University of Split

Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture

PROPOSAL FOR THE UNDERGRADUATE STUDY PROGRAMME

Computer Science

Split, March 15, 2005

STUDY PROGRAMME

Undergraduate Study: Computer Science

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1. Introduction

1.1. General information on the programme

Computer science, as both scientific and engineering discipline, deals with the research as well as the use of information, focusing on the design and changing of structures that communicate, store and process information. Computer science is related nowadays with a wide variety of fields of human activities. The basic concepts show a high level of similarity whether it deals with hardware and software systems or natural or social systems. There is a growing need for specialists of such a profile and encompasses the need for expert use of ready-made solutions through the design, application and use of very complex systems up to the original research work in the field of computer science and interdisciplinary areas overlapping with it.

Present situation and a projection of the development point out a great need for specialists in computer science. Only sufficient number of well-educated professionals in this academic discipline is the basic prerequisite for the implementation of aims defined in the "Strategy of the Development of the Republic of Croatia in the 21st century".

All areas of the human activity have been strongly influenced by general computerization and a rapid development of new technologies. Everybody needs a computer for various purposes and many will wish to study at least some forms of computer science. Computer engineering will remain to be present in enhancing careers of many professionals. Those who choose to pursue the path of computer engineering will have a significant role in the future forming of society. For further development of modern society, it is very important that the study of Computer Science attracts students with different interests and prepares them to be capable and responsible experts.

The proposed Computer Science study programme aims at educating and training professionals in the field of computer science and upon completion of studies undergraduates will be qualified for work in industry, higher education and other public and state institutions.

Estimation of the study objectives in relation to the labour market

Split is an industrial and university centre important for the whole region of Dalmatia and neighbouring surroundings. FESB is the only faculty in this region, which offers the university study programme of Computer Science. In a short-term period, the labour market in Croatia will lack several thousand experts from the field of Computer sciences whereas the European Union will need a hundred times that number. The frequent contacts between enterprises in the Split region and neighbouring surroundings confirm these estimations. As a result, this profile of experts seems to be very promising which is approved by the growing number of students enrolling every year in this study programme. Successful completion of the study programme will enable the undergraduates in Computer Sciences to

take on jobs requiring skills in the industry, computer and communication companies, higher education, services, etc. It is to point out that there is no place, where a undergraduate in Computer Sciences would not be successful in his work. Consequently, the need for these experts in today's labour market is enormous. It is of particular importance in these days when social and economic changes demand the development of new, small or medium, technologically advanced companies that will be a new support to the economical development.

Connection of the study curriculum with modern trends in computer science profession

The study programme has been designed to provide the computer sciences student with basic theoretical knowledge and practical skills qualifying them for work in the industry as well as acquiring new knowledge and new technologies. Teaching methods and techniques to be implemented within the study programme encourage critical thinking and creativity, which are essential to students' professional development. Students will be encouraged to be independent in decision-making and will be particularly trained for individual and team-work. The study programme, based on modern concepts of syllabus design in Computer Sciences, follows up world and in particular European trends in higher education as well as economical needs. In accordance to that, appropriate study programmes are being designed. In all strategically important documents concerning Croatia and EU computer-information technologies are listed as one of priorities, which opens up a path for taking part in home, European and world projects. The development of computer technologies is based, along with the progress in the field of computer science itself (e.g. cryptography, grid and embedded systems), on the latest insights into natural sciences (e.g. quantum information sciences and nanotechnology), clearly emphasizing interdisciplinary character of the study and correlation to modern scientific understanding. Scientific cooperation with renowned foreign research institutions is a basic orientation of FESB: Scientists working at FESB actively contribute to the development of computer science and computer technology.

Comparability with study programmes of higher education institutions abroad

The study programme has been designed following the model of other respected high education institutions in Europe. The best practices of American universities have been adopted and resumed in the document "Computing Curricula 2004" of the leading professional associations if the field of computer sciences (The Association for Computing – ACM, The Association for Information Systems – AIS, The Computer Society – IEEE-CS). There are no two countries in the world that share the same education system. This refers particularly to type and organization of study, duration of study, study title, professional or academic title or degree on completion of the study. In general, mathematics and basic natural sciences are given priority, and are followed by basic engineering and information sciences courses as well as specialist courses related to specific branches of computer sciences. General courses have also been implemented. The proposed study programme has been adjusted in accordance with recommendations of ERASMUS and THEIERE projects ('Towards the Harmonisation of Electrical and Information Engineering Education in Europe', http:/www.eaeeie.org/theiere/). The programme proposal has been designed in conformity with recommendations of SEFI (European Society for Engineering Education) and CESAER (Conference of European Schools for Advanced Engineering Education and Research). Electric Engineering Studies are comparable to other study programmes in several renowned European universities as:

- Techniche Univerzität Wien, Austria
- Eidgenössische Technische Hochschule (ETH) Zürich, Switzerland

1.2. Previous experience in the field

FESB has long tradition in the organisation of lectures with similar programs. The Faculty of Electrical Engineering was established in the town of Split in 1960. The Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture (FESB) was founded in 1971 and in 1974 the Faculty became a part of the University of Split. Vocational studies were established in 1979 and have been continuing to date with intermission of three years (1998-2001). Within the graduate study programme in Electrical Engineering computer engineering was introduced in 1985. More than 200 students have graduated at that course so far.

A full study of Computer Science was introduced in 2001 due to the need for a larger number of professionals in this specialization area. More than 700 students have been enrolled in the Computer Science study so far; first students are expected to graduate in the first semester of the academic year 2005.

The FESB reputation has been contributed by numerous presentations of research results obtained by professors and young researches at home and abroad. We also point out the contribution of graduate engineers, former students of this Faculty, who have become renown professionals working in various countries all over the world.

1.3. Student mobility scheme

The study programme in Computer Science enables vertical and horizontal mobility of students. As to vertical mobility the undergraduate study programme in Computer Science is mainly open to related graduate study programmes. As to horizontal mobility, it is open to the mobility of students between related studies of Croatian universities. Students will be allowed to finish a part of their study programmes at similar institutions at home or abroad.

Students educated at the study of Computer Science at FESB will gain sufficient knowledge to take up jobs concerning design, implementation and use of computer systems in a broader technical field, as well as in other fields requiring more complex computer systems. Therefore, mobility is encouraged, leaving students the choice to select courses offered at other faculties at home or abroad.

On the other hand, the need for specialists in computer engineering is in increase in all disciplines, leaving therefore the study open to all students of other study programmes who can gain further education through elective courses.

1.4. Other elements

FESB provides all conditions for the realisation of the study of Computer Science. The advantage of the programme is an optimal utilization of teaching stuff, facilities and equipment.. The Faculty employs sufficient number of lecturers and other staff having suitable scientific and professional qualification, fully in conformity with the standards prescribed for the teaching work-load by the law and collective agreement for the higher education. The suitable premises and equipment in conformity with the needs of high quality level of studying are also provided. Aditionnaly, the program is supported not only by entrepreneurs and public sector of the Split Dalmatian County, but also by the wider area comprising Dalmatian region and state authorities. FESB has signed the agreements on Collaboration in promotion of scientific and educational activities and they realise joint projects with the whole range of

organizations belonging to the economic and public sector: Split-Dalmatian County, City of Split, Ministry of Defence, Split Shipyard, Croatian Electrical Company, Croatian Telecom, Croatian Academic and Research Network – CARNet, Ericsson Nikola Tesla, Technological Center Split, Brodosplit, Siemens, VIPnet, Microsoft Croatia, Airport Split, TLM Šibenik.

2. General description

Type of programme	Undergraduate	
Programme title	Computer Science	
Institution	**Proposed by**	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
	Participating institutions	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Duration	3 years	
ECTS	180	
Admission requirements	Secondary school diploma and an adequate score in the entrance examination	
Learning outcomes and competences	After the completion of undergraduate studies the Bachelor in Computer Studies should be able to design, implement and maintain not too complicated computer systems, including hardware and software. They can continue their studies to become highly trained professionals who will be able to give their share to technological development and to become its active participant.	
Access to further studies	After successful completion of undergraduate studies the Bachelor of Science will be able to continue graduate studies within the research field of computer science or some other related graduate study programm.	
Qualification awarded	Academic degree: Bachelor's Degree in Computer Science Academic title: Bachelor of Science (BS) in Computer Science	

3. Study/Degree programme

3.1. Programme structure with credits

1st Semester			
Course code	**Course title**	**Course structure *L+E+P**	**ECTS**
	Linear algebra	30+30+0	6
	Mathematical analysis 1	45+45+0	8
	Physics 1	45+30+15	7
	Introduction to computer science	45+0+30	7
	English 1**	30+0+0	2
Total:		**195+105+45= 345**	**30**
*L = Lecture, E = Exercise, P = Practice (Laboratory)			

2nd Semester			
Course code	**Course title**	**Course structure *L+E+P**	**ECTS**
	Mathematical analysis 2	45+45+0	8
	Physics 2	45+30+15	7
	Electrical engineering	45+30+0	6
	Programming	45+0+30	7
	English 1	30+0+0	2
Total:		**210+105+45= 360**	**30**
*L = Lecture, E = Exercise, P = Practice (Laboratory)			

3rd Semester			
Course code	**Course title**	**Course structure *L+E+P**	**ECTS**
	Probability and Statistics	30+30+0	5
	Discrete mathematics	30+30+0	6
	Object oriented programming	30+0+30	6
	Data structures	30+0+30	6
	Introductory electronics	45+30+15	7
Total:		**165+90+75= 330**	**30**
*L = Lecture, E = Exercise, P = Practice (Laboratory)			

4th Semester			
Course code	**Course title**	**Course structure *L+E+P**	**ECTS**
	Computer Architecture	45+0+30	7
	Digital System and Structures	45+30+15	7
	Algorithms	45+0+30	7
	Data Base	30+0+30	5
	Signals, Systems and Control	30+30+0	4
Total:		**195+60+105= 360**	**30**
*L = Lecture, E = Exercise, P = Practice (Laboratory)			

5th Semester			
Course code	**Course title**	**Course structure *L+E+P**	**ECTS**
	Operational Systems	45+0+30	7
	Computer Networks	45+0+30	7
	Software Engineering	45+0+30	7
	Internet Programming	30+0+30	5
	Elective	30+0+15	4
Total:		**195+0+135=330**	**30**
*L = Lecture, E = Exercise, P = Practice (Laboratory)			

6th Semester			
Course code	**Course title**	**Course structure *L+E+P**	**ECTS**
	Information System Design	30+0+0+30	5
	Introduction in to Distributed Systems	30+0+0+30	5
	Business Informatics	30+0+0+15	4
	Elective	30+0+0+15	4
	Final Work (Project)	0+15+0+0	12
UKUPNO:		**120+15+0+90=225**	**30**
*L = Lecture, E = Exercise, P = Practice (Laboratory)			

Elective			
	Windows Programming	30+0+15	4
	Unix Programming	30+0+15	4
	Security of computer systems and data	30+0+15	4
	Communication Protocols and Architectures	30+0+15	4
	Digital Signal Processing	30+0+30	4
	Introduction in to Embedded Systems	30+0+30	
	Engineering Economics		
*L = Lecture, E = Exercise, P = Practice (Laboratory)			

3.2. Course description

Course title	**Linear algebra**		
Course code			
Type of course	Lecture Obligatory		
Level of course	Basic level course		
Year of study	1	**Semester/trimester**	1
ECTS (Number of credits allocated)	5 (30 hours of lectures and 30 hours of exercises is equivalent to 1.5 ECTS points, individual work requires 100 hours – 3.5 ECTS points)		
Name of lecturer	Prof. dr. sc. Ivan Slapničar, doc. dr. sc. Saša Krešić-Jurić, doc. dr. sc. Borka Jadrijević		
Learning outcomes and competences	Mastering elementary methods of matrix calculus and basic manipulation with vectors and their applications to engineering problems. The applications include solving systems of linear equations, least squares method and linear regression, and analytic geometry of space.		
Prerequisites	None		
Course contents	LINEARN ALGEBRA: matrices, matrix notation of the system of linear equations, solving triangular systems, Gaussian elimination, linear independence, rank, Kronecker-Capelli theorem, inverse matrix, determinants, QR factorisation and the least squares method, vector spaces and linear operators, eigenvalues and eigenvectors of matrices, diagonalisation methods. VECTOR ALGEBRA: vectors, basic operations with vectors, coordinatisation, unit vector and direction cosines, linear independence and the basis of the Euclidean space, vector products and applications. ANALITIC GEOMETRY: lines, planes and applications.		
Recommended reading	1. Ivan Slapničar, Matematika 1, FESB Split, 2002., http://www.fesb.hr/mat1 2. N. Elezović, Linearna algebra, Element, Zagreb, 2000.		
Supplementary reading	1. I. Slapničar, Uvod u metodu najmanjih kvadrata i problem vlastitih vrijednosti, skripta, FESB Split, http://www.fesb.hr/mat1/ls 2. S. Pavasović i ostali, Matematika 1 – riješeni zadaci, Građevinsko-arhitektonski fakultet, Split 1999. 3. N. Elezović i A. Aglić, Linearna akgebra - zbirka zadataka, Element, Zagreb, 1998.		
Teaching methods	Lectures, exercises, advisory hours, individual learning, problem solving in groups.		
Assessment methods	Continuous assessment (diagnostic tests, independent homework, mid-term exams) Exam: written and oral.		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaries and surveys. Consultations with teachers of mathematical courses and heads of study programs. Evaluation of teaching by the chair of the department and agency for quality promotion.		

Course title	**Mathematical analysis 1**		
Course code			
Type of course	Lecture Obligatory		
Level of course	Basic level course		
Year of study	1	**Semester/trimester**	1
ECTS (Number of credits allocated)	8 (45 hours of lectures and 45 hours of exercises is equivalent to 3 ECTS points, individual learning requires 150 hours – 5 ECTS points)		
Name of lecturer	Prof. dr. sc. Ivan Slapničar, doc. dr. sc. Saša Krešić-Jurić, doc. dr. sc. Borka Jadrijević		
Learning outcomes and competences	Mastering the concepts, definitions and formulas related to fundamentals of mathematics, analysis of the functions of single variable, basics of integral calculus and sequences and series of numbers and functions. Applications of the mathematical tools to solving engineering problems.		
Prerequisites	None		
Course contents	FUNDAMENTALS OF MATHEMATICS: fundamentals of mathematical logic, binary relations and functions, natural and whole numbers, rational and real numbers, complex numbers. FUNCTIONS OF REAL VARIABLE: defining functions, classification of functions, limits, continuity, asymptotes, overview of elementary functions, derivative, differential, higher derivatives and differentials, mean-value theorems, monotonicity, extrema, curvature, flow of a function. INTRODUCTION TO INTEGRAL CALCULUS: definition of indefinite integral and basic intgration techniques. SEQUENCES AND SERIES: sequences of real numbers, series of real numbers, sequences of functions, series of functions, Taylor series.		
Recommended reading	1. Ivan Slapničar, Matematika 1, FESB Split, 2002., http://www.fesb.hr/mat1 3. 2. S. Pavasović i ostali, Matematika - riješeni zadaci, Građevinski fakultet, Split, 1999.		
Supplementary reading	1. Ivan Slapničar, Saša Krešić i Josipa Barić, Matematika 1 – Vježbe, FESB Split, skripta, http://www.fesb.hr/mat1 2. L. Krnić i Z. Šikić: Račun diferencijalni i integralni, I. dio, Školska knjiga, Zagreb, 1993. 3. B. P. Demidović: Zadaci i riješeni primjeri iz više matematike s primjenom na tehničke nauke, Tehnička knjiga, Zagreb, 1980.		
Teaching methods	Lectures, exercises, advisory hours, individual learning, problem solving in groups.		
Assessment methods	Continuous assessment (diagnostic tests, independent homework, mid-term exams) Exam: written and oral.		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaries and surveys. Consultations with teachers of mathematical courses and heads of study programs. Evaluation of teaching by the chair of the department and agency for quality promotion.		

Course title	**Physics 1**		
Course code			
Type of course	Lecture / Exercise Course Obligatory		
Level of course	Basic level course		
Year of study	1	**Semester/trimestar**	1
ECTS (Number of credits allocated)	7 (45 hours lectures – 3 ECTS, 45 hours excercises – 2 ECTS, 60 hours homework 2 ECTS)		
Name of lecturer	Nikola Godinović, PhD; Ivica Puljak, PhD		
Learning outcomes and competences	Understanding the basic natural science laws, allowing a student to successfully follow the lectures form different specialized courses and to prepare a student for continual professional education after graduation.		
Prerequisites			
Course contents	On physics. Physical quantities, Dimensions of physical quantities, The international system of units (SI). Particle kinematics. Particle dynamics. Work and energy. Statics. Mechanics of rigid body. Inertial and noninertial reference frames. Relativistic mechanics. Gravitation. Fluids statics. Fluid dynamics. Heat and temperature. Kinetic-molecular theory of heat.		
Recommended reading	1. N. Godinović, I. Puljak: internal textbook 2. Kulišić, P.: *Mehanika i toplina*, Školska knjiga, Zagreb, 1995. 3. Grbac, M.; Rađa-Ljubić, L.: *Zadaci iz mehanike i hidromehanike*, FESB, Split,1991. 4. Kulišić, P. i suradnici: *Riješeni zadaci iz mehanike i topline*, Školska knjiga, Zagreb, 1996. 5. Rađa-Ljubić, L. i suradnici: *Praktikum iz fizike* (I dio), FESB, Split, 1990.		
Supplementary reading	1. Halliday/Resnick/Walker: *Fundamental of Physics*, 7th edition, Wiley, 2005 2. Cindro, N.*: Fizika 1*, Školska knjiga Zagreb, 1991. 3. Udžbenik Sveučilišta u Berkeleyu, svezak 1, *Mehanika*, Školska knjiga		
Teaching methods	Lectures / Exercise course / Practical session / Advisory hours		
Assessment methods	Continuous assesment (achievement tests) Exam: writen and oral		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaries and surveys. Lectures responsible for the same subject area collaborate closely and monitor each other's work.		

Course title	**Introduction to computer science**		
Course code			
Type of course	Lecture / Exercise Course Obligatory		
Level of course	Basic level course		
Year of study	1	**Semester/trimestar**	1
ECTS (Number of credits allocated)	5		
Name of lecturer	Dr.Sc. Mirjana Bonković		
Learning outcomes and competences	This course is designed as first course for computer science students. It will give students a broad introduction to the discipline of computer science. We will show that the discipline is not just one of programming. The course will be an opportunity to be exposed to various aspects of computer science.		
Prerequisites	-		
Course contents	**History of computing (**3 percent**)** **Basic logic design.** Binary representation of data and control information. Logical properties of gates and Boolean functions. Combinational networks. Flip-Flops, registers, memory.(17 percent) **Instruction formats.** Instruction format. Methods of addressing. Execution of instructions. (20 percent) **Computer architecture.** Functions of large scale components of a computer system. Function of a data bus. Instruction execution. Data flow and control of a simple processor. Concept of micro-programming and analogy with software. Properties of simple I/O devices and their controllers. (20 percent) **Programming.** Representation of integers, reals, characters, instructions. Data types, constants, variables. Arithmetic expressions. Assignment statement. Logical expression. Sequencing, alternation and iteration. Arrays. Subprograms and parameters. Debugging techniques. (20 per cent.) **Algorithm development.** Techniques of problem solving. Flowcharting. Stepwise refinement. Simple numerical examples. (20 per cent.)		
Recommended reading	J. Glenn Brookshear Computer Science: An Overview, Addison Wesley, 2004.		
Supplementary reading	Tannenbaum, S. Structured Computer Organisation., Prentice-Hall, Englewood Cliffs, N.J., 1990.		
Teaching methods	Lectures / Exercise course / Practical session / Advisory hours		
Assessment methods	There will be two exams during the semester and a cumulative final. Throughout the semester there will be short quizzes to test students' understanding of current topics.		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaries and surveys		

Course title	**English 1**		
Course code			
Type of course	Lecture Obligatory		
Level of course	Basic level course		
Year of study	1st	**Semester/trimestar**	1st, 2nd
ECTS (Number of credits allocated)	5 ECTS; 45 contact hours (60 min per hour) and 105 hours of of student study time		
Name of lecturer			
Learning outcomes and competences	Acquiring lexical and grammatical structures of the language of science and technology with the aim of developing reading, writing and speaking skills in the field of the students' specialization.		
Prerequisites	Prerequisites defined by the Faculty Statute.		
Course contents	Review of communication topics and grammatical structures acquired in secondary school. Introduction into basic structures and terminology of the language of science and technology. Electricity. Electromagnetism. Electric Charges; Electrical Conductivity. Mathematics. Electronics. Semiconductors. Transistors (Thyristors). Computer Technology.		
Recommended reading	1. Štambuk, Anuška. (2002). *English in Electrical Engineering and Computing*. Split: FESB 2. Sarah Cunningham; Moor, Peter. (2000). *Cutting Edge*. Longman.		
Supplementary reading	Newby, David. (1996). *Grammar for Communication*. Zagreb: Školska knjiga.		
Teaching methods	Approach based on student cooperation, i.e. students are encouraged to acquire the new knowledge by making their own conclusions on the basis of the selected texts and exercises accompanying them.		
Assessment methods	Continuous assesment: diagnostic tests, achievement tests, oral reports. Exam: oral		
Language of instruction	English		
Quality assurance methods	Student feedback via questionnaries and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occassional class observations and appraisal by Head of Department		

Course title	**Mathematical analysis 2**		
Course code			
Type of course	Lecture Obligatory		
Level of course	Basic level course		
Year of study	1	**Semester/trimester**	2
ECTS (Number of credits allocated)	8 (45 hours of lectures and 45 hours of exercises is equivalent to 3 ECTS points, individual learning requires 150 hours – 5 ECTS points)		
Name of lecturer	Prof. dr. sc. Ivan Slapničar, doc. dr. sc. Saša Krešić-Jurić, doc. dr. sc. Borka Jadrijević		
Learning outcomes and competences	Mastering the concepts, definitions and formulas related to integral calculus, definite integrals and their applications, Fourier series and applications, basics of differential equations, multivariable calculus and multiple integrals. Applications of the mathematical tools to solving engineering problems.		
Prerequisites	Mathematical analysis 1		
Course contents	INTEGRATION TECHNIQUES: integration of rational functions, trigonometric substitution, integration of some irrational functions, integration of series of functions. DEFINITE INTEGRAL: definition and basic properties, applications of definite integral, imporper integrals and numerical integration. FOURIER SERIES: orthogonal trigonometric systems, Fourier series of functions and application, Parseval identity. DIFFERENTIAL EQUATIONS: population and logistic equation, equations with separable variables, exact differential equations, linear equations of the first order, equations of higher order with constant coefficients, systems of differential equations and predator-prey system. FUNCTIONS OF SEVERAL VARIABLES: limit and continuity, partial derivatives, Taylor formula, extrema, conditional extrema. MULTIPLE INTEGRALS: double integral and applications, triple integral and applications, substitution in multiple integral.		
Recommended reading	1. Ivan Slapničar i M. Matić, Matematika 2, skripta, FESB Split, http://www.fesb.hr/mat2 4. P. Javor, Matematička analiza 2, Element, Zagreb, 2000.		
Supplementary reading	1. B. P. Demidović: Zadaci i riješeni primjeri iz više matematike s primjenom na tehničke nauke, Tehnička knjiga, Zagreb, 1980.		
Teaching methods	Lectures, exercises, advisory hours, individual learning, problem solving in groups.		
Assessment methods	Continuous assessment (diagnostic tests, independent homework, mid-term exams) Exam: written and oral.		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaries and surveys. Consultations with teachers of mathematical courses and heads of study programs. Evaluation of teaching by the chair of the department and agency for quality promotion.		

Course title	**Physics 2**		
Course code			
Type of course	Lecture / Exercise Course Obligatory		
Level of course	Basic level course		
Year of study	1	**Semester/trimestar**	2
ECTS (Number of credits allocated)	7 (45 hours lectures – 3 ECTS, 45 hours excercises – 2 ECTS, 60 hours homework 2 ECTS)		
Name of lecturer	Nikola Godinović, PhD		
Learning outcomes and competences	Understanding the basic natural science laws, allowing a student to successfully follow the lectures form different specialized courses and to prepare a student for continual professional education after graduation.		
Prerequisites			
Course contents	Oscilations. Mechanical waves. Maxwell's equations. Electromagnetics waves. Geometrical optics. Physical optics. Quantum nature of light. Structure of atoms. Atomic nucleus.		
Recommended reading	6. N. Godinović, I. Puljak: internal textbook 7. Henč-Bartolić V.; Kulišić, P.: *Valovi i optika*, Školska knjiga Zagreb, 1989. 8. Vuletin, J.: *Zadaci iz Fizike* (Titraji i valovi, Toplina, Atomi), FESB, Split, 1996. 9. Henč-Bartolić, V. I suradnici: *Riješeni zadaci iz valova i optike*, Školska knjiga, Zagreb, 1992. 10. Vuletin, J. i suradnici: *Praktikum iz opće fizike* (II dio), FESB, Split, 1993.		
Supplementary reading	4. Halliday/Resnick/Walker: *Fundamental of Physics*, 7th edition, Wiley, 2005 5. Cindro, N.: *Fizika 2*, Školska knjiga, Zagreb, 1991. 6. Udžbenik Sveučilišta u Berkeleyu, svezak 1, *Mehanika*, Školska knjiga Zagreb		
Teaching methods	Lectures / Exercise course / Practical session / Advisory hours		
Assessment methods	Continuous assesment (achievement tests) Exam: writen and oral		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaries and surveys. Lectures responsible for the same subject area collaborate closely and monitor each other's work.		

Course title	**Electrical Engineering**		
Course code			
Type of course	Lecture / Exercise Course Obligatory		
Level of course	Basic level course		
Year of study	1	**Semester**	2
ECTS (Number of credits allocated)	7 (45 hours of lectures - 2 ECTS, 30 hours of exercise course - 1 ECTS , 120 hours of individual learning - 4 ECTS)		
Name of lecturer	Professor Slavko Vujević, Ph. D.		
Learning outcomes and competences	Basic knowledge about electrostatics, direct current circuits, magnetostatics and alternating current circuits.		
Prerequisites			
Course contents	Basic terms. Electrostatics: Coulomb's law; electrostatic field; Gauss's law; electrical potential and voltage; matter in electrostatic field; electric capacity and capacitors; electrostatic energy; electrostatic discharge. Direct currents: electric circuit; Ohm's law, serial and paralell resistors; Kirchhoff's laws; electrical energy and power; methods for analysis od direct current circuits. Magnetostatics: basic terms; magnetostatic circuit; Ampere's law, Biot-Savart's law; self and mutual inductance; electromagnetic induction; forces in magnetostatic fields; magnetostatics energy. Alternating currents: basic terms; phasor representation of time-harmonic voltages and currents; impedance; analysis of linear alternating current circuits using simbolic method; power and energy; resonance; three-phase systems.		
Recommended reading	1. Vujević, S., "Predavanja iz Elektrotehnike", (skripta u pripremi), FESB, Split, ... 2. Maletić, A., "Osnove elektrotehnike", ELMAP, Split, 1993. 3. Jurić-Grgić, I. i Vujević, S., "Auditorne vježbe iz Elektrotehnike", (skripta u pripremi), FESB, Split, ...		
Supplementary reading	1. Pinter, V., "Osnove elektrotehnike - knjiga prva", Tehnička knjiga, Zagreb, 1978. 2. Pinter, V., "Osnove elektrotehnike - knjiga druga", Tehnička knjiga, Zagreb, 1978.		
Teaching methods	Lectures / Exercise course		
Assessment methods	Exam: written / oral		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaries and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work.		

Course title	**Programming**		
Course code			
Type of course	Lecture / Exercise Course / Seminar Obligatory		
Level of course	Basic level course		
Year of study	1.	**Semester/trimestar**	2.
ECTS (Number of credits allocated)	7 (lectures: 45 hours + exercise: 30 hours --> 2,5 ECTS, laboratory (30 hours) + home work plus project (45 hours) equals 75 hours – 2,5 ECTS, learning 60 hours - 2 ECTS)		
Name of lecturer	Željan Lozina		
Learning outcomes and competences	Ability for solving common programming tasks in C.		
Prerequisites	Basic knowledge of programming using procedural programming language.		
Course contents	Introduction in semantics of C programming language – basic types, expressions. Declarations of user data types. Cast operator. Structures. Enumerated types. Union. Functions. Passing arguments by value and passing by reference. Scope and life of variable. Pointers. Pointers and strings. Memory allocation. Bit manipulation. Input and output operations. Modular programming and functional program decomposition. Lexical preprocessor: header files, symbols, macro instructions. Conditional compilation. Definition of automatic, static end external variables. Abstract data types: examples of queue, stack and tree. Programming styles.		
Recommended reading	Harbison, Samuel P. & Steele, Guy L., Jr., *C A Reference Manual*. Fourth edition, 1995, Prentice Hall, ISBN 0133262243, 455 pages.		
Supplementary reading	Kochan, Stephen G., *Programming in ANSI C*. Revised edition, 1994, SAMS Publishing, ISBN 0672303396, 534 pages. Kernighan, Brian W. & Ritchie, Dennis M., *The C Programming Language*. Second edition, 1988, Prentice Hall, ISBN 0131103628, 274 pages.		
Teaching methods	Lectures / Laboratory / Practical session / Seminars Tutorials		
Assessment methods	Continuous assessment (diagnostic tests, independent homework, project tasks, achievement tests, seminar papers ...) Exam: written / seminar paper presentation		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaires and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occasional class observations and appraisal by Head of Department		

Course title	**Probability and Statistics**		
Course code			
Type of course	Lectures and seminars. Obligatory core course.		
Level of course	Intermediate level course		
Year of study		**Semester**	3
ECTS (Number of credits allocated)	5 ECTS; 45 contact hours (60 min per hour) and 105 hours of student study time.		
Name of lecturer	Ante Rozga, Ph.D., Reader		
Learning outcomes and competences	After the completion of the course, the student is expected to understand and identify the importance of probability and statistical methods. The student should be able to analyse and synthesise statistical data. S/he is also expected to have developed the ability to apply the knowledge of statistics to the solution of various practical problems. S/he would have developed probabilistic way of thinking. The student is expected to understand the major principles of estimation and hypothesis testing. S/he should be able to show the ability to demonstrate knowledge and understanding of facts, concepts, principles and theories relating to statistics.		
Prerequisites	Prerequisites defined by the Faculty Statute.		
Course contents	Some basic concepts. Measurement and measurement scales. The frequency distribution. Measures of central tendency. Measures of dispersion. Skewness and kurtosis. Elementary properties of probability. Addition and multiplication law. The law of large numbers. Conditional probability. Bayes' teorem. Discrete random variable. Probability distributions of discrete random variables. Continuous random variable. Probability distributions of continuous random variables. Sampling theory. Sampling distribution. Confidence interval for population mean, total, variance and proportion. Hypothesis testing about population mean, proportion, difference between two means, difference between two proportions. Type I and type II errors. Sample design. Chi-square test. Tests of independence. One way and two way analysis of variance. Correlation and regression.		
Recommended reading	1. Pavlić I.: Statistička teorija i primjena. Tehnička knjiga. Zagreb, 1985. 2. Rozga, A: Lecture notes and hand-outs.		
Supplementary reading	1. Pauše, Ž.: Uvod u matematičku statistiku. Školska knjiga. Zagreb, 1993. 2. Vranić, V.: Vjerojatnost i statistika. Tehnička knjiga, Zagreb, 1971.		
Teaching methods	Lectures, Seminars, Advisory hours.		
Assessment methods	1. Continuous assessment. 2. Exam: written and oral. 3. External evaluation by the Agency for quality of higher education.		
Language of instruction	Croatian.		
Quality assurance methods	1. Student feedback via questionnaires and surveys. 2. Lecturers responsible for the same subject area collaborate closely and monitor each other's work. Occasional class observations and appraisal by Head of Department. 3. External evaluation by the Agency for quality of higher education.		

Course title	**Discrete mathematics**		
Course code			
Type of course	lectures and tutorial sessions obligatory		
Level of course	basic level course		
Year of study	2 (750)	**Semester**	3 750
ECTS (Number of credits allocated)	4 ECTS credits (lectures and tutorial sessions (45+30) x 0.75 hours - 1.875 ECTS credits, study and exams 63 hours and 45 min. - 2.125 ECTS credits)		
Name of lecturer	Borka Jadrijević		
Learning outcomes and competences	Students acquire a basic knowledge and skills from mathematical logic, number theory, combinatorial counting and other selected topics of discrete mathematics, necessary for understanding the variety of specialized courses and for expected application. The primary goal is to give them sound, intuitive understanding of the basic concepts without sacrificing accuracy in stating mathematical facts.		
Prerequisites	elementary (high school) mathematics		
Course contents	*Sets and mathematical logic.* Sets and sets operations. Propositional calculus. Predicates and quantifiers. Methods of proof. Boolean algebra and Boolean functions. Logic gates. *Integers.* Divisibility. Euclidian algorithm. Congruence. Euler and Mobius functions. *Relations.* Binary relations and their properties. Equivalence relations. Partial and total order. *Combinatorial counting.* Permutations and combinations of sets. The principle of inclusion and exclusion. Inversion formulae. Pigeonhole principle. *Recursion relations.* Fibonacci numbers. Linear recurrence relations. Recursions and generating functions.		
Recommended reading	D. Žubrinić, *Diskretna matematika,* Element, Zagreb, 1997.		
Supplementary reading	D. Veljan, *Kombinatorna i diskretna matematika*, Algoritam, Zagreb, 2001		
Teaching methods	lectures, tutorial sessions, advisory hours		
Assessment methods	Continuous assesment: partial writen exams Exam: writen and oral.		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaries and surveys. Lectures responsible for the same subject area collaborate closely and monitor each other's work.		

Course title	**Object oriented programming**		
Course code			
Type of course	Lecture / Seminar / Execise Course Obligatory		
Level of course	Intermediate level course		
Year of study	2	**Semester**	3
ECTS (Number of credits allocated)	4 (30 hours lectures, 30 hours exercises, 60 hour self-learning)		
Name of lecturer	Ivo Mateljan		
Learning outcomes and competences	On completion of the course, students should, with reference to C++ language, be able to: 1. explain the concept of namespace, scope and lifetime, 2. explain difference between object based and object orieneted programming, 3. explain the polymorphism, 4. use fundamental STL classes: string, vector, list, stack, queue, 5. use the facilities in the "iostream" to provide user and file i/o in programs, 6. use the exception handling mechanism, 7. use Microsoft Visual Studio to make programs with GUI		
Prerequisites	Competences from the first year of study.		
Course contents	Structural, object based and object oriented programming. Design and implementation of program in C++ languages. Functions and primitive data types. Classes and objects. Class abstraction, interface and implementation. Operator overloading. Iterators and patterns. Inheritance and polymorphism. Abstract base classes. Generic programming and templates. Exception handling. Programs with GUI. Model-view-controller and document-view architecture of user interface. Interaction with operation system – process handling.		
Recommended reading	Ivo Mateljan: OOP, skripta, FESB, 2001. Stroustrup, B., The C++ programming Language, Adison Wesley, 1986.		
Supplementary reading	Owen L. Astrachan, Computer Science Tapestry, McGrawHill 2000.		
Teaching methods	Lectures / Seminars (discussion, seminar papers, reports) / Exercise course /		
Assessment methods	Exam: writen / oral / seminar paper presentation		
Language of instruction	Croatian/English		
Quality assurance methods	Student feedback via questionnaries and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occassional class observations and appraisal by Head of Department		

Course title	**Data structures**		
Course code			
Type of course	Lecture/ Execise Course Obligatory		
Level of course	Intermediate level course		
Year of study	2	**Semester/trimestar**	3
ECTS (Number of credits allocated)	5		
Name of lecturer	Prof. dr. sc. Sven Gotovac		
Learning outcomes and competences			
Prerequisites	Programming 1		
Course contents	Introduction to algorithms. Algorithms complexity and analyses. Abstract data type (ADT). ADT definition. List. Implementation of lists. Single linked list. Double linked list. Operation on list. Examples. Stack. Implementation of stack. Operation on stack. Examples. Queue. Operation on queue. Trees. Implementation of trees. Operation on tree. Examples. Binary trees. Operation on binary tree. Binary tree balancing technique. Hashing. Graphs.		
Recommended reading	Weiss, M.A: Data Structures & Algorithm Analyses in C, Addison-Wesley, 1997.		
Supplementary reading			
Teaching methods	Lectures / Exercise course / Practical session Advisory hours		
Assessment methods	Continuous assessment: diagnostic tests, independent homework. Exam: writen / oral / seminar paper presentation		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaries and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occassional class observations and appraisal by Head of Department		

Course title	**Introductory Electronics**		
Course code			
Type of course	Lecture / Exercise Course Obligatory /		
Level of course	Basic level course		
Year of study	2	**Semester/trimestar**	3
ECTS (Number of credits allocated)	7		
Name of lecturer	Dr. sc. Ivan Zulim, Full Professor		
Learning outcomes and competences	Knowledge of behaviour of the major semiconductor devices used in integrated circuits: properties of semiconductors, physical operation and circuit characteristics of diodes and transistors. Ability to analyse basic amplifier circuits with bipolar junction and field-effect transistors. Analysis of basic circuits with operational amplifiers.		
Prerequisites	None		
Course contents	Semiconductor components. Semiconductor devices: diodes – types and application. Bipolar junction transistors: structure, characteristics and models. Field-effect transistors: structure, characteristics and models. Analog electronic circuits: basic circuits with bipolar and unipolar transistors. Analysis for DC and AC signals. Operational amplifiers: structure and models.		
Recommended reading	1. I. Zulim, S. Gotovac: Osnovni poluvodički elektronički elementi, FESB Split 1998. 2. P. Biljanović: Elektronički sklopovi, Školska knjiga Zagreb 1989. 3. P. Biljanović, I. Zulim: Elektronički sklopovi – zbirka zadataka, Školska knjiga Zagreb 1994.		
Supplementary reading	1. P.Biljanović: Poluvodički elektronički elementi, Školska knjiga Zagreb 1996 2. J. Millman, A. Grabel: Microelectronics, second edition, McGraw-Hill Book Company, Singapore 1987.		
Teaching methods	Lectures / Exercise course / Tutorials / Advisory hours /		
Assessment methods	1. Preliminary exams during course (2 in semester). 2. Exam: written and oral.		
Language of instruction	Croatian		
Quality assurance methods	Student feedback Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occassional class observations and appraisal by Head of Department		

Course title	**Computer architecture**		
Course code			
Type of course	Lecture / Seminar / Exercise Course Obligatory		
Level of course	Intermediate level course		
Year of study	2	**Semester/trimestar**	4
ECTS (Number of credits allocated)	6		
Name of lecturer	Professor Sven Gotovac		
Learning outcomes and competences			
Prerequisites	Digital systems and structures. Electronics Programming 1		
Course contents	Introduction. Different computer perspectives. CISC. RISC. Instruction set. Instruction formats. Addressing modes. CPU design. Single and multi bus microarchitecture. ALU, Control unit. Pipeline. Memory subsystem. Hierarchical memory. Cache. I/O subsystem. IRQ. DMA. U/I devices.		
Recommended reading	1. Hennesy & Patterson, "Computer Architecture: A Quantitative Approach", 3rd edition, Morgan Kaufmann 2. Heuring, V.P., Joredan, H.F.: Computer Systems Design and Architecture, Addison-Wesley, 1997.		
Supplementary reading			
Teaching methods	Lectures / Seminars (discussion, seminar papers, reports) / Exercise course / / Practical session / Advisory hours / Project work		
Assessment methods	Continuous assessment (diagnostic tests, independent homework, project tasks, achievement tests, seminar papers ...) Exam: writen / oral / seminar paper presentation		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaries and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occassional class observations and appraisal by Head of Department		

Course title	**Digital system and structures**		
Course code			
Type of course	Obligatory		
Level of course	Advanced level course		
Year of study	2	**Semester/trimestar**	4
ECTS (Number of credits allocated)	7 ECTS (lectures 45 hours - 1,5 ECTS / exercises 30 hours - 1 ECTS / laboratory 15 hours - 0,5 ECTS / tests, consultations, laboratory practice and learning 120 hours - 4 ECTS)		
Name of lecturer	dr.sc. Julije Ožegović, associate.prof		
Learning outcomes and competencies	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.		
Prerequisites	None		
Course contents	Digital and analog variable. Information and coding. Binary number system. Modulo arithmetic. Logic gates. Boolean algebra and logic algebra. Boolean functions. Decomposition to partial functions. Minimization and realization of Boolean function using logic gates. Sumator synthesis. Realizing Boolean function using multiplexers and demultiplexers. Multiplexer - demultiplexer structures (ROM). Programmable logic structures. Time relations. Bistables. Bistable synthesis. Registers, shift registers and counters. Memories (RAM). Discrete finite digital automata. Specification and minimization. Programmable automata. Wilkies' model. Microprogramming concept. Algorithms. Event algebra. Automata specification using regular expressions. Automata, grammars and languages taxonomy.		
Recommended reading	1. Župan-Tkalić-Kunštić: Logičko projektiranje digitalnih sustava, Školska knjiga, Zagreb, 1984, 1995. 2. Ožegović, J. Digitalna i mikroprocesorska tehnika, upute za laboratorijske vježbe, interna skripta, FESB Split 1995.		
Supplementary reading	1. Ožegović, J. Digitalna i mikroprocesorska tehnika, Veleučilište u Splitu, 2002.		
Teaching methods	Lectures / Exercises course / Laboratory practice / Tutorials		
Assessment methods	Continuous assessment: laboratory tests, practical tests, knowledge tests. Exam: written and oral as unity.		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaires and surveys Occasional class observations by Head of Department		

Course title	**Algorithms**		
Course code			
Type of course	Lecture / Exercise Course Obligatory		
Level of course	Intermediate level course		
Year of study	750/2	**Semester/trimestar**	4
ECTS (Number of credits allocated)	6 (45 hours lecture + 30 hours exercise course + 60 hours studying)		
Name of lecturer	dr.sc. Hrvoje Dujmić, doc.		
Learning outcomes and competences	Theoretic knowledge about design of efficient algorithms and about analyzing algorithms characteristics (running time and memory). Practical knowledge about sorting algorithms and graph algorithms.		
Prerequisites	First year undergraduate.		
Course contents	Recurrence solving methods; Divide-and-conquer, Greedy algorithms, backtracking, branch and bound techniques; Dynamic Programming; Analyzing algorithms; Designing algorithms; Sorting algorithms (heap sort, quick sort, merge sort); Sorting in linear time; Graph algorithms DFS, BFS, Minimum spanning Tree); NP-completeness		
Recommended reading	Hrvoje Dujmić: „Algoritmi“, interna skripta		
Supplementary reading	T.Cormen, C.Leiserson, R.Rivest, C.Stein: „Introduction to Algorithms“, second edition, third printing, McGraw-Hill, 2002		
Teaching methods	Lectures / Exercise course		
Assessment methods	Continuous assessment (diagnostic tests) Alternatively: written exam		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaires and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occasional class observations and appraisal by Head of Department		

Course title	**Databases**		
Course code			
Type of course	Lecture / Execise Course Obligatory		
Level of course	Intermediate level course		
Year of study	2	**Semester/trimestar**	4
ECTS (Number of credits allocated)	5		
Name of lecturer	Tone Vidmar		
Learning outcomes and competences	The course provides students with a theoretical background and practical knowledge on Relational Database Systems.		
Prerequisites	Data Structures Discrete mathematics		
Course contents	Introduction to Database systems: architecture, data description and data manipulation languages, data models. Relational Data Model (Properties of Relations, Normalisation, Relational Algebra, Relational Calculus, SQL, QBE, Integrity) Physical and Logical Integrity, Database recovering methods.		
Recommended reading	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.		
Supplementary reading			
Teaching methods	Lectures / Exercise course / Practical session / Advisory hours		
Assessment methods	Continuous assesment (diagnostic tests, independent homework, project tasks, achievement tests, seminar papers ...) Exam: writen / oral		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaries and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occassional class observations and appraisal by Head of Department		

Course title	**Signals, Systems and Control**		
Course code			
Type of course	Lecture / Execise Course Elective		
Level of course	Basic level course		
Year of study	2	**Semester/trimestar**	IV
ECTS (Number of credits allocated)	5 (2+2+0 lecture hours x 1.2 = 4.8)		
Name of lecturer	Prof. Dr. Vlasta Zanchi		
Learning outcomes and competences	Obatining the basic knowladge of signals and control systems theory		
Prerequisites	None		
Course contents	Concept of System. Systems Without Memory. Block Diagrams. Model of Memory System. Continuous Time and Discrete Time Systems. Analysis of Low Order Systems. Mathematical Modelling of Control Systems Elements by Transfer Function. Mathematical Modelling in State Space. Matrix Algebra, Phase and Physical State Variables. State Variable Feedback System. Linear Controller. Time Response. Elements of Control System. Electrical and Mechanical Networks. DC and AC Servomotors. Step Motors. Power Amplifiers. Dynamics Characteristics of Elements.		
Recommended reading	1. Zanchi, V.: Automatika I, FESB-Split, 1989. 2. Hohn Van de Vegte: Feedback Control System, Prentice Hall Inc., 1986. 3. Faurre, P.: Elements of System Theory, N.H.Pblishing Company, Amsterdam, 1977. 4. 4.Martens, H.R., Allen, D.R.: System Theory Merrill Publishing Co., Ohio, 1969.		
Supplementary reading	1. Gugić, P.: Teorija automatskog reguliranja I, FESB-Split, 1981. 2. Masten, M.K.: Modern Control Systems Published by the Institute of Electrical and Electronics Engineers, Inc., USA, 1995.		
Teaching methods	Lectures / Exercise course		
Assessment methods	Continuous assesment (diagnostic tests, independent homework, project tasks, achievement tests, seminar papers ...) Exam: writen / oral		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaries and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occassional class observations and appraisal by Head of Department		

Course title	**Operating systems**		
Course code			
Type of course	Lecture / Seminar / Execise Course Obligatory		
Level of course	Advanced level course		
Year of study	3	**Semester/trimestar**	5
ECTS (Number of credits allocated)	6		
Name of lecturer	Prof. dr. sc. Sven Gotovac		
Learning outcomes and competences			
Prerequisites	Computer architecture Data structures Algorithms		
Course contents	Operating system structure. Operating system design goal. Main functionality. I/O control. Pooling. Interrupts. Direct memory access. Drivers. Processes. Process control. Scheduling. Communication between processes. Synchronization. Deadlock. Threads. Memory control. Virtual memory. File system. Protection and security.		
Recommended reading	1. Tanenbaum, A.S.: Woodhull, A.S.: Operating Systems: Design and Implementation, Prentice Hall, 1997.		
Supplementary reading	1. Stalings, W.: Operating Systems, Prentice Hall, 1996. 2. Silberschatz, A., Galvin, P.B.: Operatin System Concepts, Addison-Wesley, 1994.		
Teaching methods	Lectures / Seminars / Exercise course / Practical session / Advisory hours / Project work		
Assessment methods	Continuous assessment: diagnostic tests, independent homework, project tasks, seminar papers. Exam: writen / oral / seminar paper presentation		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaries and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occassional class observations and appraisal by Head of Department		

Course title	**Computer networks**		
Course code			
Type of course	Obligatory		
Level of course	Advanced level course		
Year of study	3	**Semester/trimestar**	5
ECTS (Number of credits allocated)	5 ECTS (lectures 30 hours - 1 ECTS / exercises 15 hours - 0,5 ECTS / laboratory 15 hours - 0,5 ECTS / tests, consultations, laboratory practice and learning 90 hours - 3 ECTS)		
Name of lecturer	dr.sc. Julije Ožegović, associate.prof		
Learning outcomes and competencies	Course provides fundamental knowledge of computer networks as computer science core.		
Prerequisites	None		
Course contents	Development of data communications networks. Basic characteristics. Switching methods. Importance of standardization. Open systems. Network elements. Channels, nodes, terminals. Computer and terminal network architecture. Hierarchical layered structures. ISO model. Protocols. Protocol mechanism: synchronization, addressing, flow control and error control. Traffic control, congestion. Physical level: DTE-DCE interface, RS232, X.24. Modem connections, intelligent modems. Signal codes. Local networks. Access methods. Ethernet. Digital subscriber networks: ISDN, xDSL. ATM. Data level: Error control. Character and bit oriented protocols. Local networks: MAC, LLC. ATM networks. Frame-relay networks. Network level: Packet networks. Traffic routing. Flow control. X.25. Internet. IP protocol (v4, v6), addressing, intranet, VOIP, IPsec. Transport level: TCP and UDP Internet protocols. Application level: application and network services. Client-server concept. WWW, FTP, TELNET, e-mail. Quality of service. Network management. Basic safety concepts. Account, passwords, access right. Queuing systems.		
Recommended reading	1. Turk, S.: Računarske mreže, Školska knjiga, Zagreb, 1991. 2. Rožić, N.: Informacije i komunikacije: kodiranje s primjenama, Zagreb 1992.		
Supplementary reading	1. Ožegović, J. Računalne mreže, Veleučilište u Splitu, 2000.		
Teaching methods	Lectures / Exercises course / Laboratory practice / Tutorials		
Assessment methods	Continuous assessment: laboratory tests, practical tests, knowledge tests. Exam: written and oral as unity.		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaires and surveys Occassional class observations by Head of Department		

Course title	**Software engineering**		
Course code			
Type of course	Lecture / Seminar / Execise Course Obligatory / Elective / Optional		
Level of course	Basic level course Intermediate level course Advanced level course Specialised level course		
Year of study	3	**Semester/trimestar**	5
ECTS (Number of credits allocated)	7		
Name of lecturer	Professor Sven Gotovac, Marijana Puljak		
Learning outcomes and competences	Haw to design and develop a large software systems.		
Prerequisites	Algorithms		
Course contents	Study of the nature of the program development task when many people, modules and versions are involved in designing, developing and maintaining a large program or system; issues addressed include software design, specification, version control, testing, cost estimation and management; study of software systems in different domains such as database systems and HCI systems are also addressed.		
Recommended reading	Sommerwille, I.: Software Engineering, Addison-Wesley, 1996.		
Supplementary reading	Booch, G., Object-Oriented Analysis and Design with Applications, Benjamin/Cummings, 1994. Gamma, E., Helm, R., Johnson, R., Vlissides, J.: Design Patterns - Elements of Reusable Object-Oriented Software.		
Teaching methods	Lectures / Seminars (discussion, seminar papers, reports) / Exercise course / Tutorials / Practical session/ Advisory hours / Project work (za preddiplomski)		
Assessment methods	Continuous assesment (diagnostic tests, independent homework, project tasks, achievement tests, seminar papers ...) Exam: oral / seminar paper presentation		
Language of instruction			
Quality assurance methods	Student feedback via questionnaries and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occassional class observations and appraisal by Head of Department		

Course title	**Internet programming**		
Course code			
Type of course	Lecture / Seminar / Exercise Course Obligatory		
Level of course	Intermediate level course		
Year of study	3	**Semester/trimestar**	5
ECTS (Number of credits allocated)	4		
Name of lecturer	Prof.dr.sc.Darko Stipaničev, Mr.sc.Maja Štula		
Learning outcomes and competences	Detail HTTP protocol knowledge i introduction in other main Internet standards and protocols. Introduction with techniques and standards for design and development of web applications (HTML, CSS, XML, JavaScript, CGI, PHP, Servlets, ...).		
Prerequisites	Basic computer and programming skills. Students have to be fluent in technical English reading.		
Course contents	HTML, CSS, DHTML, XML, JavaScript, Internet history and infrastructure, Network services and protocols, LAN, Ethernet, PPP, SLIP, TCP/IP, Sockets, Application protocols, WWW, HTTP, HTTP methods, Sending information via form, HTTP headers, Status codes, URL, MIME, PHP, ASP, Servlets		
Recommended reading	Goodman, D. Dynamic HTML: The Definitive Reference 2nd Edition, O'Reilly, 2002. Welling, L., Thomspon L., PHP and MySQL Web Development 2nd Edition, Sams Publishing, 2003.		
Supplementary reading	On-line programming school in English (http://www.w3schools.com) PHP net (http://www.php.net)		
Teaching methods	Lectures / Seminars (discussion, seminar papers) / Exercise course / Practical session / Advisory hours / Project work		
Assessment methods	Continuous assessment during course through seminar papers. Exam: written		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaires and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occasional class observations and appraisal by Head of Department		

Course title	**Information systems development**		
Course code			
Type of course	Lecture / Seminar / Execise Course Obligatory		
Level of course	Intermediate level course		
Year of study	3	**Semester/trimestar**	6
ECTS (Number of credits allocated)	5		
Name of lecturer	Tone Vidmar		
Learning outcomes and competences	Students will learn how to analyze system requirements, design, model and implement information system. They will learn about system life cycle.		
Prerequisites	Databasese		
Course contents	System analysis fundamentals. Information requirements analysis. The Analysis Process. Design. Software engineering and implementation. Maintenance. Tools and Diagramming techniques.		
Recommended reading	**Systems Analysis and Design (6th Edition)** by Kenneth E. Kendall, Prentice Hall 2004 **Modern Systems Analysis and Design (4th Edition)** by Jeffrey A. Hoffer, Prentice Hall 2005		
Supplementary reading			
Teaching methods	Lectures / Seminars (discussion, seminar papers, reports) / Exercise course / Practical session / Advisory hours / Project work		
Assessment methods	Continuous assesment (diagnostic tests, independent homework, project tasks, achievement tests, seminar papers ...) Exam: writen / oral / seminar paper presentation		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaries and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occassional class observations and appraisal by Head of Department		

Course title	**Distributed Information Systems**		
Course code			
Type of course	Lecture / Seminar / Execise Course Obligatory		
Level of course	Intermediate level course		
Year of study	2	**Semester**	1
ECTS (Number of credits allocated)	3.5 (30 hours lectures, 15 hours exercises, 60 hour self-learning)		
Name of lecturer	Tone Vidmar		
Learning outcomes and competences	On completion of the course, students should be able to: 1. To explain concepts: centralized, decentralized distributed system 2. To explain the difference between decentralized and distributed data base 3. To explain the idea of multi layer system and presentation, session layer from the point of distributed system 4. To explain the concepts of distributed control of data consistency and processing synchronization. 5. to use JAVA (.net) technology in distributed environment. 7. To implement the mechanisms of reliability and protection in distributed environment.		
Prerequisites	Competences from the first year of study.		
Course contents	In the introduction the idea of a decentralized and distributed system will be described. Decentralization and distribution is defined as the consequence of the system resources decentralization (data, processing, control). Special care is given to so called distributed data base ant to the criteria of different nature of the distribution. The control problems will be discussed in the contexts of the presentation and session layer. The session layer will be defined as a operating system witch controls application processes witch run in deferent local (OS) environments.		
Recommended reading			
Supplementary reading			
Teaching methods	Lectures / Seminars (discussion, seminar papers, reports) / Exercise course /		
Assessment methods	Exam: writen / oral / seminar paper presentation		
Language of instruction			
Quality assurance methods	Student feedback via questionnaries and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occassional class observations and appraisal by Head of Department		

Course title	**Business Informatics**		
Course code			
Type of course	Lecture / Seminar / Execise Course Obligatory / Elective / Optional		
Level of course	Basic level course Intermediate level course Advanced level course Specialised level course		
Year of study	3	**Semester/trimestar**	6
ECTS (Number of credits allocated)			
Name of lecturer	dr.sc. Stipe Celar		
Learning outcomes and competences	The main goals are to provide graduates with the relevant skills to be a mediator between "IT people" and "business people".		
Prerequisites	Finished 2nd jahr (with good IT-knowledge and a basic economic knowledge)		
Course contents	The solution of business problems with the help of information technologies is today the central application field of business informatics. Business Informatics includes therefore the consideration of both information technological and economic topics. The most important focus is on a connection between the business strategy/plan and an appropriate information technology. The course provides students with the necessary skills to recognize: • the segments which business organizations have (Human Resource Management, Financial Management, Customer Relationship Management,…) and • the most important IT-characteristics (requirements concerning *functionality*, *usability*, *security*, *availability*, *maintainability*, *portability,…*) in order to be able to find the right solution at the right time.		
Recommended reading	www.gartner.com www.metagroup.com www.sei.cmu.edu www.idc.com		
Supplementary reading	www.microsoft.com www.sap.com www.oracle.com		
Teaching methods	Lectures / Seminars (discussion, seminar papers, reports) / Exercise course / Tutorials / Practical session / Distance learning / Advisory hours / Project work (za preddiplomski)/ Research project (za diplomski)		
Assessment methods	Continuous assesment (diagnostic tests, independent homework, project tasks, achievement tests, seminar papers ...) Exam: writen / oral / seminar paper presentation		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaries and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occassional class observations and appraisal by Head of Department		

Course title	**Windows programming**		
Course code			
Type of course	Lecture Elective		
Level of course	Intermediate level course		
Year of study	3	**Semester/trimestar**	6
ECTS (Number of credits allocated)	5		
Name of lecturer	Doc. Dr. sc. Mirjana Bonković, Mr. sc. Maja Štula		
Learning outcomes and competences	Application development fundamentals using WIN32 API. Working with keyboard, mouse, using GDI for text and graphics display, MDI application development, resources, controls, printing, dialog windows.		
Prerequisites	Passed exams Computer introduction/Programming 1/Programming 2.		
Course contents	Messages, Message types, Message processing, WinMain function, Creating windows, WNDCLASSEX structure, Window standard classes, Window procedure, Window hierarchy, Window styles, Window types, Resources – Menu, Accelerator keys, Toolbars, Icons, Cursors, Dialog boxes, Controls, Memory allocation, GDI/DC, Text functions, Graphic functions, Printing, File writing/reading, Standard dialog boxes, Interprocess communication.		
Recommended reading	Programming Windows, The Definitive Guide to the Win32 API, Charles Petzold TheForger's Win32 API Tutorial, Brook Miles, http://www.winprog.org		
Supplementary reading	Microsoft Developer Network (MSDN) Using vc-6, Kate Gregory		
Teaching methods	Lectures / Seminars (discussion, seminar papers, reports) / Exercise course / Tutorials / Practical session / Advisory hours / Project work		
Assessment methods	Exam: seminar paper presentation		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaries and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occassional class observations and appraisal by Head of Department		

Course title	**UNIX Programming**		
Course code			
Type of course	Lecture / Seminar / Execise Course		
Level of course	Intermediate level course Advanced level course		
Year of study	3	**Semester/trimestar**	6
ECTS (Number of credits allocated)			
Name of lecturer	Damir Krstinić		
Learning outcomes and competences	Programming in the Unix environment		
Prerequisites	Programiranje 1, Programiranje 2		
Course contents	*Introduction:* unix environment, file system, unix shell, standard input/output, redirection of the input/output *File I/O:* file permissions, opening and closing a file (functions *open, close*), reading and writing a file (functions *read, write, lseek*), introduction to file sharing *Unix process:* environment of the unix process, memory layout of the process, function *main*, creation of the process (function *fork*), process identification, functions *exit* and *wait, exec* functions *Interprocess communication:* signals, pipes, shared memory, unix sockets Introduction to network programming, introduction to Xwin programming		
Recommended reading	Advanced Programming in the UNIX Environment, *Richard W. Stevens*		
Supplementary reading			
Teaching methods	Lectures / Seminars (discussion, seminar papers, reports) / Exercise course / Tutorials / Practical session / Advisory hours / Project work (za preddiplomski)/ Research project (za diplomski)		
Assessment methods	Continuous assesment (diagnostic tests, independent homework, project tasks, achievement tests, seminar papers ...) Exam: writen / oral / seminar paper presentation		
Language of instruction	Croatian / English		
Quality assurance methods	Student feedback via questionnaries and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occassional class observations and appraisal by Head of Department		

Course title	**Security of computer systems and data**		
Code			
Type	Elective course		
Level	Specialist level course		
Year	4	**Semester/trimester**	8
ECTS (number of credits allocated)	5 ECTS (lectures 30 hours – 1 ECTS / exercises 15 hours - 0,5 ECTS / laboratory 15 hours – 0,5 ECTS / tests, consultations, laboratory practice and learning 90 hours - 3 ECTS)		
Name of lecturer	Julije Ožegović, Ph.D., Associate prof,		
Competences	The course provides students with professional knowledge of computer systems as an addition to the information technology core and trains a student for technical and organizational protection of computers and data-		
Prerequisites	None		
Contents	Information system security and aims of protection. Development of Internet, role of intranet and extranet. Management level controls: data control, data administration, security control, management control. Software control: access control: cryptography, , personal identification numbers, digital signatures, safety and cards transactions. Input data controls, communication controls, data processing controls, database controls, output data controls. Legal aspects of information system protection. Information system protection planning: Supervision of the information system protection, plan for information system reconstruction, ISO/IEC 17799: 2000 - information security standard. Security organizations. Network security threats: eavesdropping, scanning, denial of service, Web hacking, data manipulation, masquerade, session replay, session hijacking, rerouting, viruses, Trojan horses and worms. Definition of security policy. Network protection and protection of operating system services. Protection of DNS, NIS, Proxy, e-mail, WWW, ftp, and NFS. Firewalls, NAT. Security services and procedures: one-time passwords, token cards/soft tokens, TACACS+, RADIUS, KERBEROS, VPN, IKE/IPSec. Safety data storage – back up. Systems for attack detection. Restoration of network services.		
Recommended reading	1. Klasić, K.: Zaštita informacijskih sustava, Biblioteka inženjera sigurnosti, Iproz , Zagreb, 2002. 2. Benak, M.: Plan oporavka u slučaju katastrofe, Savjetovanje CASE 12, Opatija, 2000 3. Dragičević, D.: Kompjutorski kriminalitet i informacijski sustavi, Informator, Zagreb, 1999. 4. Ellis, J. i Speed, T.: The Internet Security Guidebook from Planning to Deployment, Academic Press, 2001.		
Supplementary reading			
Teaching methods	Lectures, exercise course, laboratory work		
Assessment methods	Continuous assessment during the course. Seminar work. Final exam (written and oral)		
Language of instruction	Croatian		
Quality assurance methods	– Student feedback on teacher performance and teaching materials		

Course title	**Communication Systems and Protocols**		
Course code			
Type of course	Lecture / Execise Course Elective		
Level of course	**Intermediate level course**		
Year of study	3	**Semester/trimestar**	VI
ECTS (Number of credits allocated)	5		
Name of lecturer	***Nikola Rožić, Ph.D., Full Professor***		
Learning outcomes and competences	• Communication architectures and protocols, ISO-OSI reference model, • protocol data units (PDUs) and communication between neighbor layers, • communication model and formal description methods, • algebraic description of basic protocol functions, • physical and link layer protocols, • line encoding and multilevel modulation QAM, • pulse coded modulation PCM and DPCM, adaptive and vector quantization, • vocoders (LPC) and delta modulation systems (DM) • orthogonal signalization (OFDM), CDMA coding, • spread spectrum systems (DSSS, FH i TH).		
Prerequisites			
Course contents	Basic models in communications, quality criteria and standards, communications architectures and protocols, ISO-OSI reference model, protocol data units (PDUs) and communication between neighbor layers, service access points (SAPs) and service data units (SDU), link layer protocol (HDLC), point-to-point and multipoint communications, communication model and formal description methods, algebraic description of basic protocol functions, physical layer protocols (V.24/28, USB), line encoder, multilevel modulation QAM, V.34 modem, pulse modulated systems (PAM, PDM, PPM), pulse coded modulation (PCM), adaptive and vector quantization, line encoding, comparison of PCM and FM, differential systems (DPCM), vocoders (LPC), delta modulation systems (DM) and adaptive variants, orthogonal signalization (OFDM), CDMA coding, spread spectrum systems (DSSS, FH i TH).		
Recommended reading	1. M.Schwartz: Telecommunication Networks: Protocols, Modeling and Analysis, Addison Wesley 2. S.Mauw, G.J.Veltink:Algerbaic Specification of Communication Protocols, Cambridge Press, 1993.		
Supplementary reading	1. W. Stallings: Computer Communications, Vol. I, II, Sams Publ		
Teaching methods	Lectures / Exercise course / Practical session / Project work (za preddiplomski)/ Research project (za diplomski)		
Assessment methods	Continuous assesment (diagnostic tests, independent homework, project tasks, achievement tests, seminar papers ...) Exam: writen / oral /		
Language of instruction	Croatian/English		
Quality assurance methods	Student feedback via questionnaries and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occassional class observations and appraisal by Head of Department		

Course title	**Digital Signal Processing**		
Course code			
Type of course	Lecture / Seminar / Execise Course Obligatory		
Level of course	Advanced level course		
Year of study	3	**Semester**	VI
ECTS (Number of credits allocated)	5		
Name of lecturer	***Dinko Begusic, Ph.D., Full Professor***		
Learning outcomes and competences	- understanding of the basic concepts of discrete systems and signals - frequency analysis of discrete time signals - application of linear integral transforms for discrete signals and systems analysis and synthesis - ability to apply and design digital filters - understanding of the basic concept sof adaptive signal processing - ability to peroform analysis and synthesis of disrete signals and systems by using standard software environment (MATLAB)		
Prerequisites	Competences and skills acquired by completing courses *Information theory* and *Network analysis*. Calculus. Vector analysis. Linear integral transforms.		
Course contents	Discrete signals and systems. Analysis of linear time invariant systems. z-transform. Frequency analysis of discrete time signals and systems. Fourier transform. Discrete Fourier transform (DFT). Fast Fourier transform (FFT). Implementation of discrete time systems. Analysis and synthesis of digital filters. Digital filter structures. Design of FIR and IIR filters. Digital spectra. Multidimensional discrete signals and systems. Adaptive signal processing. Algorithms and structures for adaptive signal processing. Applications of adaptive signal processing in communication systems, control and instrumentation. Digital signal processors. Development of softvare for digital signal processing.		
Recommended reading	1. Proakis, J.G., Manolakis, D.G.: Digital Signal Processing: Principles, Algorithms, and Applications, Prentice Hall, 1996. 2. Dinko Begušić: Digitalna obrada signala, interni nastavni tekst		
Supplementary reading	1. Haykin,S.: Adaptive Filter Theory, Prentice Hall, 1996.		
Teaching methods	Lectures / Exercise course / Laboratory Excercise		
Assessment methods	Continuous assesment (diagnostic tests) Exam: writen / oral		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaries and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occassional class observations and appraisal by head of the program.		

Course title	**Introduction to embedded systems**		
Course code			
Type of course	Lecture / Seminar / Execise Course Elective		
Level of course	Intermediate level course		
Year of study	3	**Semester/trimestar**	6
ECTS (Number of credits allocated)	4		
Name of lecturer	Dr. sc. Sven Gotovac, professor		
Learning outcomes and competences	Almost every electronic appliance and device today uses embedded systems. Cell phones, automobiles, toasters, televisions, airplanes, medical equipment, and a host of other devices, products, and applications use embedded systems. Such systems include microcontrollers, embedded programs, and real-time operating systems. These systems require a conscious effort to produce the most reliable product possible requiring the utmost diligence in system design and in design methodologies. Indeed, these designs often reflect the design of low power systems and tool support. The student will learn trough this course how to achieve this goal.		
Prerequisites			
Course contents	Interfacing of microcomputers to peripherals or other computers for purposes of data acquisition, device monitoring and control, and other communications. The interfacing problem is considered at all levels including computer architecture, logic, timing, loading, protocols, and software laboratory for building and simulating designs.		
Recommended reading	Frank Vahid, Tony D. Givargis, Embedded System design: A Unified Hardware/Software Introduction**,** John Wiley 2001, ISBN 0-471-38678-2		
Supplementary reading			
Teaching methods	Lectures / Practical session / Advisory hours / Project work		
Assessment methods	Continuous assesment (diagnostic tests, independent homework, project tasks, achievement tests, seminar papers) Exam: writen / seminar paper presentation		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaires and surveys Lectures responsible for the same subject area collaborate closely and monitor each other's work. Occassional class observations and appraisal by Head of Department		

Course title	**Engineering Economy**		
Course code			
Type of course	Lecture, exercises, seminar Elective(?)		
Level of course	Specialized level course		
Year of study	4	**Semester/trimester**	
ECTS (Number of credits allocated)	5 Description (2+1+1): Lecture and exercises - 60 hours (2 ECTS) Seminar – 30 hours (1 ECTS) Homeworks, literature reading and learning – 60 hours (2 ECTS)		
Name of lecturer	Ranko Goić, Assistant Professor		
Learning outcomes and competences	The basics knowledge in area of engineering economics, with understanding of "time value of money" concept. Ability to apply economic analyses of investment projects, with clear formulation of technical end technological input parameters. Stand-alone developing spreadsheet models for economic analyses of alternative solutions, sensitivity and risk analyses.		
Prerequisites	Mathematical courses in first two years of study, and basic courses in area of electrical engineering and information technology.		
Course contents	Cost concepts and theory, money-time relationships, compound discount rates, cash flow, present and future worth method, rate of return methods, payback period method. Cost calculation and estimation. Replacement analyses. Comparing alternatives, sensitivity and risk analyses. Evaluating projects and investments, feasibility study, contracting. Decision modelling. Presentation of examples and development of spreadsheet models for techno-economic analyses of investment and business decision.		
Recommended reading	1. W.G. Sullivan, J.A. Bontadelli, E.M. Wicks: Engineering economy, Prentice Hall, 1999. 2. R. Goić: Engineering economy - internal script		
Supplementary reading	1. W. L. Winston, S. C. Albright: Practical Management Science, Duxbury Press, 2001. 2. F. Khan, R. Parra: Financing Large Projects: Using Project Finance Techniques and Practices, Pearson Education Asia Pte., 2003. 3. Lj. Vidučić: Financijski menadžment, RRIF-plus d.o.o., 2002. 4. http://www.ise.ufl.edu/ein6357/downloads.html		
Teaching methods	Lectures. Interactive work on PC. Exercises. Homeworks. Seminar paper and report.		
Assessment methods	Continuous assessment (diagnostic tests, independent homework, achievement tests, seminar papers) Exam: seminar paper presentation and oral exam		
Language of instruction	Croatian		
Quality assurance methods	Student feedback via questionnaires and surveys Occasional class observations and appraisal by Head of Department		

Course title	**Final work (Project)**		
Course code			
Type of course	Guided personal study.		
Level of course	Advanced level course		
Year of study	III	**Semester**	VI
ECTS (Number of credits allocated)	12		
Name of lecturer	Lecturer from the selected subject.		
Learning outcomes and competences	After the Final work is completed the learner is expected to acquire knowledge she/he evaluated in collaboration with the mentor within the selected subject.		
Prerequisites	Completed all courses of I, II, III and IV semesters of Bachelor degree cycle.		
Course contents	The student is selects the subject of the Final work according to the previously defined subjects determined by the Faculty Council for each academic year. The student performs individual and independent research in the subject selected in collaboration with the lecturer/mentor. The student accomplishes her/his Final work in written or in any other suitable form.		
Recommended reading	According to the subject lecturer recommendation.		
Supplementary reading	According to the subject lecturer recommendation.		
Teaching methods	Consultations with selected subject lecturer and individual research work, as well as accomplishment of the Final work in a defined form.		
Assessment methods	Oral presentation of the Final work in front of the lecturer.		
Language of instruction	Croatian.		
Quality assurance methods	Quality assurance will be performed at three levels: (1) University level; (2) Faculty level by Quality Control Committee; (3) Lecturer's level.		