University of Rijeka
Faculty of Engineering

CURRICULUM
UNDERGRADUATE UNIVERSITY STUDY OF COMPUTING

Rijeka, May 2017

1. CURRICULUM DESCRIPTION

1.1. The list of compulsory and elective courses with the number of active classes required for their performance and ECTS credits

1. semester							
	Subject title	Hours / week					ECTS
		L	aT	lT	dT	L+T	
	Mathematics I	3	3			6	7
	Introduction to Modern Physics	2	1			3	4
	Electrical Engineering CE	2	1	1		4	7
	Programming I	2		2		4	6
	Computer Skills	1		1		2	3
	English Language I	1	2			3	3
	TOTAL					22	30

L - lectures, aT – auditory tutorials, lT – laboratory tutorials, dT – design tutorials,

2. semester							
	Subject title	Hours / week					ECTS
		L	aT	lT	dT	L+T	
	Mathematics II	3	3			6	7
	Electronics	3		1		4	7
	Programming II	2		3		5	7
	Digital Logic	2	2			4	6
	English Language II	1	2			3	3
	TOTAL					22	30

3. semester							
	Subject title	Hours / week					ECTS
		L	aT	lT	dT	L+T	
	Mathematics for Engineers CE	2	1	1		4	5
	Algorithms and Data Structures	2	1	2		5	7
	Computer Architecture	2	2			4	6
	Signals and Systems	3	1			4	6
	Introduction to Object Oriented Programming	2		2		4	6
	TOTAL					21	30

4. semester							
	Subject title	Hours / week					ECTS
		L	aT	IT	dT	L+T	
	Operating Systems	2		2		4	7
	Computer Networks	2		2		4	7
	Computer Graphics	2		2		4	7
	Elective Subject I					3	4
	Professional Practice I						5
	TOTAL					15	30

Elective Subject I							
	Subject title	Hours / week					ECTS
		L	aT	IT	dT	L+T	
	Modelling of Process Information Systems	2			1	3	4
	Computer Simulations in Engineering	2			1	3	4

5. semester							
	Subject title	Hours / week					ECTS
		L	aT	IT	dT	L+T	
	Embedded Systems	3		2		5	7
	Database Systems	2		2		4	6
	Web Application Development	2		2		4	7
	Elective Subject II					4	5
	Elective Project [1]				3	3	5
	TOTAL					20	30

[1] election from list of offered projects: Algorithms and Data Structures, Computer Aided Measurements, Computer Architecture, Computer Graphics, Computer Networks, Computer Skills, Database Systems, Digital Logic, Embedded Systems, Introduction to Object Oriented Programming, Operating Systems, Programming I, Programming II, Signals and Systems, Web Application Development

Elective Subject II							
	Subject title	Hours / week					ECTS
		L	aT	IT	dT	L+T	
	Computer Aided Measurements	2		2		4	5
	Computational Methods	2		2		4	5
	Competitive Programming	2	2			4	5

6. semester							
	Subject title	Hours / week					ECTS
		L	aT	IT	dT	L+T	
	Software Engineering	3		2		5	7
	Organization and Economics of Business Systems	2	1			3	4
	Introduction to Artificial Intelligence	2		2		4	5
	Free Elective Subject[2]					3	4
	Physical and Health Education[3]			2		2	1
	Final Work						10
	TOTAL					15	30

[2] Enroll one subject from the 6th semester of undergraduate university studies of mechanical engineering, naval architecture and electrical engineering at the Faculty of Engineering University of Rijeka, worth 4 ECTS or more.

[3] Subject can be enrolled as additional free elective subject

UNDERGRADUATE UNIVERSITY STUDY OF COMPUTER ENGINEERING TOTAL	Hours	ECTS
	115	180

Basic description		
Course title	Algorithms and Data Structures	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	2.	
ECTS credits and teaching	ECTS student 's workload coefficient	7
	Number of hours (L+E+S)	30+45+0

1. COURSE DESCRIPTION

1.1. Course objectives

Acquiring basic knowledge and understanding of simple and abstract data types, algorithm complexity analysis, sort and search algorithms. Developing the capability of solving complex programming problems.

1.2. Course enrolment requirements

Programming II.

1.3. Expected course learning outcomes

Upon a completion of the course, students will be able to: understand simple and abstract data types; describe an algorithm using natural language or pseudo code; analyse algorithm complexity; use elementary data structures; use and apply sorting and searching algorithms; use available programming libraries.

1.4. Course content

Introduction: problem solving, algorithm, pseudo code, data types, time complexity of algorithms. Abstract data type. List. Stack. Queue. Recursion and iteration. Sorting and searching algorithms. Trees. Graphs. Hash tables.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☒ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Class attendance, homework, studying.

1.8. Evaluation of student's work

Course attendance	2.5	Activity/Participation	0.5	Seminar paper	0.5	Experimental work	
Written exam	1	Oral exam		Essay		Research	
Project		Sustained knowledge check	2.5	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Class attendance and activity, midterm exams, sustained knowledge check, individual assignments and written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

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1.11. Optional / additional reading (at the time of proposing study programme)

Thomas H. Cormen Charles E. Leiserson Ronald L. Rivest Clifford Stein: Introduction to Algorithms Third Edition
Mark Allen Weiss: Data structures and algorithm analysis in C++ / Edition:3rd ed. Publication:Boston : Pearson, Addison Wesley, 2006
Robert Sedgewick: Algorithms in C, Parts 1-5: Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms, Addison-Wesley Professional, 2001.
Wikibooks: Data structures <http://en.wikibooks.org/wiki/Data_Structures>, Algorithms

<http://en.wikibooks.org/wiki/Algorithms>

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality insurance system.

Basic description		
Course title	Competitive Programming	
Study programme	Undergraduate University Study of Computing	
Course status	optional	
Year	3.	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	30+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

The aim of the course is to introduce students to techniques of abstraction and modeling of complex problems, applying known algorithms and data structures to address them, and to improve programming skills using the programming language C ++ and C++ standard library.

1.2. Course enrolment requirements

Algorithms and Data Structures

1.3. Expected course learning outcomes

Upon a completion of the course, students will be able to: analyze and model complex problems; identify subproblems and choose appropriate algorithms and data structures for an effective solution; analyze the complexity and identify the advantages and disadvantages of certain algorithms; generate test patterns to check the correctness of the program which, in particular, includes the identification of specific cases and boundary conditions; quickly implement effective solutions using the programming language C ++ and C++ standard library.

1.4. Course content

Introduction to algorithms and data structures implemented in the C++ standard library. The basic problem solving paradigms: complete search, divide and conquer, greedy algorithms, dynamic programming. Review and implementation of specific areas of mathematics used in algorithm design: graph theory, combinatorics, number theory, probability theory, game theory, computational geometry. String processing.

1.5. Teaching methods	☒ lectures ☒ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☒ laboratories ☒ mentorship ☐ other _____
1.6. Comments		

1.7. Student's obligations

Class attendance, self-study, homework and participation in competitions in programming on the Internet.

1.8. Evaluation of student's work

Course attendance	2	Activity/Participation	0.2	Seminar paper		Experimental work	
Written exam	1.5	Oral exam		Essay		Research	
Project		Sustained knowledge check	1	Report	0.3	Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Class attendance and participation, homework, continuous assessment (competitions), written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

1. Steven Halim; Felix Halim: Competitive Programming, 3rd Edition, 2013.

1.11. Optional / additional reading (at the time of proposing study programme)

1. Steven S. Skiena; Miguel A. Revilla: Programming Challenges: The Programming Contest Training Manual, Springer, 2008.

2. Thomas H. Cormen; Charles E. Leiserson; Ronald L. Rivest; Clifford Stein: Introduction to Algorithms, Third Edition, MIT Press, 2009.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Steven Halim; Felix Halim: Competitive Programming, 3rd Edition, 2013.	-	-

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the institution's quality assurance system.

Basic description		
Course title	Computational Methods	
Study programme	Undergraduate University Study of Computing	
Course status	optional	
Year	3.	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	30+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

Recognize computational problems in mechanical engineering. Understand and apply basic numerical methods. Basic knowledge of MatLab or C programming language. Independent ly write shorter program code and use existing software for numerical problem solving.

1.2. Course enrolment requirements

Mathematics I.

1.3. Expected course learning outcomes

Recognize appropriate computational methods for given simpler mathematical formulations of engineering problems. Correctly explain fundamental idea of particular computational methods. Correctly explain advantages and disadvantages of particular computational methods. Compare computational methods applicable to the same type of problem. Apply existing software to simpler problems. Write simple computer programs for particular computational methods by following instructions. Evaluate results of computational methods.

1.4. Course content

Mechanical engineering examples for nonlinear equations with one unknown. Applicable numerical methods and their comparison. Convergence criteria in iterative methods. Computer programs in C or MatLab. Mechanical engineering examples for systems of nonlinear equations. Applicable exact and numerical methods and their comparison. Round-off error. Computer programs in C or MatLab. Mechanical engineering examples for curve fitting. Regression, interpolation, and spline curves in computer graphics. Computer programs in C or MatLab. Mechanical engineering examples for definite integral. Applicable numerical methods. Increase in computational accuracy vs. round-off error accumulation. Computer programs in C or MatLab. Mechanical engineering examples for ordinary differential equations. Applicable numerical methods. Local and global errors. Computer programs in C or MatLab.

1.5. Teaching methods		
	☒ lectures	☐ individual assignment
	☐ seminars and workshops	☐ multimedia and network
	☒ exercises	☒ laboratories
	☐ long distance education	☐ mentorship
	☐ fieldwork	☐ other

1.6. Comments -

1.7. Student's obligations

Course attendance, mid-term exams, computer knowledge checks.

1.8. Evaluation of student's work

Course attendance	2	Activity/Participation		Seminar paper		Experimental work	
Written exam	0.5	Oral exam	0.5	Essay		Research	
Project		Sustained knowledge check	2	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Course attendance, mid-term exams, computer knowledge checks, written and/or oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Chapra, S. C., Channale, R. P., Numerical methods for engineers, McGrowHill Inc., 1988
Press, W., et al: Numerical Recipes for C/C++/Pascal/Fortran, Cambridge University Press, 1992

1.11. Optional / additional reading (at the time of proposing study programme)

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1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Chapra, S. C., Channale, R. P., Numerical methods for engineers, McGrowHill Inc., 1988	6	100
Press, W., et al: Numerical Recipes for C/C++/Pascal/fortran, Cambridge University Press, 1992	6	100

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	Computer Aided Measurements	
Study programme	Undergraduate University Study of Computing	
Course status	optional	
Year	3.	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	30+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

Computer Aided Measurements enable students to understand advantages and possibilities of electronic measurement instruments, to independently analyze measurement problem and to realize virtual instrumentation.

1.2. Course enrolment requirements

Electrical Engineering CE.

1.3. Expected course learning outcomes

After passing the exam, student is able to do following:
1. Interpret and explain measurement uncertainty
2. Apply the model of measurement uncertainty at simple examples
3. Describe the working principles of measurement amplifiers
4. Describe how noise and interference influence measurement results and methods how to reduce them
5. Describe transfer function of A/D and D/A converters
6. Describe working principles of different types of A/D converters
7. Select the appropriate type of A/D converter for different measurement problems
8. Describe the working principles of user interfaces
9. Implement virtual instrument
10. Analyze characteristics of automated instrumentation

1.4. Course content

Introduction to the measurement science. The international system of units. Measurement errors. Measurement uncertainty. Noise and interference. Measurement amplifiers. Analog-digital converters. Digital-analog converters. Oscilloscopes. Automated measurements. Microprocessors and microcontrollers in computerized instrumentation. Examples of computer aided measurements: 3D multisensor coordinate measuring machines and systems for 3D scanning-digitalization-measurements. Communication with measurement equipment. Basic configurations of computerized measurement systems. Virtual instrumentation. Software for development of measurement applications.

1.5. Teaching methods		
	☒ lectures	☒ individual assignment
	☐ seminars and workshops	☐ multimedia and network
	☐ exercises	☒ laboratories
	☐ long distance education	☐ mentorship
	☐ fieldwork	☐ other

1.6. Comments

1.7. Student's obligations

Course and laboratory practice attendance, seminar paper, activity during course lectures, studying.

1.8. Evaluation of student's work

Course attendance	2	Activity/Participation		Seminar paper	1	Experimental work	
Written exam		Oral exam		Essay		Research	
Project		Sustained knowledge check	1.5	Report		Practice	0.5
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Assessment and evaluation of student's work will be based on sustained knowledge checks, laboratory practice and based on seminar paper or final exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Vujević, D., Ferković, B.: Basics of Electrical Engineering Measurements, I. i II. part, Školska knjiga, Zagreb, 1996. (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

Šantić, A.: Electronic Instrumentation, 3rd Edition, Školska knjiga, Zagreb, 1993. (in Croatian)
Coombs, C.F.Jr.: Electronic Instrument Handbook, McGraw-Hill, 2nd Edition, 1999.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Vujević, D., Ferković, B.: Basics of Electrical Engineering Measurements, I. i II. part, Školska knjiga, Zagreb, 1996. (in Croatian)	8	40

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	Computer Architecture	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	2.	
ECTS credits and teaching	ECTS student 's workload coefficient	6
	Number of hours (L+E+S)	30+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

Obtaining basic knowledge of computer hardware.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Define and classify Computer Architecture. Understand work and basement of a Turing machine. Understand basic elements of computer systems. Understand basics of von Neumann Architecture. Understand work of arithmetic-logical unit in a computer. Understand execution of microprocessor instructions. Understand pipeline architecture of microprocessors. Understand hierarchy of memory in computer system. Understand programs written in assembler code.

1.4. Course content

Computer Architecture definition and classification. Historical overview of computer development. Turing machine. Coding data and operations in a computer. Model of von Neumann Computer Architecture. Control unit. Simple microprocessor model instruction execution.

RICS and CISC architecture. Pipeline architecture of microprocessor. Computer Buses. Computer memory system and Cache memory. Memory organization and virtual memory system. Input/output control system. Interrupt handling techniques. Overview of 8, 16, 32 and 64 bits computer architecture.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance, activity, homework, studying.

1.8. Evaluation of student's work

Course attendance	2	Activity/Participation		Seminar paper		Experimental work	
Written exam	1.5	Oral exam		Essay		Research	
Project		Sustained knowledge check	2.5	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Course attendance, activity, homework, continuous knowledge testing (two mid-term exams), written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Ribarić, S.: Computer Architecture, Architecture and Organisation of Computer Systems, Algebra d.o.o. 2011 (in Croatian).
Ribarić, S.: Computer Architecture RISC i CISC, Školska knjiga, Zagreb, 1996 (in Croatian).
Ribarić, S.: Advanced Microprocessor Architectures, Školska knjiga, Zagreb, 1997 (in Croatian).

1.11. Optional / additional reading (at the time of proposing study programme)

Ribarić, S.: Arhitektura mikroprocesora, Tehnička knjiga, Zagreb, 1988.
Peruško, U., Glavinić, V.: Digitalni sustavi, Školska knjiga Zagreb, 2005.
Hennessey, J.L., Patterson D.A.: Computer Organization and Design : The Hardware/Software Interface, Morgan Kauf. Pub., San Mateo, 2013.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Ribarić, S.: Computer Architecture, Architecture and Organisation of Computer Systems, Algebra d.o.o. 2011 (in Croatian).	2	50
Ribarić, S.: Computer Architecture RISC i CISC, Školska knjiga, Zagreb, 1996 (in Croatian).	1	50
Ribarić, S.: Advanced Microprocessor Architectures, Školska knjiga, Zagreb, 1997 (in Croatian).	5	50

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	Computer Graphics	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	2.	
ECTS credits and teaching	ECTS student 's workload coefficient	7
	Number of hours (L+E+S)	30+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

An overview of the basics in computer graphics. Understanding of existing and capability to develop smaller computer graphics software.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Proper interpretation ot principles of projective geometry. To classify and name basic traits of curves and surfaces in use in computer graphics. To develop computer programs using OpenGL and/or similar libraries. To develop computer programs which display 2d and 3d objects, curves and surfaces, light, color and material assignement to objects.

1.4. Course content

Review the basics of computer graphics. Ortographic and perspective transformations. Graphic primitives and transformations. Parametric display of curves and surfaces. Elemental differential geometry. Bikubic presentation of the surface. Modeling body geometry. Network display. Visualization with basic bodies. Models and procedures of shading, shading. Set objects in a 3d scene. Light, materials, animation.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendace, individual assignements and exercises.

1.8. Evaluation of student's work

Course attendance	2	Activity/Participation		Seminar paper		Experimental work	
Written exam	1.5	Oral exam		Essay		Research	
Project		Sustained knowledge check	2.5	Report		Practice	
Portfolio		Exercises	1				

1.9. Assessment and evaluation of student's work during classes and on final exam

Course attendance, homework, sustained knowledge check (two partial exams), oral and written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

M. Čupić, Ž. Mihajlović, Interactive Computer Graphics through Examples in OpenGL, Zagreb, 2011 (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

Penna M. A., Patterson R. R., Projective geometry and its applications to computer graphics, Prentice-Hall, Englewood Cliffs, New Yersey
Yamagochy F., Curves and surfaces in computer aided geometric design, Springer-Verlag 1988.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
M. Čupić, Ž. Mihajlović, Interactive Computer Graphics through Examples in OpenGL, Zagreb, 2011 (in Croatian)	30	27

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	Computer Networks	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	2.	
ECTS credits and teaching	ECTS student 's workload coefficient	7
	Number of hours (L+E+S)	30+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

Description and classification of computer networks and communication services structure and architecture. Computer networks working principles. Understanding and usage of basic network communication protocols and Internet services.

1.2. Course enrolment requirements

There are no formal requirements, however, for successful course completion, a good programming skills are necessary.

1.3. Expected course learning outcomes

After the course completion, students should be able to:

- Define OSI reference model of computer networks architecture
- Describe purpose of each layer of the OSI model
- Compare OSI reference model to other network architectures (TCP/IP, hybrid)
- Describe important services and protocols on each network layer
- Analyse well known Internet protocols
- Describe problems in designing secure computer networks
- Apply Internet application layer protocols using specific solutions
- Implement simple network protocols
- Perform basic network devices configuration

1.4. Course content

Computer networks organization. OSI reference model. Physical layer: theoretical foundation, media. Physical layer implementation, cabling. Data link layer. Error detection and correction, protocol examples, Internet data link layer. Media access control (MAC) sub-layer, transmission channel contention. IEEE 802 LAN standards. Network layer. Routing algorithms and congestion control algorithms. Connecting networks. Internet network layer. Transport layer services, transport protocol functioning. Internet transport layer. Application layer. Internet applications and protocols. Computer networks applications. Computer networks security.

1.5. Teaching methods		
	☒ lectures	☐ individual assignment
	☐ seminars and workshops	☐ multimedia and network
	☒ exercises	☒ laboratories
	☐ long distance education	☐ mentorship
	☐ fieldwork	☐ other

1.6. Comments

1.7. Student's obligations

Course attendance, activity, homework, studying.

1.8. Evaluation of student's work

Course attendance	2	Activity/Participation		Seminar paper		Experimental work	
Written exam		Oral exam		Essay		Research	2.5
Project		Sustained knowledge check	2.5	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Lab quizzes and skills exams, mid-term exams, final exam

1.10. Assigned reading (at the time of the submission of study programme proposal)

Lecture notes on the course web page
Kurose, J.F., Ross K.W.: Computer Networking: A Top-Down Approach, 6th Edition, Pearson Education, 2012
Radovan, M.: Computer Networks (1), Rijeka, Digital point tiskara, 2010. (in Croatian)
Radovan, M.: Computer Networks (2), Rijeka, Digital point tiskara, 2011. (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

Peterson, L., Davie, B.:Computer Networks, Fifth Edition: A Systems Approach, Morgan Kaufmann, 2011
Tanenbaum, A.S.: Computer Networks, 5th Edition. Prentice Hall, 2010.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Computer networks	1	43

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	Computer Simulations in Engineering	
Study programme	Undergraduate University Study of Computing	
Course status	optional	
Year	2.	
ECTS credits and teaching	ECTS student's workload coefficient	4
	Number of hours (L+E+S)	30+15+0

1. COURSE DESCRIPTION

1.1. Course objectives

General knowledge of computer simulation technology. Understanding the basis of mathematical modeling. Knowing capabilities and limitations of computer simulations. Identifying methods for solving engineering problems using computer simulations.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Correctly explain the methodology of mathematical modeling. Classify mathematical models typical of technical systems. Identify basic types of numerical network. Classify commercial software for numerical modeling. Explain the entire process of applying computer simulation in solving engineering problems. Perform a simulation of a simple problem of mechanical design, in available software.

1.4. Course content

Review of existing CAE systems. The process of mathematical modeling. Using finite-element model of solid body mechanics. Using computational fluid dynamics. Modeling of heat transfer. Introduction to commercial software and I-DEAS, CATIA, FLUENT. Structured and unstructured mesh, boundary condition definitions. Understanding the entire process of application of computer simulation for solving engineering problems.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments	-	

1.7. Student's obligations

Attendance, class participation, individual assignment.

1.8. Evaluation of student's work

Course attendance	1.5	Activity/Participation		Seminar paper	2	Experimental work	
Written exam		Oral exam		Essay		Research	
Project		Sustained knowledge check	0.5	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Course attendance, activity, continuous knowledge testing, seminar paper.

1.10. Assigned reading (at the time of the submission of study programme proposal)

I-DEAS, CATIA, FLUENT User Manuals.

1.11. Optional / additional reading (at the time of proposing study programme)

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1.12. Number of assigned reading copies with regard to the number of students currently attending the course		
Title	*Number of copies*	*Number of students*
I-DEAS, CATIA, FLUENT User Manuals.	online copies	50
1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences		
Through the Institution's quality assurance system.		

Basic description		
Course title	Computer Skills	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	1.	
ECTS credits and teaching	ECTS student 's workload coefficient	3
	Number of hours (L+E+S)	15+15+0

1. COURSE DESCRIPTION

1.1. Course objectives

Understanding tools for processing and structuring the text, understanding the principles of version control for software product.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Understanding the basic tools for processing and structuring the text; Understand the difference between the examined tools and WYSIWYG word processor; Recognize the importance and benefit of tools for software product version control; To understand and use the concepts of version control systems.

1.4. Course content

Software tools for processing and structuring the text (Markdown, Latex, etc.). Tools to manage versions (Git, etc.). Using the online repository to manage versions.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance and activity (lectures, exercises), studying, exams, final exam.

1.8. Evaluation of student's work

Course attendance	1	Activity/Participation		Seminar paper		Experimental work	
Written exam	1	Oral exam		Essay		Research	
Project		Sustained knowledge check	1	Report		Practice	
Portfolio		Constructive work					

1.9. Assessment and evaluation of student's work during classes and on final exam

Course attendance and activity (lectures, exercises), exams, writen exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Darko Grundler: Applied Computing, Graphis Zagreb 2000, ISBN: 953-6647- 03-6. (in Croatian)
Gilat, A.: MATLAB: An Introduction with Applications, 3rd edition, Wiley, 2008.
Manuals for Commercial Programming Equipment (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

The teacher will propose up to date materials during the course

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*

Darko Grundler: Applied Computing, Graphis Zagreb 2000, ISBN: 953-6647- 03-6. (in Croatian)	1	50
Gilat, A.: MATLAB: An Introduction with Applications, 3rd edition, Wiley, 2008.	1	50
Manuals for Commercial Programming Equipment (in Croatian)	Network copies	50

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution´s quality assurance system.

Basic description		
Course title	Database Systems	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	3.	
ECTS credits and teaching	ECTS student 's workload coefficient	6
	Number of hours (L+E+S)	30+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

Understanding database systems. Modelling databases. Defining relational databases and handling data. Enforcing data integrity and protecting data. Using tools for modelling and building databases and applications.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Describe the basic concepts of data and information. Describe the database management system. Describe the concept of relational, network and hierarchical databases. Model entity relationship diagrams. Design the relational model. Determine functional dependence. Apply the normalization process. Apply query language (SQL). Implement physical and application model. Analyse the database integrity enforcement.

1.4. Course content

Basic database concepts. Data and information. Database management systems. Relational, network and hierarchical data model. Logical design of databases. Functional dependencies and normalization. Relational algebra. Structured query language (SQL). Transactions. Data integrity and security. Modelling and data models. Conceptual design and functional analysis. Entity-relationship model. Transforming entity-relationship models into relational models.

1.5. Teaching methods		
	☒ lectures	☒ individual assignment
	☐ seminars and workshops	☐ multimedia and network
	☒ exercises	☒ laboratories
	☐ long distance education	☐ mentorship
	☐ fieldwork	☐ other

1.6. Comments

1.7. Student's obligations

Class attendance, active participation, self-learning, solving a project task.

1.8. Evaluation of student's work

Course attendance	2	Activity/Participation		Seminar paper		Experimental work	
Written exam	0.5	Oral exam	0.5	Essay		Research	
Project	1.5	Sustained knowledge check	1.5	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Tests, laboratory exercises, projects, written and oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Carlos Coronel, Steven Morris, Peter Rob: Database Systems: A Practical Approach to Design, Implementation and Management (5th Edition), Course Technology, 2012.
H. Garcia-Molina, J.D. Ullman, J. Widom, Database Systems: The Complete Book, Pearson, 2008.

1.11. Optional / additional reading (at the time of proposing study programme)

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Carlos Coronel, Steven Morris, Peter Rob: Database Systems: A Practical Approach to Design, Implementation and Management (5th Edition), Course Technology, 2012.	0	50
H. Garcia-Molina, J.D. Ullman, J. Widom, Database Systems: The Complete Book, Pearson, 2008.	0	50

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the quality assurance system of the Faculty of Engineering.

Basic description		
Course title	Digital Logic	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	1.	
ECTS credits and teaching	ECTS student 's workload coefficient	6
	Number of hours (L+E+S)	30+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

Understanding basic concepts of digital logic and operation of logic circuits. Understanding basic methods for analysing and designing combinational and sequential digital circuits and systems. Developing the ability of analysing, synthesizing and solving problems in the field of digital logic.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Defining logical levels and basic characteristics of digitals signals. Applying various number systems. Using various codes to express digital data. Defining the Boolean algebra axioms and basic theorems. Minimizing logical functions. Distinguishing AND-OR, AND-OR complement, XOR and NOR logic. Using various combinational logic circuits and functions. Explaining operational principles and applications of sequential logic circuits.

1.4. Course content

Basic digital concepts: digital and analog quantities, logic levels, digital signals, digital systems. Number systems and operations: decimal, binary, octal and hexadecimal system, complement of number. Error detection and correction codes; weighted and unweighted codes, Hamming code. Boolean Algebra; axioms and theorems, Boolean functions, standard form of function, truth table. Minimization of logic functions: Karnaugh map, Quine–McCluskey algorithm. Combinational logic circuits; AND-OR, AND-OR complement, XOR and exclusive NOR. Universal properties of NAND and NOR logic gates. Functions of combinational logic; adders, comparators, coders, decoders, multiplexors, demultiplexors. Latches: S-R latch, J-K latch and edge triggered flip-flops, applications. Counters; asynchronous, synchronous, design of counters, applications. Shift registers; basic and bidirectional registers, applications.

1.5. Teaching methods		
	☒ lectures	☒ individual assignment
	☐ seminars and workshops	☐ multimedia and network
	☒ exercises	☐ laboratories
	☐ long distance education	☐ mentorship
	☐ fieldwork	☐ other

1.6. Comments	-

1.7. Student's obligations

Course attendance, project assignment, individual studying.

1.8. Evaluation of student's work

Course attendance	2	Activity/Participation		Seminar paper		Experimental work	
Written exam	1	Oral exam		Essay		Research	
Project	1.5	Sustained knowledge check	1.5	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Course attendance, sustained knowledge check (two tests), project, written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

A. P. Godse and D. A. Godse: Digital Logic Circuits, Technical Publications, 2011.
U. Peruško i V. Glavinić: Digital Systems, Školska knjiga, 2005. (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

T. L. Floyd: Digital Fundamentals, 10/E, Prentice Hall, 2009.
M. M. Mano and M. D. Ciletti: Digital Design, 4/E, Prentice Hall, 2007.
W. Kleitz: Digital Electronics with VHDL, Prentice Hall, 2006.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
A. P. Godse and D. A. Godse: Digital Logic Circuits, Technical Publications, 2011.	1	60
U. Peruško i V. Glavinić: Digital Systems, Školska knjiga, 2005. (in Croatian)	5	60

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	Elective Project	
Study programme	Undergraduate University Study of Computing	
Course status	optional	
Year	3.	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	0+45+0

1. COURSE DESCRIPTION

1.1. Course objectives

Application of acquired knowledge and skills to solve practical problems in the field of associated course from which the project is elected.

1.2. Course enrolment requirements

Enrolled course from which the project is elected.

1.3. Expected course learning outcomes

Apply the knowledge and skills from professional content of the associated course. Solve practical task. Acquire competence for individually solving specific professional tasks.

1.4. Course content

Chosen chapter of associated course from which the project was elected.

1.5. Teaching methods	☐ lectures ☐ seminars and workshops ☐ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Attending the consultation, individually solving task and writing the project report.

1.8. Evaluation of student's work

Course attendance		Activity/Participation		Seminar paper		Experimental work	
Written exam		Oral exam		Essay		Research	
Project	2	Sustained knowledge check		Report		Practice	
Portfolio		Individual task solving	3				

1.9. Assessment and evaluation of student's work during classes and on final exam

Assesses and evaluates the accuracy and completeness of the project task solution and its presentation.

1.10. Assigned reading (at the time of the submission of study programme proposal)

References listed for the associated course from which the project is elected.

1.11. Optional / additional reading (at the time of proposing study programme)

References listed for the associated course from which the project is elected.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences		
Through the Institution's quality assurance system.		

Basic description		
Course title	Electrical Engineering CE	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	1.	
ECTS credits and teaching	ECTS student 's workload coefficient	7
	Number of hours (L+E+S)	30+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

Mastering basic concepts, postulates and methods of electrostatics, magnetostatics and electrical circuits. Describing behavior of electromagnetic circuits' main components and analysis of electrical circuits.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Describe and apply basic laws of electrostatics. Define and use basic electric quantities. Apply fundamental laws and methods of DC circuits. Describe and apply basic laws of magnetostatics. Analyse AC circuits. Organize and conduct electric measurements.

1.4. Course content

Electrostatics - basic concepts and laws. Dielectric materials. Basic concepts and laws of DC circuits. DC circuit analysis - methods and theorems. Magnetostatics - basic concepts and laws. Magnetic materials and circuits. Basic concepts and laws of AC circuits.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☒ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance, activity, studying.

1.8. Evaluation of student's work

Course attendance	2	Activity/Participation		Seminar paper		Experimental work	
Written exam	2	Oral exam	0.5	Essay		Research	
Project		Sustained knowledge check	2	Report		Practice	0.5
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Course attendance, activity, continuous knowledge testing (two mid-term exams), laboratory exercises, written and oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Pinter, V.: Fundamentals of electrical engineering – part I, Tehnička knjiga, Zagreb,1989, (in Croatian)
Pinter, V.: Fundamentals of electrical engineering – part II, Tehnička knjiga, Zagreb,1989, (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

Đurović, G.: Electrical engineerging I, Školska knjiga, Zagreb, 2004. , (in Croatian)
Đurović, G.: Electrical engineerging II, Školska knjiga, Zagreb, 2004. , (in Croatian)
Felja, I., Koračin, D.: A collection of assignments and solved examples from fundamentals of electrical engineering, part 1., Školska knjiga, Zagreb, 1991. (in Croatian)

1.12. Number of assigned reading copies with regard to the number of students currently attending the course		
Title	*Number of copies*	*Number of students*
Pinter, V.: Fundamentals of electrical engineering – part I, Tehnička knjiga, Zagreb, 1989. (in Croatian)	5	82
Pinter, V.: Fundamentals of electrical engineering – part I, Tehnička knjiga, Zagreb, 1989. (in Croatian)	5	82
1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences		
Through the Institution's quality assurance system.		

Basic description		
Course title	Electronics	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	1.	
ECTS credits and teaching	ECTS student 's workload coefficient	7
	Number of hours (L+E+S)	45+15+0

1. COURSE DESCRIPTION

1.1. Course objectives

Student is able to understand and describe physical characteristics of semiconductor components and then use their appropriate models for analysis and design of basic electronic digital circuits.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Describe the properties of semiconductors: type, charge carriers, the life time of charge carriers, generation-recombination processes, quasi-neutrality and thermal equilibrium. Describe and analyze the physical events and the working principles, describe and analyze models of electronic elements for small signals. Apply recombination and optical generation processes when describing the work of optoelectronic components: LEDs, photodiodes. Define parameters of incremental linearized models of electronic elements (pn diode, bipolar transistor, field-effect transistors JFET and MOSFET) for small signals in dependence on the known structure, the dimensions and the applied voltage. Differentiate incremental linearized models of electronic elements for small signals at low and high frequencies. Describe the voltage and current gains of bipolar and MOSFET transistors. Apply pn diode and field-effect transistor in digital circuits.

1.4. Course content

The electrical properties of semiconductors. Physical and electrical properties of semiconductor PN junctions, diodes, bipolar transistors, unipolar transistors. Correlation between electrical properties of semiconductor devices with physical processes in them. Development of incremental models of semiconductor components and understanding the uses and limitations of various models. The use of incremental models of semiconductor devices in the analysis and design of bipolar transistors and field-effect transistors, with an emphasis on MOS devices. Use of incremental models for analysis and design of digital circuits, linear differential amplifiers and other integrated circuits.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☒ multimedia and network ☒ laboratories ☐ mentorship ☐ other
1.6. Comments	-	

1.7. Student's obligations

Course attendance, activity, homework, studying.

1.8. Evaluation of student's work

Course attendance	2	Activity/Participation	0.5	Seminar paper	1	Experimental work	1
Written exam	1	Oral exam		Essay		Research	
Project	0.5	Sustained knowledge check	1	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Course attendance, activity, project work, continuous knowledge testing (two mid-term exams), written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

P.Biljanović, Semiconductor Electronics' Elements, Školska knjiga Zagreb, 2004. (in Croatian)
J. Šribar, J. Divković-Pukšec, Electronics' Elements, problem collection, I i II part, Element, Zagreb, 1996. (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

S.M.Sze, Physics of Semiconductor Devices, New Jersey: J. Wiley &Sons, Inc. Publication, 2007.
A.S.Sedra, K.C. Smith, Microelectronic Circuits, 5th edit, N. York, Oxford, Uni. Press, 2004.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
P.Biljanović, Semiconductor Electronics' Elements, Školska knjiga Zagreb, 2004. (in Croatian)	10	60
J. Šribar, J. Divković-Pukšec, Electronics' Elements, problem collection, I i II part, Element, Zagreb, 1996. (in Croatian)	1	60
S.M.Sze, Physics of Semiconductor Devices, New Jersey: J. Wiley &Sons, Inc. Publication, 2007.	1	60
A.S.Sedra, K.C. Smith, Microelectronic Circuits, 5th edit, N. York, Oxford, Uni. Press, 2004.	1	60

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	Embedded Systems	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	3.	
ECTS credits and teaching	ECTS student 's workload coefficient	7
	Number of hours (L+E+S)	45+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

Understanding of microcontroller architecture and applications. Understanding of embedded systems programming principles and concepts. Practical skills and experience in implementation of hardware and software embedded systems components.

1.2. Course enrolment requirements

Computer Architecture, Digital Logic.

1.3. Expected course learning outcomes

After the course completion, students should be able to:

- Compare and describe embedded systems applications
- Define and describe basic on-chip building blocks
- Describe and use microcontroller peripheral units
- Define and determine embedded systems key parameters
- Apply procedures and use tools for embedded systems programming and adjusting
- Implement and inspect various algorithms for specific problems solving in embedded systems applications

1.4. Course content

Overview of embedded systems applications. Embedded systems processors architecture. Chip building blocks: CPU core, internal and external bus, specific and general purpose I/O, timers/counters, A/D and D/A converters, serial communication units. Units for system operation inspection. Embedded systems programming. External and internal interrupts. Characteristics and problems of embedded systems hardware and firmware development. Practice labs for development of skills in working with software and hardware tools for embedded systems programming and debugging.

1.5. Teaching methods		
	☒ lectures	☒ individual assignment
	☐ seminars and workshops	☐ multimedia and network
	☒ exercises	☒ laboratories
	☐ long distance education	☐ mentorship
	☐ fieldwork	☐ other

1.6. Comments

1.7. Student's obligations

Course attendance, activity, homework, studying, team project.

1.8. Evaluation of student's work

Course attendance	2.5	Activity/Participation		Seminar paper		Experimental work	
Written exam		Oral exam		Essay		Research	1.5
Project	1	Sustained knowledge check	2	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Lab quizzes, mid-term exams, final project

1.10. Assigned reading (at the time of the submission of study programme proposal)

Catsoulis J.: Designing Embedded Hardware, O'Reilly Media; Second Edition edition (May 1, 2005)

Datasheet for used microcontrollers and electronic components

Lecture notes

1.11. Optional / additional reading (at the time of proposing study programme)

Ball S.: Embedded Microprocessor Systems: Real World Design, Newnes; 3 edition (December 2, 2002)

Williams T.: The Circuit Designer's Companion, Second Edition (EDN Series for Design Engineers), Newnes; 2 edition (January 4, 2005)

Horowitz P., Hill W.: The Art of Electronics, Cambridge University Press; 2 edition (July 28, 1989)

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Designing Embedded Hardware	0	25

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	English Language I	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	1.	
ECTS credits and teaching	ECTS student 's workload coefficient	3
	Number of hours (L+E+S)	15+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

Students should be able to use general purpose English as well as technical jargon at the elementary level according to the Common European Framework of Reference for Languages (up to B1 level).

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Students should be able to: compare general with technical English on the basis of selected texts and topics; recognize and explain grammatical structures and principles typical of the vocational jargon from examples; implement grammatical structures and aspects in written exercises; recognize terminology, key words and/or information in selected texts as well as differentiate and analyse relevant elements in them; describe and interpret accurately simple diagrams, charts, figures and mathematical formulae; formulate in writing summaries, arguments and definitions.

1.4. Course content

Topics: Engineering Profession. Basics in Electrical Engineering. Computer Users. Computer Architecture. Computer Applications. Operating Systems. Graphical User Interface. Application Programmes. Multimedia.
Grammatical Structures: Tenses. Modals. Passive. Definite and Indefinite Article. Gerund and Infinitive. Dependent Clauses: Conditional, Relative Clauses.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Attendance, activity in class, independent learning.

1.8. Evaluation of student's work

Course attendance	1.5	Activity/Participation		Seminar paper	0.25	Experimental work	
Written exam	0.5	Oral exam		Essay		Research	
Project		Sustained knowledge check	0.75	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Attendance, activity in class, continuous evaluation of knowledge (two tests), seminar paper, written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Glendinning E./McEwan J.: Oxford English for Information Technology (2nd ed.) Oxford University Press 2006
Vince M.: Intermediate Language Practice, Heinemann Elt, Oxford 1998

1.11. Optional / additional reading (at the time of proposing study programme)

Vince M.: Advanced Language Practice, Mac Millan 2003
Selected vocational articles at the upper intermediate level of the Cambridge University Press.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course		
Title	*Number of copies*	*Number of students*
Glendinning E./McEwan J.: Oxford English for Information Technology (2nd ed.) Oxford University Press 2006	2	51
Vince M.: Intermediate Language Practice, Heinemann Elt, Oxford 1998	20	51
1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences		
Through the Institution`s Quality Assurance System.		

Basic description		
Course title	English Language II	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	1.	
ECTS credits and teaching	ECTS student 's workload coefficient	3
	Number of hours (L+E+S)	15+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

Students should be able to use professional jargon independently, namely communicate with other experts in the field of the engineering profession and in an international environment, at the B2 level of the Common European Framework of Reference for Languages.

1.2. Course enrolment requirements

Attended course English Language I.

1.3. Expected course learning outcomes

Students should be able to: recognize and explain grammatical structures typical of the vocational jargon; implement grammatical structures in written exercises; analyse and differentiate relevant elements in texts; paraphrase certain relevant parts in the text; write summaries of the text, arguments and definitions; analyse and describe complex diagrams, charts, figures and mathematical formulae; defend orally their own positions as well as critically evaluate individual solutions of a problem.

1.4. Course content

Topics: Computing Support. Networks. Network Communication. The Intenet. The World Wide Web. Websites. Webpage Creator. Communications Systems. Data Security. Software Engineering. People in Computing. Recent Developments in IT. The Future of IT.
Grammatical Structures: Tense Revision and Sequence of Tenses. Present and Past Participle. Temporal Clauses. Direct and Indirect Speech. Word Formation. Collocations. Idioms. Phrasal Verbs. Writing Summaries.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Attendance, activity in class, independent learning.

1.8. Evaluation of student's work

Course attendance	1.5	Activity/Participation		Seminar paper	0.25	Experimental work	
Written exam	0.5	Oral exam		Essay		Research	
Project		Sustained knowledge check	0.75	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Attendance, activity in class, continuous evaluation of knowledge (two tests), seminar paper, written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Glendinning E./McEwan J.: Oxford English for Information Technology (2nd ed.) Oxford University Press 2006
Vince M.: Intermediate Language Practice, Heinemann Elt, Oxford 1998

1.11. Optional / additional reading (at the time of proposing study programme)

Vince M.: Advanced Language Practice, Mac Millan 2003
Selected vocational articles at the upper intermediate level of the Cambridge University Press.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Glendinning E./McEwan J.: Oxford English for Information Technology (2nd ed.) Oxford University Press 2006	2	53
Vince M.: Intermediate Language Practice, Heinemann Elt, Oxford 1998	20	53

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution`s Quality Assurance System.

Basic description		
Course title	Final Work	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	3.	
ECTS credits and teaching	ECTS student 's workload coefficient	10
	Number of hours (L+E+S)	-

1. COURSE DESCRIPTION

1.1. Course objectives

The Final Work is an individual assignment and verification of student expertises, which should show the appropriate level of engineering skills for individually solving specific professional task.

1.2. Course enrolment requirements

Enrolled course from which the Final Work is selected.

1.3. Expected course learning outcomes

Apply acquired knowledge, expertises and skills of the content of Final Work associated course. Solve practical task. Acquire competence for individually solving specific professional task.

1.4. Course content

The content of the Final Work is based on the application of acquired knowledge from educational programs at the undergraduate university studies. Final thesis can be specified from a particular course specific professional content and exceptionally from course that belongs to the group of shared content, when it represents a broader entity with a particular course specific content of the studies. Student enrollers the Final Work by enrolling the last semester. Thesis of the Final Work is establishes by Commission for Final Works, based on suggestion of teacher who will mentor the Final Work.

1.5. Teaching methods	☐ lectures ☐ seminars and workshops ☐ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Attending the consultation, individually solving task and writing the Final Work report.

1.8. Evaluation of student's work

Course attendance		Activity/Participation		Seminar paper		Experimental work	
Written exam		Oral exam		Essay		Research	
Project		Sustained knowledge check		Report		Practice	
Portfolio		Individual task solving	8	Final work in written form	2		

1.9. Assessment and evaluation of student's work during classes and on final exam

Assesses and evaluates the accuracy and completeness of a given task solving process, the Final Work written report, and its oral presentation

1.10. Assigned reading (at the time of the submission of study programme proposal)

1.11. Optional / additional reading (at the time of proposing study programme)

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	Introduction to Artificial Intelligence	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	3.	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	30+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

Obtaining theoretical knowledge and developing skills to solve practical problems in the field of artificial intelligence. Acquiring the knowledge required for independent use of computing systems and software packages for solving common problems.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Recognize appropriate computing methods for prepared simpler mathematical formulations of problems in intelligent agents. Correct understanding of basic idea as well as advantages and disadvantages for individual computing methods. Comparison of methods applicable to the same type of problems. Application to simpler problems.

1.4. Course content

Software systems for scientific computing. Approximation and evaluation of functions. Basic data processing and modelling. Heuristic and local searches. Basic game theory. Uncertainty and decision making. Machine learning fundamentals.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance, activity in class, studying.

1.8. Evaluation of student's work

Course attendance	2	Activity/Participation	0.5	Seminar paper		Experimental work	
Written exam	1	Oral exam		Essay		Research	
Project		Sustained knowledge check	1.5	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Course attendance, activity, continuous knowledge testing (2 mid-term exams), written and oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Russell, S.J., Norvig P., Artificial Intelligence: A Modern Approach, Prentice Hall, 2009.

1.11. Optional / additional reading (at the time of proposing study programme)

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*

Russell, S.J., Norvig P., Artificial Intelligence: A Modern Approach, Prentice Hall, 2009.	2	50

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	Introduction to Modern Physics	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	1.	
ECTS credits and teaching	ECTS student 's workload coefficient	4
	Number of hours (L+E+S)	30+15+0

1. COURSE DESCRIPTION

1.1. Course objectives

Adoption of theoretical knowledge and develop the ability to differentiate properties and concepts of classical and modern physics. Forming a proper view of the interpretation of physical phenomena and their applications in engineering.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Parsed fields of classical, relativistic and quantum physics. Define fundamental physical quantities and units of measure. Identify features an exact approach to physical phenomena. Comparable phenomena in continuum mechanics and atomic physics. Distinguish between wave and particle properties of matter. Analyze the interaction between radiation and matter. Develop and independently argue simpler problems. Apply learned knowledge to problem-solving tasks.

1.4. Course content

The laws of motion, the relativity of motion. Harmonic oscillation. Muted and forced oscillation. Mechanical waves. The superposition of waves, standing waves. Doppler effect. The electromagnetic oscillations. Electromagnetic waves. Geometric optics. Physical optics, interference, diffraction, polarization. Elements of quantum physics. The structure of matter, the Bohr model of the atom. The quantum numbers. Pauli principle and consequences. The interaction of radiation with matter. Photoelectric effect, Compton effect, the formation of pairs.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☐ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments	-	

1.7. Student's obligations

Course attendance, activity, homework, studying.

1.8. Evaluation of student's work

Course attendance	1.5	Activity/Participation	0.5	Seminar paper		Experimental work	
Written exam	0.5	Oral exam	0.5	Essay		Research	
Project		Sustained knowledge check	1	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Course attendance, activity, continuous knowledge testing, written and oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Dobrinić, J.: Physics (waves, optics, structure of matter), Tehnički fakultet, Rijeka, 1998. (In Croatian)
Glavan, N., Mandić, L., Dobrinić, J.: Solved examples in Physics II, Tehnički fakultet, Rijeka, 2004. (In Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

Henč-Bartolić, V. i sur.: Waves and Optics, Školska knjiga, Zagreb, 1998.
Dobrinić, J., Bonato, J.: Physics , Pomorski fakultet, Rijeka, 2010.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course		
Title	*Number of copies*	*Number of students*
Dobrinić, J.: Physics (waves, optics, structure of matter), Tehnički fakultet, Rijeka, 1998. (In Croatian)	12	9
Glavan, N., Mandić, L., Dobrinić, J.: Solved examples in Physics II, Tehnički fakultet, Rijeka, 2004. (In Croatian)	13	9
1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences		
Through the Institution's quality assurance system.		

Basic description		
Course title	Introduction to Object Oriented Programming	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	2.	
ECTS credits and teaching	ECTS student 's workload coefficient	6
	Number of hours (L+E+S)	30+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

Basic knowledge and skills for object oriented programming.

1.2. Course enrolment requirements

Programming I, Programming II.

1.3. Expected course learning outcomes

Explain class and object, inheritance, interface, and polymorphism, distributed systems programming, threading, application of object oriented programming using object oriented methods.

1.4. Course content

Basic principles of object oriented programming, class and object, access control, inheritance, interface and polymorphism, graphical programming, tree. Examples of object-oriented languages Java I C ++. Object oriented programming in a distributed environment.

1.5. Teaching methods	☒ lectures ☒ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☒ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance, activity, studying, exercising.

1.8. Evaluation of student's work

Course attendance	2	Activity/Participation		Seminar paper	1	Experimental work	
Written exam	1	Oral exam		Essay		Research	
Project		Sustained knowledge check	2	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Course attendance, laboratory practice, homework, seminar, written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Eckel, Thinking in C++, 3rd Edition
Java Tutorial
Java API

1.11. Optional / additional reading (at the time of proposing study programme)

G. Booch, J. Rumbaugh, I. Jacobson, The Unified Modeling Languague User Guide, Addison – Wesley, 1998.
A. Alexandrescu, Modern C++ Design, Addison – Wesley Int., 2001.
S. Meyers, Effective C++, Addison – Wesley Professional, 2005.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*

Eckel, Thinking in C++, 3rd Edition, available online	Free access	
Java Tutorial, available online	Free access	
Java API, available online	Free access	

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	Mathematics for Engineers CE	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	2.	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	30+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

Acquiring basic knowledge and skills in Fourier analysis, Laplace transforms, and combinatorics. Understanding of recursive relations and the structure of their solutions. Acquiring basic notions from graph theory, understanding of the selected algorithms from the graph theory. Acquiring basic notions from probability and descriptive statistics and understanding of the application in practice.

1.2. Course enrolment requirements

Mathematics I, Mathematics II.

1.3. Expected course learning outcomes

Define and correctly interpret basic notions from Fourier analysis and Laplace transforms, specify basic properties of Fourier and Laplace transformations. Compute Fourier series, Fourier transforms and Laplace transforms of some functions, determine solutions of differential equations by using Laplace transforms. Define basic combinatorial structures and apply them in practical problems. Determine the solutions of recursive relations and understand their properties. Define basic notions from graph theory. Explain some selected algorithms from graph theory and apply them correctly to practical problems. Define basic concepts from descriptive statistics and analyze the collection of statistical data. Define and interpret the concept of random events, operations with events and the probability of random events. Calculating the probability of certain events. Express and understand Bayes' theorem and apply the Bayesian formula.

1.4. Course content

Fourier series. Fourier integral and Fourier transformation.
Laplace transformation. Basic properties and application.
Discrete mathematics: Introduction to combinatorics. Recursive relations. Basic notions from graph theory.
Basics of probability: Descriptive statistics. Random events, probability of random events, Bayesian formula

1.5. Teaching methods		
	☒ lectures	☐ individual assignment
	☐ seminars and workshops	☐ multimedia and network
	☒ exercises	☒ laboratories
	☐ long distance education	☐ mentorship
	☐ fieldwork	☐ other

1.6. Comments -

1.7. Student's obligations

Course attendance, activity, mid-term exams, tests.

1.8. Evaluation of student's work

Course attendance	2	Activity/Participation		Seminar paper		Experimental work	
Written exam	1	Oral exam		Essay		Research	
Project		Sustained knowledge check	2	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Course attendance, activity, continuous knowledge testing (mid-term exams, quizzes, tests), written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Elezović, N.: Fourier series and integral, Laplace transform, (FER) Biblioteka Bolonja, Element, 2006. (in Croatian)
Žubrinić D.: Introduction to discrete mathematics, Biblioteka Bolonja, Element, Zagreb 2006. (in Croatian)
Pavčević M., Introduction to graph theory, Biblioteka Bolonja, Element, Zagreb 2006. (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

Črnjarić-Žic N.: Internal lecture notes about engineering statistics.
Kreyszig, E.: Advanced Engineering Mathematics, John Wiley & Sons, Inc., 1993.
Črnjarić-Žic N., Štefan Trubić M., Internal lecture notes about Laplace transforms.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Elezović, N.: Fourier series and integral, Laplace transform, (FER) Biblioteka Bolonja, Element, 2006. (in Croatian)	2	50
Žubrinić D.: Introduction to discrete mathematics, Biblioteka Bolonja, Element, Zagreb 2006. (in Croatian)	2	50
Pavčević M., Introduction to graph theory, Biblioteka Bolonja, Element, Zagreb 2006. (in Croatian)	2	50

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	Mathematics I	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	1.	
ECTS credits and teaching	ECTS student 's workload coefficient	7
	Number of hours (L+E+S)	45+45+0

1. COURSE DESCRIPTION

1.1. Course objectives

Acquiring basic knowledge and skills in linear algebra and calculus.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Define and correctly interpret basic notions in linear algebra, single-variable functions, and single-variable calculus. State and correctly interpret basic results in linear algebra and single-variable calculus. Carry out basic computations with matrices, vectors, determinants; determine solutions of systems of linear equations. Apply vector operations to compute some areas, volumes; determine equations of planes and lines. Compute limit values and derivatives of single-variable functions. Apply integration rules and evaluate indefinite and definite integrals of some function.

1.4. Course content

Solving systems of linear equations. Matrices. Determinants.
Vectors and analytical geometry in space.
Single-variable functions. Limit values and continuous functions. Elementary functions.
Derivatives. Indefinite and definite integrals.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☐ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments	-	

1.7. Student's obligations

Course attendance, activity/participation, mid-term exams, and tests.

1.8. Evaluation of student's work

Course attendance	3	Activity/Participation		Seminar paper		Experimental work	
Written exam	1.5	Oral exam		Essay		Research	
Project		Sustained knowledge check	2.5	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Course attendance, activity/participation, sustained knowledge check (mid-term exams, tests), and written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Slapničar I.: Mathematics 1, Sveučilište u Splitu FESB, Split 2002, online book (in Croatian)
Slapničar I.: Mathematocs 1 – Workbook, Sveučilište u Splitu FESB, Split 2010, online book , (in Croatian)
Jurasić, K.-Dražić, I.: Mathematics I, Workbook, Tehnički fakultet, Rijeka, 2008. (in Croatian)
Štefan Trubić M., Sopta L., Črnjarić-Žic N., Maćešić S.: Mathematics, a collection of tasks: integrals, ordinary differential equations, functions of several variables, Rijeka 2012, (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

Elezović N., Aglić A., Linear algebra - a collection of tasks, Element, Zagreb 1999 (in Croatian)
Demidovič, B. P.: Tasks and solved examples from mathematics, Tehnička knjiga, Zagreb, (in Croatian)
Devide, V. i oth.: Solved Problems in mathematics, 1-4, Školska knjiga Zagreb, 1990 (in Croatian)

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Slapničar I.: Mathematics 1, Sveučilište u Splitu FESB, Split 2002, online book (in Croatian)	50	50
Slapničar I.: Mathematocs 1 – Workbook, Sveučilište u Splitu FESB, Split 2010, online book , (in Croatian)	50	50
Jurasić, K.-Dražić, I.: Mathematics I, Workbook, Tehnički fakultet, Rijeka, 2008. (in Croatian)	5	50
Štefan Trubić M., Sopta L., Črnjarić-Žic N., Maćešić S.: Mathematics, a collection of tasks: integrals, ordinary differential equations, functions of several variables, Rijeka 2012, (in Croatian)	20	50

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	Mathematics II	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	1.	
ECTS credits and teaching	ECTS student 's workload coefficient	7
	Number of hours (L+E+S)	45+45+0

1. COURSE DESCRIPTION

1.1. Course objectives

Acquiring basic knowledge and skills in application of calculus for single-variable functions, calculus for multi-variable functions, and ordinary differential equations.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Correctly interpret and apply single-variable calculus. Define and correctly interpret basic notions of multi-variable calculus and ordinary differential equations (ODE). Compute derivatives and some integrals of multi-variable functions, and solutions of some ODE. Compute polynomial approximations; find local extremes of single-variable and multi-variable functions by applying differential calculus. Compute some lengths, areas, and volumes by applying integral calculus. Model vibrations in simple mechanical and electrical systems by applying ODE.

1.4. Course content

Applications of single-variable calculus.
Multi-variable functions. Partial derivatives, differential calculus for two-variable functions and applications (approximations, local extremes, optimal control problems).
Double integral and applications.
First order ODE. Higher order ODE.
Systems of ODE. Applications of ODE.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☐ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments	-	

1.7. Student's obligations

Course attendance, activity/participation, mid-term exams, and tests.

1.8. Evaluation of student's work

Course attendance	3	Activity/Participation		Seminar paper		Experimental work	
Written exam	1.5	Oral exam		Essay		Research	
Project		Sustained knowledge check	2.5	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Course attendance, activity/participation, sustained knowledge check (mid-term exams, tests), and written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Slapničar I.: Mathematics 2, Sveučilište u Splitu FESB, Split 2002, online book, (in Croatian)
Štefan Trubić M., Sopta L., Črnjarić-Žic N., Maćešić S.: Mathematics, a collection of tasks: integrals, ordinary differential equations, functions of several variables, Rijeka 2012, (in Croatian)
Demidovič, B. P. : Tasks and solved examples from mathematics, Tehnička knjiga, Zagreb, (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

Sopta, L.: Mathematics 2, Tehnički fakultet Sveučilišta u Rijeci, 1995, (in Croatian)
Kamenarović, I.: Mathematics in Engineers 1, Tehnički fakultet Sveučilišta u Rijeci, 1997, (in Croatian)
Kreyszig E., Advanced Engineering Mathematics, John Wiley & Sons, Inc., 1993

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Slapničar I.: Mathematics 2, Sveučilište u Splitu FESB, Split 2002, online book, (in Croatian)	50	50
Štefan Trubić M., Sopta L., Črnjarić-Žic N., Maćešić S.: Mathematics, a collection of tasks: integrals, ordinary differential equations, functions of several variables, Rijeka 2012, (in Croatian)	20	50
Demidovič, B. P. : Tasks and solved examples from mathematics, Tehnička knjiga, Zagreb, (in Croatian)	10	50

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	Modelling of Process Information Systems	
Study programme	Undergraduate University Study of Computing	
Course status	optional	
Year	2.	
ECTS credits and teaching	ECTS student 's workload coefficient	4
	Number of hours (L+E+S)	30+15+0

1. COURSE DESCRIPTION

1.1. Course objectives

Acquisition of theoretical knowledge and developing skills for modeling of process information for complex technical systems and electric facilities.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Describe and explain the modular structure of technical systems. Analyze the structure of parameters in electric identification function. Define and distinguish between models of process information in real-time power system. Explain and interpret the sources of process information of technical systems. Describe and correctly interpret the structure of process information in long-distance communication. Design and create UML diagrams for different systems. Distinguish between a standard means of communication and connectivity of open systems. Correctly explain the importance of standardization and application in modeling of process information systems. Define and describe the application of the SCL language. Explain and justify the equipment and software in the control centers of power system.

1.4. Course content

The modular structure of technical systems. Structure of variables in the plant identification function. Display variables in multidimensional vector space. The application of object-oriented approach in modeling. Technological-functional model of process information. Device design of process information. The structure of process information in remote communication between the facilities and control centers. Application of the common data model (CIM). Abstract model of real devices in the facilities. Application program interface management system (EMS-API). Standardization of communication and process information of substation automation. Models of process information in an environment of new technologies and related standards. Open System Interconnection (OSI). Application of UML diagrams for modeling process information. Application of SCL language (based on XML) for configuring and parameterization of intelligent electronic devices (IED). The application of multi-agent system.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☒ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance, activity, preparation of seminar papers, studying.

1.8. Evaluation of student's work

Course attendance	1.5	Activity/Participation		Seminar paper	1.5	Experimental work	
Written exam	0.5	Oral exam	0.5	Essay		Research	
Project		Sustained knowledge check		Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Course attendance, activity, seminar paper, written and oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Šimunić, J.: Lectures, 2012. (in Croatian)
Shahidehpour M., Wang Y., Communication and Control in Electric Power Systems, Wiley & Sons, 2003..

1.11. Optional / additional reading (at the time of proposing study programme)

Strauss, C.: Practical Electrical Network Automation and Communication Systems, Elsevier, 2003.
Brand, K.P., Lohmann, V., Wimmer, W.: Substation Automation Handbook, UAC, 2003.
Rehtanz, C.: Autonomous systems and intelligent agents in power system control and operation, Springer; 1 ed, 2003.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Šimunić, J.: Lectures, 2012. (in Croatian)	1	14
Shahidehpour M., Wang Y., Communication and Control in Electric Power Systems, Wiley & Sons, 2003..	1	14

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	Operating Systems	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	2.	
ECTS credits and teaching	ECTS student 's workload coefficient	7
	Number of hours (L+E+S)	30+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

Acquiring fundamental knowledge of modern operating systems.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Upon a completion of the course, students will: understand which are the basic operating system components and provided services; recognize concepts common to modern operating systems; describe the relation between the hardware and the operating system; understand process management; use inter-process communication techniques; describe memory management; discuss advantages and disadvantages of virtualization; use command-line interface to access operating system's services; understand basic threats to computer security and common defence practices.

1.4. Course content

Introduction to operating systems: history of operating systems, operating system structure, interaction between operating system and hardware. Process management: processes and threads, concurrent execution, scheduling, deadlocks, synchronization. Memory management. Virtual machines. Shells for working with operating systems and shell programming. Operating system security. Examples of installing and configuring operating systems.

1.5. Teaching methods		
	☒ lectures	☒ individual assignment
	☐ seminars and workshops	☐ multimedia and network
	☒ exercises	☒ laboratories
	☐ long distance education	☒ mentorship
	☐ fieldwork	☐ other

1.6. Comments

1.7. Student's obligations

Class attendance, homework, studying.

1.8. Evaluation of student's work

Course attendance	2	Activity/Participation	1	Seminar paper	0.5	Experimental work	
Written exam	1.5	Oral exam		Essay		Research	
Project		Sustained knowledge check	2	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Class attendance, activity, midterm exams (sustained knowledge check), optional individual assignment and written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

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1.11. Optional / additional reading (at the time of proposing study programme)

Silberschatz, Galvin, Gagne: Operating System Concepts, Wiley, 8th Ed.
Budin, Golub, Jakobović, Jelenković: Operating Systems (in Croatian)
Tanenbaum: Modern Operating Systems, Prentice Hall, 2008.

Stallings: Operating Systems: Internals and Design Principles, Prentice Hall, 6th Ed.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality insurance system.

Basic description		
Course title	Organization and Economics of Business Systems	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	3.	
ECTS credits and teaching	ECTS student 's workload coefficient	4
	Number of hours (L+E+S)	30+15+0

1. COURSE DESCRIPTION

1.1. Course objectives

Assuming theoretical concepts and knowledge of the organization and business economics.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Explain the concept of business systems and building the business system. Define the basic principles of the organization. Define the management of systems and information in the enterprise. Analyze the types of organizational structures. Analyze the evaluation of jobs. Distinguish the ownership, the management and the leadership. Define the principles of management and leadership. Analyze the teamwork. Define the business policies. Describe the principles and methods of planning. Define the long-term and operational plans. Analyze network planning technique. Define the plant as an economic system. Analyze income and expenses. Distinguish the Income Statement and Balance Sheet. Define the effects of the business.

1.4. Course content

The definition of a business system. The evolution of the business system. Factory as a business system. Building the business system. The basic principles of the organization. Definition and managing of business system. The information in the enterprise. Types of organizational structures. Design of the business system. Evaluation of jobs. Ownership. Management. Leadership. The principles of management and leadership. Teamwork. Business policy. Planning. Principles and methods of planning. Network planning techniques. Plans of the business system. Long-term and operational plans. Using of computers in planning. Factory as an economic system. Income and expenses. Types of costs. Break even. Income Statement. Balance Sheet. Effects of business.

1.5. Teaching methods		
	☒ lectures	☐ individual assignment
	☐ seminars and workshops	☐ multimedia and network
	☒ exercises	☐ laboratories
	☐ long distance education	☐ mentorship
	☐ fieldwork	☐ other

1.6. Comments

1.7. Student's obligations

Attendance, class participation, independent learning.

1.8. Evaluation of student's work

Course attendance	1.5	Activity/Participation		Seminar paper		Experimental work	
Written exam	1	Oral exam		Essay		Research	
Project		Sustained knowledge check	1.5	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Attendance, class participation, continuous assessment (two mid-term exams), written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Mikac, T., Ikonić, M.: Organization of Business Systems, Tehnički fakultet Sveučilišta u Rijeci, 2008. (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

Novak, M., Sikavica, P.: Business Organization, Informator, Zagreb, 1999. (in Croatian)

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Mikac, T., Ikonić, M.: Organization of Business Systems, Tehnički fakultet Sveučilišta u Rijeci, 2008. (in Croatian)	As needed	83
Novak, M., Sikavica, P.: Business Organization, Informator, Zagreb, 1999. (in Croatian)	-	83

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	Physical and Health Education	
Study programme	Undergraduate University Study of Computing	
Course status	optional	
Year	3.	
ECTS credits and teaching	ECTS student 's workload coefficient	1
	Number of hours (L+E+S)	0+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

The general objective of the educational field of Physical and Health Education is to satisfy man`s biosocial need for movement through appropriate kinetic activities, thus satisfying this general need by increasing the adaptive and creative capabilities in contemporary life and work conditions.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Through appropriate kinetic activities satisfy man`s biosocial need for movement.

1.4. Course content

The course content of the educational field of Physical and Health Education shall be implemented through regular (field athletics, football, basketball, volleyball, handball, swimming and water- polo, fitness) and optional (skiing, sailing, rowing, trekking, tennis and rafting) programmes.

1.5. Teaching methods	☐ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☐ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance.

1.8. Evaluation of student's work

Course attendance	1	Activity/Participation		Seminar paper		Experimental work	
Written exam		Oral exam		Essay		Research	
Project		Sustained knowledge check		Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Regular course attendance.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Medved, R.: Sports medicine, Medicinska knjiga, Zagreb. (in Croatian)
Tuka, K.:Physiology of sport, Sportska tribina, Zagreb. (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Medved, R.: Sports medicine, Medicinska knjiga, Zagreb. (in Croatian)	1	50

Tuka, K.:Physiology of sport, Sportska tribina, Zagreb. (in Croatian)	1	50
1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences		
Through the Institution`s Quality Assurance System.		

Basic description		
Course title	Professional Practice I	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	2.	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	-

1. COURSE DESCRIPTION

1.1. Course objectives

Student verifies and complements his own expertise, along with a comprehensive view of the work process.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Apply acquired knowledge and skills from studied courses professional content. Gain working process experience. Develop and further improve competence for solving specific professional engineering problems.

1.4. Course content

Industrial practice within Undergraduate University Study of Naval Architecture is carried out individually in work organization that is engaged in the student's field of study, and with activities in accordance with the Industrial Practice Rules and Study Program curriculum. Within such practice, student is familiarized with the corresponding jobs that are studied through programs of education, with the task of verifying and complementing their own expertise, along with a comprehensive view of the work process.

1.5. Teaching methods	☐ lectures ☐ seminars and workshops ☐ exercises ☐ long distance education ☒ fieldwork	☐ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Conducting professional practice in duration of 15 working days, or 120 hours, and writing the corresponding report.

1.8. Evaluation of student's work

Course attendance		Activity/Participation		Seminar paper		Experimental work	
Written exam		Oral exam		Essay		Research	
Project		Sustained knowledge check		Report	1	Practice	4
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Assesses and evaluates student work and dedication, and written report.

1.10. Assigned reading (at the time of the submission of study programme proposal)

1.11. Optional / additional reading (at the time of proposing study programme)

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences		
Through the Institution's quality assurance system.		

Basic description		
Course title	Programming I	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	1.	
ECTS credits and teaching	ECTS student 's workload coefficient	6
	Number of hours (L+E+S)	30+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

Introduction to basics of hardware and software. Learning about the process of writing and debugging a program. Introduction to programming principles.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Basic use o f Windows and Linux operating system. Understand the software/hardware interface. Apply programming skills to write small programs.

1.4. Course content

Introduction to computer science. Information coding : number systems, formats and standards for number presentation. Computer architecture: model of a simple processor, instruction execution, process of program compilation. Introduction to operating systems Windows and Linux. Programming principles. Syntax of a programming language. Loops. Arrays. Functions.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance, activity, homework, continuous knowledge testing , written exam.

1.8. Evaluation of student's work

Course attendance	2	Activity/Participation		Seminar paper		Experimental work	
Written exam	1.5	Oral exam		Essay		Research	
Project		Sustained knowledge check	2.5	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Lecturing with knowledge checking based on quizies, partial exams and homeworks. Exercises with problems solving and prepearing for final project.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Darko Grundler: Applied Computing, Graphis Zagreb 2000, ISBN: 953-6647- 03-6. (in Croatian)
Rajko Vulin: From Now we are Programming in C, Turbo C, Školska knjiga, Zagreb 1991. (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

Kernighan B. W., Ritchie D. M., The C Programming Language, Prentice Hall, Inc., 1988.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Darko Grundler: Applied Computing, Graphis Zagreb 2000, ISBN: 953-	1	50

6647- 03-6. (in Croatian)		
Rajko Vulin: From Now we are Programming in C, Turbo C, Školska knjiga, Zagreb 1991. (in Croatian)	1	50
1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences		
Through the Institution's quality assurance system.		

Basic description		
Course title	Programming II	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	1.	
ECTS credits and teaching	ECTS student 's workload coefficient	7
	Number of hours (L+E+S)	30+45+0

1. COURSE DESCRIPTION

1.1. Course objectives

Software development in programming language C.

1.2. Course enrolment requirements

None.

1.3. Expected course learning outcomes

Apply programming skills to write small programs. Understand principles of software development. Understand the syntax of the C programming language. Understand data types and basic data structures. Apply pointers and dynamic memory allocation. Understand modular program design.

1.4. Course content

Program structure. Memory classes. Functions. Recursive functions. Function libraries. Pointers and arrays. Structures. Files.Command line arguments. Programmiing tools configure and make.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☒ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance, activity, homework, continuous knowledge testing , written exam.

1.8. Evaluation of student's work

Course attendance	2.5	Activity/Participation		Seminar paper		Experimental work	1
Written exam	1.5	Oral exam		Essay		Research	
Project		Sustained knowledge check	2	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Lecturing with knowledge checking based on quizies, partial exams and homeworks. Exercises with problems solving and prepearing for final project.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Rajko Vulin: From Now we are Programming in C, Turbo C, Školska knjiga, Zagreb 1991. (in Croatian)
Kernighan B. W., Ritchie D. M., The C Programming Language, Prentice Hall, Inc., 1988.

1.11. Optional / additional reading (at the time of proposing study programme)

Rajko Vulin: " A collection of solved tasks from C ", Školska knjiga, Zagreb 1995. (in Croatian)

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Rajko Vulin: From Now we are Programming in C, Turbo C, Školska knjiga, Zagreb 1991. (in Croatian)	1	50

Kernighan B. W., Ritchie D. M., The C Programming Language, Prentice Hall, Inc., 1988.	1	50
1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences		
Through the Institution's quality assurance system.		

Basic description		
Course title	Signals and Systems	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	2.	
ECTS credits and teaching	ECTS student 's workload coefficient	6
	Number of hours (L+E+S)	45+15+0

1. COURSE DESCRIPTION

1.1. Course objectives

Understanding time and frequency analysis and processing methods of continuous and discrete-time signals, as well as basic input-output relationships of linear time-invariant systems. Development of analysis, synthesis, and problem solving skills.

1.2. Course enrolment requirements

Mathematics I and Mathematics II.

1.3. Expected course learning outcomes

Define both elementary signals and basic system properties. Define the impulse response of LTI systems, convolution integral and sum. Use the convolution for the time-domain analysis of LTI systems. Define Fourier series and Fourier transform. Use different Fourier representations in spectral analysis of signals. Define the frequency response of LTI systems. Study LTI systems in the frequency domain. Describe signal sampling and reconstruction procedures.

1.4. Course content

Signals and systems; classification, elementary signals, signal models, operations on signals, system properties. Continuous and discrete LTI systems; impulse response, convolution of signals, properties of LTI systems. Fourier series; line spectrum, systems with periodic inputs. Fourier transform; signal energy, transfer function of ideal filters. Signal sampling; aliasing, reconstruction filter. Discrete Fourier Transform (DFT); signal spectral analysis.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☐ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments	-	

1.7. Student's obligations

Course attendance, individual studying.

1.8. Evaluation of student's work

Course attendance	2	Activity/Participation		Seminar paper		Experimental work	
Written exam	1.5	Oral exam		Essay		Research	
Project		Sustained knowledge check	2.5	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Sustained knowledge check (written tests), final written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

B. P. Lathi: Linear Systems and Signals, 2/E, Oxford University Press, 2004.
S. S. Soliman and M. D. Srinath: Continuous and Discrete Signals and Systems, 2/E, Prentice Hall, 1998.
M. Vrankić: Signals and Systems: Solved Problems, (book), Graphis, 2007. (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

C. L. Phillips, J. Parr, and E. Riskin: Signals, Systems, and Transforms, 4/E, Prentice Hall, 2008.

J. H. McClellan, R. W. Schafer, and M. A. Yoder: Signal Processing First, Prentice Hall, 2003.
S. Haykin and B. Van Veen: Signals and Systems, 2/E, Wiley, 2003.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
B. P. Lathi: Linear Systems and Signals, 2/E, Oxford University Press, 2004.	1	60
S. S. Soliman and M. D. Srinath: Continuous and Discrete Signals and Systems, 2/E, Prentice Hall, 1998.	1	60
M. Vrankić: Signals and Systems: Solved Problems, (book), Graphis, 2007. (in Croatian)	11	60

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	Software Engineering	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	3.	
ECTS credits and teaching	ECTS student 's workload coefficient	7
	Number of hours (L+E+S)	45+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

Introduction to software engineering basics. Explore lifecycle phases, acquire knowledge and skills of software project management. Teamwork in software development projects.

1.2. Course enrolment requirements

Introduction to Object Oriented Programming.

1.3. Expected course learning outcomes

Explain main activities and purpose of software engineering discipline. Describe software lifecycle phases. Differentiate software development models. Argument application of software development methods and tools. Explain elements and models of software engineering management in software engineering discipline. Argument application of methods and tools used for software project management. Summarise the project and project results.

1.4. Course content

Introduction into software engineering discipline. Software lifecycle model, analysis, specification, design, implementation, and test of requirements. Methods and tools used in each software lifecycle phase. Software development lifecycle models, waterfall, spiral, iterative, incremental, and agile methods. Requirements engineering and software design. Object oriented design. Programming languages. Quality planning and control. Verification and validation. Management in software engineering discipline. Teamwork.

1.5. Teaching methods	☒ lectures ☒ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☒ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance, activity, seminar and homework, studying, project execution.

1.8. Evaluation of student's work

Course attendance	2.5	Activity/Participation	0.5	Seminar paper	0.5	Experimental work	
Written exam	1	Oral exam		Essay		Research	
Project	1	Sustained knowledge check	1.5	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Course attendance, activity, homework, continuous knowledge testing, project control, written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Lectures.
Guidelines for laboratory exercises and homework.
Vliet, H.v.: Software Engineering, Principles and Practice. John Wiley & Sons, Chichester, 2009

1.11. Optional / additional reading (at the time of proposing study programme)

Kerzner, H.: Project Management: A Systems Approach to Planning, Scheduling and Controlling, John Wiley & Sons,

Hoboken, 2003

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Vliet, H.v.: Software Engineering, Principles and Practice. John Wiley & Sons, Chichester, 2009	1	59

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	Web Application Development	
Study programme	Undergraduate University Study of Computing	
Course status	compulsory	
Year	3.	
ECTS credits and teaching	ECTS student 's workload coefficient	7
	Number of hours (L+E+S)	30+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

This course prepares students to work in the area of web application development by teaching them basics of web systems design and implementation. It is expected to provide practical skills for development of dynamic and interactive web applications by introducing contemporary technologies, platforms, programming languages, and related development tools.

1.2. Course enrolment requirements

There are no formal prerequisites for course enrollment, but basic programming skills are expected.

1.3. Expected course learning outcomes

Upon a completion of the course, students will be able to: describe the basic principles of distributed systems and web-based protocols; explain the characteristics of the application models based on client-server paradigm; analyze the possibilities of different approaches to web application development; apply contemporary technologies for developing web system frontend and backend; develop dynamic web applications based on data resources.

1.4. Course content

The basic principles for building distributed, dynamic, and interactive information services for content management. Main concepts of the web programming. Design and implementation of web application frontend (HTML, CSS, JavaScript) and backend. Practical examples of dynamic web application development with the use of contemporary technologies. Web services (REST).

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☒ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Class attendance, participation in the student project team (group project assignment).

1.8. Evaluation of student's work

Course attendance	2	Activity/Participation		Seminar paper		Experimental work	
Written exam	1	Oral exam		Essay		Research	
Project	2	Sustained knowledge check	2	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Class attendance, midterm exams (continuous knowledge examination), laboratory exercises (individual assignments), and project assignment (participation in a team project).

1.10. Assigned reading (at the time of the submission of study programme proposal)

1. Douglas Crockford: JavaScript: The Good Parts, O'Reilly Media / Yahoo Press, 2008
2. Jon Ducket: HTML and CSS: Design and Build Websites, John Wiley & Sons, 2011

1.11. Optional / additional reading (at the time of proposing study programme)

1. Andy Budd, Emil Björklund: CSS Mastery, Apress, 2013
2. K. Scott Allen: What Every Web Developer Should Know About HTTP, OdeToCode LLC, 2012

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Douglas Crockford: JavaScript: The Good Parts, O'Reilly Media / Yahoo Press, 2008	-	-
Jon Ducket: HTML and CSS: Design and Build Websites, John Wiley & Sons, 2011	-	-

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the institution's quality assurance system.