

Primjer dopunske isprave o studiju Fakulteta elektrotehnike i računarstva, Sveučilišta u Zagrebu na engleskom jeziku



REPUBLIC OF CROATIA
UNIVERSITY OF ZAGREB
FACULTY OF ELECTRICAL
ENGINEERING AND COMPUTING



University of
Zagreb



FACULTY OF
ELECTRICAL
ENGINEERING
AND COMPUTING

This Diploma Supplement model was developed by the European Commission, Council of Europe and UNESCO/CEPES. The purpose of the supplement is to provide sufficient independent data to improve the international 'transparency' and fair academic and professional recognition of qualifications (diplomas, degrees, certificates etc.). It is designed to provide a description of the nature, level, context, content and status of the studies that were pursued and successfully completed by the individual named on the original qualification to which this supplement is appended. It should be free from any value judgements, equivalence statements or suggestions about recognition. Information in all eight sections should be provided. Where information is not provided, an explanation should give the reason why.

1	INFORMATION IDENTIFYING THE HOLDER OF THE QUALIFICATION	
1.1	family name(s)	██████████
1.2	given name(s)	██████████
1.3	date, place and country of birth	8 June 1987, Karlovac, Republic of Croatia
1.4	student identification number or code	██████████
2	INFORMATION IDENTIFYING THE QUALIFICATION	
2.1	name of qualification and (if applicable) title conferred (in original language)	magistar inženjer elektrotehnike i informacijske tehnologije; n.a.
2.2	main field(s) of study for the qualification	Electrical Engineering and Information Technology, profile Electrical Power Engineering
2.3	name and status of awarding institution	University of Zagreb Faculty of Electrical Engineering and Computing. Public higher education institution. Accreditation issued by the Ministry of Science, Education and Sports on December 18 2002. Accreditation for the university graduate study programme in Electrical Engineering and Information Technology issued by the Ministry of Science, Education and Sports on 28 August 2006. International accreditation for the study programme issued by ASIIN on 30 March 2007.
2.4	name and status of institution (if different from above)	—
2.5	language(s) of instruction/examination	Croatian
3	INFORMATION ON THE LEVEL OF THE QUALIFICATION	
3.1	level of qualification	Graduate university study programme (second-cycle degree), with master's thesis
3.2	official length of programme	Two-year study programme, 120 ECTS credits
3.3	access requirements(s)	Completed adequate undergraduate study earning at least 180 ECTS credits.
4	INFORMATION ON THE CONTENTS AND RESULTS GAINED	
4.1	mode of study	Full-time study
4.2	programme requirements	Electrical engineering covers the application of physical laws on electromagnetic phenomena in the development of products and services that benefit mankind. Information technology, which uses computers, computer networks, communication systems, and technology to sense, process, store, and display information, has a significant impact on electrical engineering today. Nowadays, it is almost impossible to come across an activity within electrical engineering that is not interconnected with information technology. Thus, these areas have been joined to form the second cycle study programme in Electrical Engineering and Information Technology. This programme enables the student to acquire competences to solve difficult engineering problems, to design complex systems, to act as a team leader, and to conduct research and development. Upon enrolment, the student immediately chooses a profile, that is, a specialisation within the study programme he or she is enrolled in. For each profile, the following sets of courses are defined: Theoretical courses – courses which

comprise theory specific to one or more profiles. At least 25 ECTS points must be acquired. Specialisation courses – courses which offer the student further specialisation within a profile. At least 20 ECTS points must be acquired. Elective courses – all other courses in the fields of electrical engineering, information and communication technology or computing, or other fields within the student's interest. At least 12 ECTS points must be acquired. Mathematics and science courses – courses with mathematical and science content offered at the Faculty of Electrical Engineering and Computing or at other faculties within the University of Zagreb. At least 8 ECTS points must be acquired. Humanities or social science courses – courses with humanities or social science content offered at the Faculty of Electrical Engineering and Computing or other faculties within the University of Zagreb. At least 6 ECTS points must be acquired. In addition, student must enrol in two laboratory courses offering practical knowledge specific to the chosen profile. Further on, the student must

successfully complete a seminar, in which each of the participating students needs to prepare and present their own individual results. Finally, a project must be completed where the students, in groups of 6 to 8, increase their project management skills and teamwork competencies. At the end, a graduation thesis must be completed and defended, which contributes 30 ECTS points.

The second-cycle graduates acquire

KNOWLEDGE AND UNDERSTANDING OF THE FOLLOWING:

- Mathematics required for solving complex problems related to electrical engineering and information technology, including analysis, chaos theory, computational mathematics, differential equations and stability theory, Fourier analysis, graph theory, linear algebra, and stochastic processes;
- Scientific principles underlying electrical engineering and information technology, including laser physics, physics of materials, field theory, and quantum computers;
- In-depth knowledge and understanding of the theoretical background and principles of their branch of engineering and also of the wider context of engineering;
- Critical awareness of the forefront of their branch;
- The social, ethical, business, and legal context of engineering, as well as of information society development.

ENGINEERING ANALYSIS ABILITIES:

- The ability to solve problems related to electrical engineering and information technology that are unfamiliar, incompletely defined, and have mutually competing specifications, by using a systematic approach to problem identification, analysis, modelling and simulation, and the evaluation of appropriate methods;
- The ability to formulate and solve problems in new and emerging areas of their specialisation;
- The ability to use their knowledge and understanding to conceptualise engineering models, systems, and processes;
- The ability to apply innovative methods in problem solving.

ENGINEERING DESIGN ABILITIES:

- The ability to use their knowledge and understanding to design solutions to unfamiliar problems, possibly involving other disciplines;

- The ability to use creativity to develop new and original ideas and methods;
- The ability to use their engineering judgement to work with complexity, technical uncertainty, and incomplete information using abstraction, decomposition, consistency checking, requirement elicitation and other techniques.

RESEARCH ABILITIES:

- The ability to identify, locate, and obtain the required data;
- The ability to design and conduct analytic, modelling, and experimental investigations;
- The ability to critically evaluate data and draw conclusions;
- The ability to investigate the application of new and emerging technologies in their branch of engineering.

ENGINEERING PRACTICE:

- The ability to integrate knowledge from different branches and to handle complexity;
- Comprehensive understanding of applicable techniques and methods, and of their limitations;
- Knowledge of the non-technical implications of engineering practice.

TRANSFERABLE SKILLS:

- The ability to function effectively as an individual, as a member of a team, or as a team leader whose team may be composed of people from different disciplines and levels;
- The ability to use diverse methods to communicate effectively within the engineering community and with society at large at the national and the international level;
- An awareness of the health, safety, legal issues, and responsibilities of engineering practice, the impact of engineering solutions within the context of the society and the environment, and a commitment to professional ethics and responsibility, as well as the norms of engineering practice;
- An aptitude for project management and business practices, such as risk and change management, and the ability to understand their limitations;
- The ability to recognize the need for further learning, and the ability to engage in independent, life-long learning.

4.3

programme details

hours	ECTS		date of examination	grade	subject
	credits	date of			
1 90	5.0	25/01/10	4		Laboratory of Electrical Power Engineering 1
2 45	5.0	18/01/10	5		Energy Conversion
3 45	5.0	22/01/10	4		Power System Dynamics and Control
4 45	5.0	20/01/10	4		Power Systems Analysis
5 30	4.0	27/01/10	4		Nuclear Engineering
6 45	4.0	29/01/10	4		Complex Analysis
7 30	2.0	25/01/10	4		Organizational Psychology
8 45	3.0	23/06/10	5		Laboratory of Electrical Power Engineering 2
9 30	3.0	01/07/10	5		Seminar
10 45	5.0	06/07/10	5		Economics of Energy
11 45	5.0	02/07/10	5		High Voltage Engineering
12 30	4.0	05/07/10	4		Renewable Resources and Advanced Technology
13 45	4.0	24/06/10	4		Laser Physics
14 30	4.0	23/06/10	5		Electric Power Network Operation and Control
15 30	2.0	01/07/10	3		Croatian in engineering practice
16 —	8.0	21/01/11	5		Project
17 30	4.0	14/01/11	4		Electrical Lighting
18 30	4.0	20/01/11	4		Risk Management
19 30	4.0	12/01/11	5		Energy, Environment and Sustainable Development
20 30	4.0	21/01/11	5		Electric Power Networks
21 30	4.0	10/01/11	5		Power System Protection
22 30	2.0	18/01/11	5		Social aspects of computer-mediated communication.
23 —	30.0	20/06/11	5		Graduation Thesis

additional ECTS credits

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total ECTS credits 120

beginning of the study—end of the study 1 October 2009—20 June 2011

diploma number 691

master thesis; mentor; defended on Utilisation of potential for micro hydro power plants in Croatia; Prof. Nenad Debrecin, PhD; 20 June 2011

4.4 grading scheme and, if available, grade distribution guidance All the courses are graded through continuous assessment, in which each activity contributes with a certain number of points. The number of points earned in one course is 100. Regular class attendance is expected of all students, but it contributes with a maximum of 10 points. The contributions of other activities are as follows: homework (maximum of 20 points); laboratory activities (maximum of 15 points); mid-term exams (maximum of 50 points); final exam (maximum of 40 points); Few exceptions are allowed, depending on the specific course structure. In order to achieve a passing grade, the student is required to earn at least 50 points. After the final exam, the students are ranked according to the number of points earned. The final grade is defined as follows: grade 5 – the best 15% of the students; grade 4 – the next 35%; grade 3 – the next 35%; grade 2 – the lowest 15%. Some courses are not graded, but all the course requirements must be fulfilled. Such courses are marked with “+” in the transcript. In courses with under 40 enrolled students, slight modification of the grading system is allowed. The following honours can be awarded: cum laude (students ranked in the top 10 percent of their graduating class), magna cum laude (in the top 5%), and summa cum laude (in the top 1%). Only students who have completed their course of study within the official duration of the study programme are eligible for these honours.

4.5 overall classification of the qualification Cumulative grade point average: 4.625

5 INFORMATION ON THE FUNCTION OF THE QUALIFICATION

5.1 access to further study This degree entitles the student to continue his or her education at the third-level of study at the Faculty of Electrical Engineering and Computing in order to obtain the degree Doctor of Science in Electrical Engineering or Computing. Continuation of study is also possible at other institutions which offer third-level study programmes.

5.2 professional status The Master's degree in Electrical Engineering and Information Technology entitles its holder to bear the legally protected professional title Master of Science and to perform professional work in the field for which it was awarded. The study relies on a strong advanced knowledge of electrical engineering and information technology. Based on this, the student possesses the knowledge and skills needed to solve complex tasks in different branches of industry and business, and to address changes and technological innovations that are expected in the future. Employment is not necessarily limited to the fields of electrical engineering or information technology.

6 ADDITIONAL INFORMATION

6.1 additional information —

6.2 further information sources Republic of Croatia, Ministry of Science, Education and Sports, <http://www.mzos.hr>; University of Zagreb, <http://www.unizg.hr>; Faculty of Electrical Engineering and Computing, <http://www.fer.hr>

7 CERTIFICATION OF THE SUPPLEMENT

7.1 place and date
Zagreb, 20 June 2011

7.2 name and signature
Prof. Nedjeljko Perić, PhD

N. Perić

7.3 capacity
Dean



7.4 official stamp or seal

INFORMATION ON THE NATIONAL HIGHER EDUCATION SYSTEM IN CROATIA

- 8**
- 8.1 Types of institutions**
- UNIVERSITIES (sveučilišta)** are institutions of higher education which offer university study programmes in at least two research areas and/or art areas covering a number of disciplines. Exceptionally, universities may also offer vocational study programmes. Universities may be comprised of constituent units which are legal entities and which are called **FACULTIES (fakulteti)** or **ART ACADEMIES (umjetničke akademije)**. Universities and their constituent units offer study programmes, and engage in research and other professional and art-related work.
- POLYTECHNICS (veleučilišta) and SCHOOLS OF VOCATIONAL HIGHER EDUCATION (visoke škole)** are higher education institutions which offer vocational study programmes. The two types of institution differ in the range of programmes they offer: polytechnics are institutions of vocational higher education which offer vocational study programmes in three or more disciplines. Their mission is to offer career-oriented programmes, which often include practical work experience.
- Public universities are established by law; public polytechnics and schools of vocational higher education are established by a decree of the Croatian Government; private higher education institutions are established by the founder.
- 8.5**
- UNIVERSITY SPECIALIST POSTGRADUATE PROGRAMMES (poslijediplomski sveučilišni specijalistički studij)** normally take one to two years. Upon completion students receive a diploma and the academic degree of University Specialist (sveučilišni specijalist) with an indication of the field of study.
- Organisation of vocational study programmes**
- SHORT CYCLE VOCATIONAL STUDY PROGRAMMES (stručni studij)** normally take two or two-and-a-half years, in which students are required to earn between 120 and 150 ECTS credits respectively. Upon completion students receive a diploma (svjedodžba) and a Short-Cycle Vocational Degree (stručni pristupnik) with an indication of the field of study. Students holding a short-cycle vocational degree can apply for admission to higher levels of vocational study programmes, or enter the workforce.
- VOCATIONAL UNDERGRADUATE PROGRAMMES – FIRST CYCLE (stručni prediplomski studij)** normally take three years in which students are required to earn 180 ECTS credits. A minority of vocational programmes in Croatia are offered as four-year programmes in which students are required to earn 240 ECTS credits. Upon completion students are awarded a diploma (svjedodžba) and the vocational degree of Vocational Bachelor (stručni prvostupnik) with an indication of the field of study. Students graduating in technical sciences receive the vocational degree of Vocational Bachelor in Engineering (stručni prvostupnik inženjer) with an indication of the field of study.
- Students holding a first cycle vocational degree can apply for admission to vocational specialist graduate programmes, or to second cycle university graduate programmes under conditions determined by the university, or to enter the workforce.
- VOCATIONAL SPECIALIST GRADUATE PROGRAMMES – SECOND CYCLE (stručni diplomski specijalistički studij)** normally take two years in which students are required to earn 120 ECTS credits. A minority of vocational specialist graduate programmes in Croatia are offered as one-year programmes in which students are required to earn 60 ECTS credits. The total number of credits earned in first and second cycle programmes must be at least 300. Upon completion of vocational specialist graduate programmes students are awarded a diploma and the vocational degree of Vocational Specialist (stručni specijalist) with an indication of the field of study. Students graduating in technical sciences receive the vocational degree of Vocational Specialist in Engineering (stručni specijalist inženjer) with an indication of the field of study, and students graduating in the fields of medicine, dentistry or veterinary medicine receive a diploma vocational degree (diplomirani) with an indication of the field of study. Students holding a second cycle vocational degree can enter the workforce, or they can also apply, under conditions determined by universities, for transfer to university diploma study programme (with the proviso of taking differential exams) and admission to a university postgraduate programme.
- 8.6**
- 8.2 Types of programmes**
- UNIVERSITY STUDY PROGRAMMES** prepare students for work in research and higher education institutions, as well as in private and public sectors. Students in these programmes receive an education that enables them to develop and use scholarly and professional knowledge at the appropriate level.
- VOCATIONAL STUDY PROGRAMMES** provide students with a career-ready level of knowledge, skills and competences required for work in specific vocations.
- 8.3 Accreditation of higher education institutions and study programmes**
- Higher education institutions (HEIs) and their study programmes are subject to an evaluation process in order to get accreditation. The request for accreditation is submitted to the Ministry in charge of higher education, which then requests an evaluation from the National Council for Higher Education (NCHE). The NCHE appoints an expert committee which, in cooperation with the Agency for Science and Higher Education, performs the evaluation and submits a report. A draft report is then sent to the HEI for feedback and clarifications. The National Council makes a final evaluation of the proposed study programme or of the higher education institution and recommends to the minister issuance or denial of accreditation.
- 8.4 Organisation of university study programmes**
- Since 2005, all study programmes in Croatia measure student work load in ECTS credits. A student is typically required to earn 60 ECTS credits in one academic year.
- UNIVERSITY UNDERGRADUATE PROGRAMMES – FIRST CYCLE (prediplomski sveučilišni studij)** normally take three years in which students are required to earn 180 ECTS credits. A minority of undergraduate university programmes in Croatia are offered as four-year programmes in which students are required to earn 240 ECTS credits. Upon completion students are awarded a diploma (svjedodžba) and the academic degree of University Bachelor (sveučilišni prvostupnik) with an indication of the field of study. Students graduating in technical sciences receive the academic degree of University Bachelor in Engineering (sveučilišni prvostupnik inženjer) with an indication of the field of study.
- Students holding a first cycle university degree can apply for admission to university graduate programmes or vocational specialist graduate programmes, or enter the workforce.
- UNIVERSITY GRADUATE PROGRAMMES – SECOND CYCLE (diplomski sveučilišni studij)** normally take two years in which students are required to earn 120 ECTS credits. A minority of graduate programmes in Croatia are offered as one-year programmes in which students are required to earn 60 ECTS credits. The total number of credits earned in the first and second cycle programmes must be at least 300. Upon completion students are awarded a diploma and the academic degree of Master of (magistar struke) with an indication of the field of study. Students graduating in technical sciences receive the academic degree of Master in Engineering (magistar inženjer) with an indication of the field of study. Students holding a second cycle university degree can continue their studies in university postgraduate programmes or enter the workforce.
- INTEGRATED UNDERGRADUATE AND GRADUATE UNIVERSITY PROGRAMMES – FIRST AND SECOND CYCLES (integrirani prediplomski i diplomski sveučilišni studij)** normally take five or six years in which students are required to earn 300 or 360 ECTS credits respectively. Upon completion students are awarded a diploma and the academic degree of Master of (magistar struke) with an indication of the field of study. Upon completion of integrated first and second cycle programmes in medicine, dentistry and veterinary medicine students receive the academic degree of Doctor (doktor struke) with an indication of the field of study (e.g. Doctor of Medicine, etc.)
- Students with this degree can continue their studies in university postgraduate programmes or enter the workforce.
- UNIVERSITY POSTGRADUATE PROGRAMMES – THIRD CYCLE (poslijediplomski sveučilišni studij)** normally take three years. Upon completion students are awarded a diploma and the academic degree of Doctor of Philosophy (or Doctor scientiarum), or Doctor of Fine Art (doktor znanosti or doktor umjetnosti), with an indication of the academic field or art form.
- 8.7**
- 8.6**
- Higher education institutions independently set the minimum educational requirements for admission to university undergraduate programmes and first cycle vocational programmes. Normally, the minimum requirement for admission to university undergraduate programmes is completion of a four-year secondary school; the minimum requirement for enrolment into first cycle vocational programmes is completion of a three- or four-year secondary school.**
- The admissions process to first cycle study programmes at Croatian universities is normally based on secondary school grades and an entrance examination. Each constituent unit of a university usually carries out its own entrance examination. The admissions process to first cycle programmes at polytechnics and schools of vocational higher education is also based on secondary school grades and sometimes an entrance examination, but the use of the latter is less common than in the case of universities.
- The minimum educational requirement for enrolment in university graduate programmes is completion of a university undergraduate programme. Universities can allow students with a higher education vocational degree to enrol in university graduate programmes under specially defined requirements.
- The minimum educational requirement for enrolment in vocational specialist graduate programmes is completion of a university undergraduate programme or a vocational programme (first cycle). The minimum educational requirement for enrolment in university postgraduate programmes is completion of a specific graduate programme. Normally, the requirement for enrolment in a university postgraduate programme is completion of a university graduate programme. Students who have completed pre-Bologna undergraduate programmes lasting at least four academic years (sveučilišni dodiplomski studij) can apply for admission to Bologna postgraduate programmes as well.
- 8.7**
- Grading scale**
- The Croatian national grading scale consists of five grades with numerical equivalents: izvrsno – 5 (excellent); vrlo dobar – 4 (very good); dobar – 3 (good); dovoljan – 2 (sufficient); nedovoljan – 1 (fail). The minimum passing grade is 2 (sufficient).

