachenko, Sergey. Transient Electromagnetic Field Coupling to Buried Thin

years in the field of the course (5 works at most)	Wire Configurations: Antenna Model versus Transmission Line Approach in the Time Domain. // *International Journal of Antennas and Propagation*. 2016 (2016); 1-11 • 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 • Garma, Tonko; Šesnić, Silvestar. Measurement and modeling of the propagation of the Ripple Control Signal through the distribution network. // International journal of electrical power & energy systems. 63 (2014); 674-680 • 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	**Božo Terzić, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Electrical Drives Maintenance and Testing of Electrical Power Equipment
GENERAL INFORMATION ON COURSE TEACHER	
Address	Elemova 5, 21312 Podstrana HR
Telephone number	+385 91 4305609
E-mail address	bterzic@fesb.hr
Personal web page	
Year of birth	1962.
Scientist ID	138865
Research or art rank, and date of last rank appointment	Scientific Adviser, 9/7/2009
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Senior Full Professor, 18/9/2014
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	1986.
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Electrical Drives, Power Converters
Function	Head of Chair of Electrical Drives and Automation
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	25/11/1998
INFORMATION ON ADDITIONAL TRAINING	
Year	
Place	
Institution	
Field of training	
MOTHER TONGUE AND FOREIGN LANGUAGES	
Mother tongue	Croatian
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	English (4)
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	German (2)
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)	Electrical drives - Professional study programme of Electrical engineering, Testing of Electrical Equipement - Graduate study programme of Power engineering
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Terzić, Božo; Despalatović, Marin; Slutej, Alojz. *Magnetization Curve Identification of Vector-Controlled Induction Motor at Low-Load Conditions*. // Automatika - Journal for Control, Measurement, Electronics, Computing and Communications, 53 (2012) , 3; 1-8.

	2. Jadrić, Martin; Terzić, Božo; Despalatović, Marin; Majić, Goran; Slutej, Alojz; Šimić, Toni. *Identification of Rotor Resistance and Transient Inductance of Induction Motors Using Frequency Selection Criterion* // Proceedings of the 2012 XXth International Conference on Electrical Machines / Nogueiras Meléndez, Andrés A. (ur.). Marseille, Francuska : IEEE IES, 2012. 978-984. 3. Terzić, Božo; Despalatović, Marin: *Ispitivanje i procjena stanja izolacijskog sustava visokonaponskih motora u tvornicama cementa CEMEX – Kaštel Sućurac*, tijekom posljednjih 5 godina svake godine se testira približno 30 visokonaponskih motora, Naručitelj: Cemex, 2012.-2016. 4. Terzić, Božo; Despalatović, Marin; Majić, Goran; Gladina, Željko: *Mjerenja i analiza karakteristika upuštača asinkronih motora u postrojenju mlina cementa 2 u tvornici Cemex – Pogon Sv. Juraj*, Naručitelj: Siemens, 2014. 5. Terzić, Božo; Despalatović, Marin; Majić, Goran; Stergulc, Marjan; Kriletić, Ante; Šormaz, Krste: *Frequency Converter Design for High Speed Permanent Magnet Generator in Cogeneration Plants*,, Technical Journal, Scientific-professional Journal of University North, Vol. 10, No. 3-4, Croatia, 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)	1. Domestic sceintific project: *On-line parameter identification of synchronous generator,* project leader, 2011. – 2013., funding the project: MZOŠ 2. International development project: Development of electric drives for crane systems operating in hard environment, project leader, 2008. – 2013., in cooperation with swedish company *ABB Crane Systems* that fully funded the project. 3. Researche and development project: A safer and more efficient cogeneration / trigeneration plants, project leader, 2014.-2016., project was funded from EU structural funds.
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	From 4 to 4,8.

First and last name and title of teacher	**Ivica Veža, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Economics and Production Organisation
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 – 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 TRAINING	
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 COURSE	
Earlier experience as course teacher of similar courses (name title of course, study programme	Economics and Production Organisation, Undergraduate study programme,

where it is/was offered, and level of study programme)	
Authorship of university/faculty textbooks in the field of the course	Dulčić, Želimir; Pavić, Ivan; Rovan, Mario; Veža, Ivica: Proizvodni management, Ekonomski fakultet, FESB Split, Split, 1996.
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. 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 2. Veža, Ivica; Mladineo, Marko: SUSTAINABILITY THROUGH PRODUCTION NETWORKS. Management and Production Engineering Review. 4 (2013), 4; 33-39 3. 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 4. Takakuwa, Soemon; Veža, Ivica: Technology Transfer and World Competitiveness. Procedia Engineering. 69 (2014); 121-127 5. 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)	1. 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. 2. Čelar, Stipe; Turić, Mili; Dragičević, Srdjana; Veža, Ivica. Digital Learning Factory at FESB – University of Split , ZBORNIK RADOVA YU INFO 2016, 2016. 001-006 3. 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 4. 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)	1. 2008 – 2013 Project TEMPUS-2008-IT-JPCR 144 959, Master Study Program in Product Lifecycle Management with Sustainable Production 2. 2011-2014 LEONARDO DA VINCI Project “LOPEC - Logistics personnel excellence by continuous self-assessment”, FESB Split, University of Reutlingen 3. 2013-2016 Network of Innovative Learning Factories NIL, “System - Learning Factory“, FESB, Split, University of Reutlingen 4. 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

	5. 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?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	4,8/5

First and last name and title of teacher	**Slavko Vujević, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	1. Fundamentals of Power Engineering 2. Marine Electrical Engineering
GENERAL INFORMATION ON COURSE TEACHER	
Address	Vijugasta 18, Hr-21000 Split, Croatia
Telephone number	+385 21 305-613
E-mail address	vujevic@fesb.hr
Personal web page	
Year of birth	1958
Scientist ID	122731
Research or art rank, and date of last rank appointment	Scientific Adviser; January 20, 2005
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Senior Full Professor, September 24, 2009
Area and field of election into research or art rank	Technical Sciences, Electrical Engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	February 26, 1982
Name of position (professor, researcher, associate teacher, etc.)	Professor
Field of research	Electrical Measurement, Power Quality
Function	Head of the Subdepartment of Electromagnetics and Engineering Modeling
INFORMATION ON EDUCATION – Highest degree earned	
Degree	Ph.D.
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	July 14, 1994
INFORMATION ON ADDITIONAL TRAINING	
Year	2003
Place	Neumarkt, Germany
Institution	DEHN + Söhne
Field of training	Certificate in Red/Line-Seminar and Yellow/Line-Seminar on "Lightning and Surge Protection in Power Networks"
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)	• Electric Machinery Fundamentals, university undergraduate study of Electrical Engineering, University of Split, FESB • Fundamentals of Electric Power Engineering, the university undergraduate study of Electrical Engineering, specialisation Electronics, University of Split, FESB

	• Marine Electrical Engineering, the university undergraduate study of Naval Architecture, University of Split, FESB
Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Vujević, Slavko; Lovrić, Dino, On Continuous Numerical Fourier Transform for Transient Analysis of Lightning Current Related Phenomena, Electric Power Systems Research, Vol. 119, pp. 364-369, 2015. 2. Vujević, Slavko; Lovrić, Dino; Balaž, Zdenko, Self and Mutual Ground Impedances of Cylindrical Metal Plates Buried In Homogeneous Earth, International Journal of Numerical Modelling - Electronic Networks Devices and Fields; Vol. 28. No. 1, pp. 33-49, 2015. 3. Vujević, Slavko; Lovrić, Dino; Boras, Vedran, High-Accurate Numerical Computation of Internal Impedance of Cylindrical Conductors for Complex Arguments of Arbitrary Magnitude, IEEE Transactions on Electromagnetic Compatibility, Vol. 56, No. 6, pp. 1431-1438, 2014. 4. Lovrić, Dino; Vujević, Slavko; Modrić, Tonći, On the Estimation of Heidler Function Parameters for Reproduction of Various Standardized and Recorded Lightning Current Waveshapes, International Transactions on Electrical Energy Systems; Vol. 23, No. 2, pp. 290-300, 2013. 5. Vujević, Slavko; Sarajčev, Petar; Lovrić, Dino, Time-Harmonic Analysis of Grounding System in Horizontally Stratified Multilayer Medium, Electric Power Systems Research, Vol. 83, No. 1, pp. 28-34, 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)	Project of MZOS of Republic of Croatia no. 023-0000000-3271 - Development of Advanced Algorithms for Modelling of Electromagnetic Phenomena, 2008 - 2013 (project leader Professor Slavko Vujević)
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	**Dinko Vukadinović, Ph.D., Full Professor**
The course he/she teaches in the proposed study programme	Control Engineering Power Electronics Electronic Converters for Power Supplies
GENERAL INFORMATION ON COURSE TEACHER	
Address	Pujanke 61, Split
Telephone number	021/376-715
E-mail address	dvukad@fesb.hr
Personal web page	
Year of birth	1973
Scientist ID	248950
Research or art rank, and date of last rank appointment	Senior research scientist, 15/7/2010
Research-and-teaching, art-and-teaching or teaching rank, and date of last rank appointment	Full Professor, 26/1/2013
Area and field of election into research or art rank	Technical Sciences, Electrical engineering
INFORMATION ON CURRENT EMPLOYMENT	
Institution where employed	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Date of employment	9/2/1998
Name of position (professor, researcher, associate teacher, etc.)	Full Professor
Field of research	Power Engineering (Power Electronics, Control of Electrical Machines)
Function	Head of Group for Power Electronics and Control
INFORMATION ON EDUCATION – Highest degree earned	
Degree	PhD
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	27/10/2005
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, 3
Foreign language and command of foreign language on a scale from 2 (sufficient) to 5 (excellent)	Germany, 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)	Power Electronics, Undergraduate study programme Electronic Converters for Power Supplies, Undergraduate study programme

Authorship of university/faculty textbooks in the field of the course	
Professional, scholarly and artistic articles published in the last five years in the field of the course (5 works at most)	1. Bašić, M., Vukadinović, D. „Online Efficiency Optimization of a Vector Controlled Self-Excited Induction Generator“, IEEE Transactions on Energy Conversion. 31 (2016) , 1; 373-380 2. Vukadinović, D., Bašić, M., Nguyen, C.H., Vu, N.L., Nguyen, T.D., „Hedge-Algebra-Based Voltage Controller for a Self- Excited Induction Generator“, *Control engineering practice*, 30 (2014) ; 78-90 3. Bašić, M., Vukadinović, D., „Vector control system of a self-excited induction generator including iron losses and magnetic saturation“, *Control engineering practice*, 21 (2013) , 4; 395-406 4. Bašić, M., Vukadinović, D., Petrović, G., „Dynamic and Pole-Zero Analysis of Self-Excited Induction Generator Using a Novel Model with Iron Losses“, *International journal of electrical power & energy systems*, 42 (2012) , 1; 105-118 5. Bašić, M., Vukadinović, D., Polić, M., „Analysis of Power Converter Losses in Vector Control System of a Self–Excited Induction Generator“, *Journal of Electrical Engineering - Elektrotechnický časopis*, 65 (2014) , 2; 65-74
Professional and scholarly articles published in the last five years in subjects of teaching methodology and teaching quality (5 works at most)	
Professional, science and artistic projects in the field of the course carried out in the last five years (5 at most)	
The name of the programme and the volume in which the main teacher passed exams in/acquired the methodological-psychological-didactic-pedagogical group of competences?-pedagoške kompetencije?	
PRIZES AND AWARDS, STUDENT EVALUATION	
Prizes and awards for teaching and scholarly/artistic work	
Results of student evaluation taken in the last five years for the course that is comparable to the course described in the form (evaluation organizer, average grade, note on grading scale and course evaluated)	

3.4. Optimal number of students

The admission quote for the first year of studies is 180.

3.5. Estimate of costs per student

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

3.6. Plan of procedures of study programme quality assurance

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

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

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