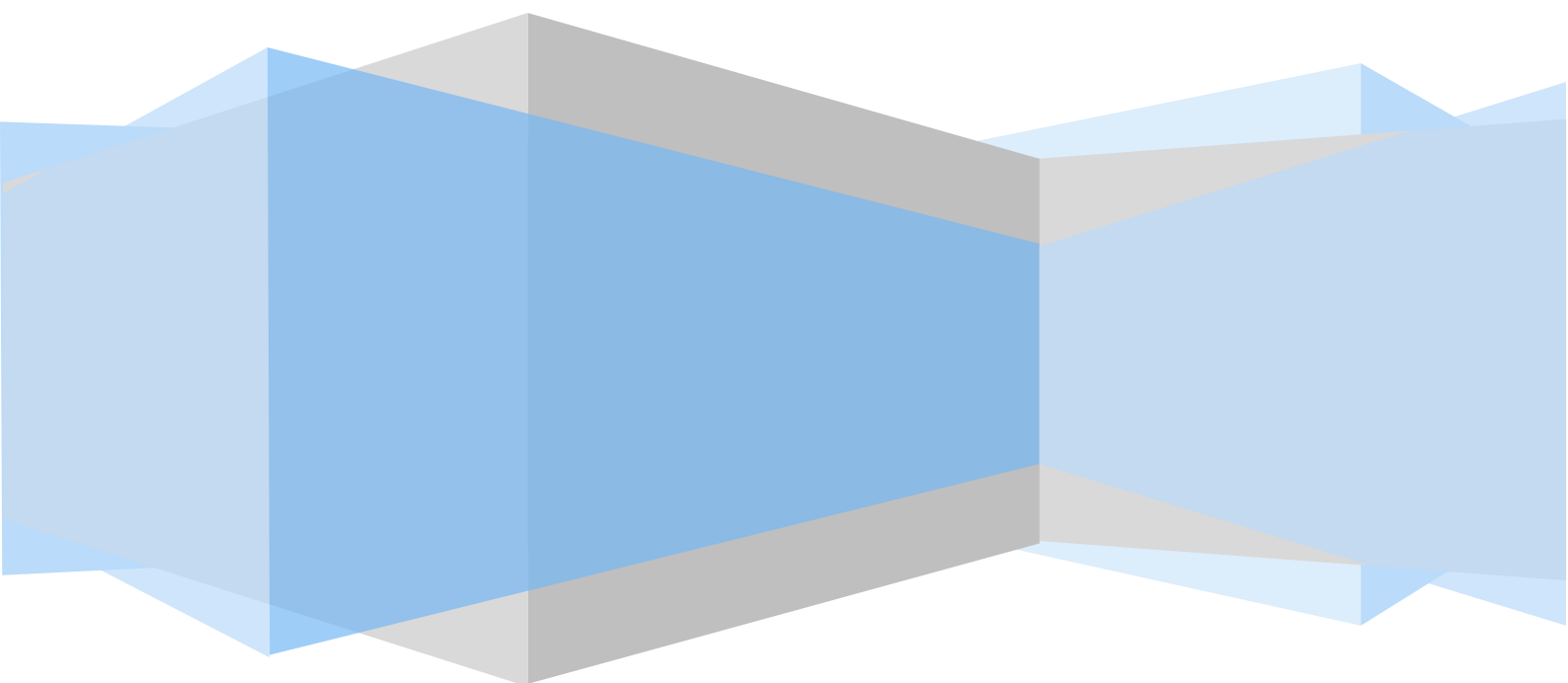


**Bjelovar University of Applied Sciences**

# **COURSE CATALOGUE**

**COMPUTER SCIENCE - academic year**

**2022/23**



## Catalogue of courses offered in English

NAME OF THE COURSE	SEMESTER (WS / SS / WS & SS)	ECTS	PAGE WITH DETAILED DESCRIPTION OF THE COURSE
Introduction to Informatics	WS	4.0	3
Introduction to Programming	WS	6.0	4
Communication Skills	WS	3.0	5
Technical English Language 1	WS	2.0	6
Application of Mathematical Software Tools	SS	2.0	7
Introduction to Computer Networks	SS	6.0	8
Introduction to Linux	SS	6.0	9
Programming in C	SS	7.0	10
Technical English Language 2	SS	2.0	11
Digital Techniques (only lectures without practical sessions)	WS	6.0	12
Web Programming 1	WS	5.0	13
Object-Oriented Programming	WS	6.0	14
Data Structures and Algorithms	WS	5.0	15
Database Systems	WS	6.0	16
Technical English Language 3	WS	2.0	17
Microcomputers	SS	4.0	18
C# Programming	SS	5.0	19
Fundamentals of Programming in JAVA	SS	5.0	20
Web Programming 2	SS	6.0	21
Operating Systems	SS	4.0	22
Technical English Language 4	SS	2.0	23
.NET Programming	WS	6.0	24
Mobile Application Development	WS	6.0	25
Internet of Things	WS	5.0	26
Application of Blockchain Technology	WS	4.0	27
Field Practice 1	WS	3.0	28
Computer and Data Security	SS	6.0	29
Field Practice 2	SS	5.0	30
Computer and Robot Vision	SS	4.0	31
Introduction to Artificial Intelligence	SS	4.0	32

## 1<sup>st</sup> semester (WS)

General information				
Course instructor	Dario Vidić Ivan Sekovanić			
Course title	Introduction to Informatics			
Programme of study	Undergraduate professional programme of study in Mechatronics Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	1 <sup>st</sup> , WS			
ECTS	4			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	15	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

1. COURSE DESCRIPTION							
<b>1.1. Expected learning outcomes</b>							
Upon completion of the course students will be able to:							
O1: analyse the historical development and current significance of computer systems,							
O2: describe and recognise the main components of a computer system, their functions and the role of numeral systems in computer operation,							
O3: describe the role of computer operating systems,							
O4: create a simple database,							
O5: edit and format texts,							
O6: process data in table calculations,							
O7: describe adjustment and maintenance techniques related to the Windows operating system and its security settings.							
<b>1.2. Students' obligations</b>							
Laboratory sessions							
<b>1.3. Students' performance monitoring</b>							
Class attendance		Class participation		Seminar paper		Experimental work	
Written exam	3.2	Oral exam		Essay		Research	
Project		Continuous assessment	0.2	Class report		Practical work	0.6
Portfolio							

<b>General information</b>				
Course instructor	Ivan Sekovanić			
Course title	Introduction to Programming			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	1 <sup>st</sup> , WS			
ECTS	6			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>							
<b>1.1. Expected learning outcomes</b>							
Upon completion of the course students will be able to:							
O1: distinguish between simple types of data and subject them to programming operations,							
O2: apply consecutive, selection commands and loops within a programming code,							
O3: use complex types of data and implement more complex programming operations,							
O4: write programming functions with or without return value that performs various operations,							
O5: use programming commands for writing and reading data from a textual file.							
O6: describe advanced features and abilities in programming							
<b>1.2. Students' obligations</b>							
Laboratory sessions							
<b>1.3. Students' performance monitoring</b>							
Class attendance		Class participation	0.36	Seminar paper		Experimental work	
Written exam	4.14	Oral exam		Essay		Research	
Project		Continuous assessment		Class report		Practical work	1.5
Portfolio							

<b>General information</b>				
Course instructor	<b>Tatjana Badrov</b>			
Course title	<b>Communication Skills</b>			
Programme of study	Undergraduate professional programme of study in Mechatronics Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	1 <sup>st</sup> , WS			
ECTS	3			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	15	APS	LPS	0
		30	0	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>							
<b>1.1. Expected learning outcomes</b>							
Upon completion of the course students will be able to:							
	O1:	explain basic concepts, types and difficulties in the field of communication,					
	O2:	distinguish between the techniques of active listening,					
	O3:	apply information collection techniques and a balanced feedback,					
	O4:	identify and compare basic communication styles and apply an assertive I-message,					
	O5:	distinguish between three types of complaints and complaint resolving techniques,					
	O6:	prepare and deliver a presentation on a given topic,					
	O7:	describe and demonstrate the basic elements of the negotiation process,					
	O8:	explain debate principles and participate in a debate on a given topic.					
<b>1.2. Students' obligations</b>							
2 preliminary exams							
3 homework assignments, one of which being the preparation for a presentation							
10 written assignments/exercises							
<b>1.3. Students' performance monitoring</b>							
Class attendance	0.5	Class participation	0.5	Seminar paper		Experimental work	
Written exam	1	Oral exam	0.5	Essay		Research	
Project		Continuous assessment	0.5	Class report		Practical work	
Portfolio							

<b>General information</b>				
Course instructor	Ivana Jurković			
Course title	Technical English 1			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	1 <sup>st</sup> , WS			
ECTS	2			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	15	APS 30	LPS 0	0

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>							
<b>1.1. Expected learning outcomes</b>							
<p>Upon completion of the course students will be able to use the English language to:</p> <p>O1: describe technical functions and applications of products and the manner in which products function,</p> <p>O2: describe the properties and application of materials used in various fields of engineering,</p> <p>O3: describe the shape and features of components and assemblies as well as joining and fixing procedures,</p> <p>O4: demonstrate mastery of simple grammatical structures.</p>							
<b>1.2. Students' obligations</b>							
2 preliminary exams or the written exam Oral exam							
<b>1.3. Students' performance monitoring</b>							
Class attendance		Class participation	0.5	Seminar paper		Experimental work	
Written exam	1	Oral exam	0.5	Essay		Research	
Project		Continuous assessment		Class report		Practical work	
Portfolio							

## 2<sup>nd</sup> semester (SS)

General information				
Course instructor	Danijel Radočaj			
Course title	Application of Mathematical Software Tools			
Programme of study	Undergraduate professional programme of study in Mechatronics Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	1 <sup>st</sup> , SS			
ECTS	2			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	0	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

1. COURSE DESCRIPTION						
<b>1.1. Expected learning outcomes</b>						
<p>Upon completion of this course students will be able to:</p> <p>O1: initialise various types of variables in Matlab and execute basic relation and logical operations on them,</p> <p>O2: use programming loops and flow control in Matlab,</p> <p>O3: use basic mathematical functions, functions for processing sign sequences and functions for working with polynomials in Matlab,</p> <p>O4: draw a graph of a given mathematical function using graphical functions in Matlab,</p> <p>O5: use basic functions of the symbol package,</p> <p>O6: use Simulink to simulate system response.</p>						
<b>1.2. Students' obligations</b>						
Continuous assessment.						
<b>1.3. Students' performance monitoring</b>						
Class attendance	1	Class participation		Seminar paper		Experimental work
Written exam		Oral exam		Essay		Research
Project		Continuous assessment	1	Class report		Practical work
Portfolio						

<b>General information</b>				
Course instructor	Ivan Sekovanić			
Course title	Introduction to Computer Networks			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	1 <sup>st</sup> , SS			
ECTS	6			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>							
<b>1.1. Expected learning outcomes</b>							
<p>Upon completion of this course students will be able to:</p> <p>O1: describe basic concepts and terms related to computer networks,</p> <p>O2: distinguish between the purposes of various network devices and explain the procedure of connecting several computers into a network,</p> <p>O3: describe the operation of a standard TCP/IP protocol,</p> <p>O4: name and describe the operation of the most important protocols of the application layer.</p>							
<b>1.2. Students' obligations</b>							
Laboratory sessions							
<b>1.3. Students' performance monitoring</b>							
Class attendance		Class participation	0.36	Seminar paper		Experimental work	
Written exam	4.68	Oral exam		Essay		Research	
Project		Continuous assessment		Class report		Practical work	0.96
Portfolio							



<b>General information</b>				
Course instructor	Ivan Sekovanić			
Course title	Introduction to Linux			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	1 <sup>st</sup> , SS			
ECTS	6			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>							
<b>1.1. Expected learning outcomes</b>							
<p>Upon completion of this course students will be able to:</p> <p>O1: install Linux on a virtual machine, explain the role and significance of the Linux operating system in the current IT system,</p> <p>O2: explain the structure and role of a directory and work with directories in shell prompt,</p> <p>O3: work with file sin Linux,</p> <p>O4: use and explain authorisation and groups in Linux,</p> <p>O5: explain the work with processes in Linux,</p> <p>O6: describe installation and configuration of basic Linux servers,</p> <p>O7: code basic shell scripts.</p>							
<b>1.2. Students' obligations</b>							
Laboratory sessions							
<b>1.3. Students' performance monitoring</b>							
Class attendance		Class participation		Seminar paper		Experimental work	
Written exam	4.8	Oral exam		Essay		Research	
Project		Continuous assessment	1.2	Class report		Practical work	
Portfolio							

General information				
Course instructor	Krunoslav Husak			
Course title	Programming in C			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	1 <sup>st</sup> , SS			
ECTS	7			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	45	

\*APS - auditory practical sessions LPS- laboratory practical sessions

1. COURSE DESCRIPTION							
<b>1.1. Expected learning outcomes</b>							
<p>Upon completion of this course students will be able to:</p> <p>O1: use basic and logical types of data,  O2: apply the structures for the program flow control,  O3: apply fields in programming solutions,  O4: explain the execution and apply strings,  O5: develop own functions and correctly declare arguments depending on the type of transfer,  O6: interpret the role of a pointer in programs and use them for working with fields and functions,  O7: interpret the structures and ways of recording data in files,  O8: code according to a given specification in the programming language C.</p>							
<b>1.2. Students' obligations</b>							
Laboratory sessions							
<b>1.3. Students' performance monitoring</b>							
Class attendance		Class participation		Seminar paper		Experimental work	
Written exam	4.8	Oral exam		Essay		Research	
Project		Continuous assessment		Class report		Practical work	1.2
Portfolio							

<b>General information</b>				
Course instructor	Ivana Jurković			
Course title	Technical English 2			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	1 <sup>st</sup> , SS			
ECTS	2			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	15	APS 30	LPS 0	0

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>							
<b>1.1. Expected learning outcomes</b>							
<p>Upon completion of the course students will be able to use the English language to:</p> <p>O1: describe the procedure of developing an engineering project,</p> <p>O2: describe technical problems and malfunctions as well as their causes and possible solutions,</p> <p>O3: discuss about technical requirements and describe project feasibility, improvements and redesigns,</p> <p>O4: demonstrate mastery of simple grammatical structures.</p>							
<b>1.2. Students' obligations</b>							
2 preliminary exams or the written exam Oral exam							
<b>1.3. Students' performance monitoring</b>							
Class attendance		Class participation	0.5	Seminar paper		Experimental work	
Written exam	1	Oral exam	0.5	Essay		Research	
Project		Continuous assessment		Class report		Practical work	
Portfolio							

### 3<sup>rd</sup> semester (WS)

<b>General information</b>				
Course instructor	<b>Dario Vidić</b>			
Course title	<b>Digital Techniques</b>			
Programme of study	Undergraduate professional programme of study in Mechatronics Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	2 <sup>nd</sup> , WS			
ECTS	6			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		16	14	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>							
<b>1.1. Expected learning outcomes</b>							
Upon completion of this course students will be able to:							
O1: use different number systems and codes,							
O2: design units for detecting and correcting data transfer errors,							
O3: minimise and realise complex logical functions using basic logic circuits,							
O4: explain the operation of combinational and arithmetic units,							
O5: explain the operation of basic types of bistables and counters,							
O6: design sequential circuits,							
O7: explain the operation of AD and DA conversion circuits.							
<b>1.2. Students' obligations</b>							
Laboratory sessions							
<b>1.3. Students' performance monitoring</b>							
Class attendance		Class participation		Seminar paper		Experimental work	
Written exam	3.6	Oral exam		Essay		Research	
Project		Continuous assessment	0.6	Class report		Practical work	1.8
Portfolio							

<b>General information</b>				
Course instructor	Tomislav Adamović			
Course title	Web Programming 1			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	2 <sup>nd</sup> , WS			
ECTS	5			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>						
<b>1.1. Expected learning outcomes</b>						
Upon completion of this course students will be able to:						
O1: Create a static HTML document, use HTML5 for animation effects						
O2: Use CSS. Create a separate CSS file. Use CSS framework						
O3: Manage HTML page elements using JavaScript						
O4: Apply standard JavaScript libraries to manage HTML page elements						
<b>1.2. Students' obligations</b>						
Laboratory sessions						
Project						
<b>1.3. Students' performance monitoring</b>						
Class attendance		Class participation		Seminar paper		Experimental work
Written exam	1	Oral exam		Essay		Research
Project	4	Continuous assessment		Class report		Practical work
Portfolio						

<b>General information</b>				
Course instructor	<b>Krunoslav Husak</b>			
Course title	<b>Object-Oriented Programming</b>			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	2 <sup>nd</sup> , WS			
ECTS	6			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>						
<b>1.1. Expected learning outcomes</b>						
Upon completion of this course students will be able to:						
O1: Use fundamental language elements in creating a program in the programming language C++						
O2: Correctly define classes and objects						
O3: Correctly define inheritance and polymorphism						
O4: Correctly define templates						
O5: Use a C++ standard library for program development						
O6: Use the object-oriented programming language C++ and its libraries for developing a program according to a given specification						
<b>1.2. Students' obligations</b>						
Laboratory sessions						
Project						
<b>1.3. Students' performance monitoring</b>						
Class attendance		Class participation		Seminar paper		Experimental work
Written exam	1.2	Oral exam		Essay		Research
Project	3.6	Continuous assessment		Class report		Practical work
Portfolio						1.2

<b>General information</b>				
Course instructor	<b>Ante Javor</b>			
Course title	<b>Data Structures and Algorithms</b>			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	2 <sup>nd</sup> , WS			
ECTS	5			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>							
<b>1.1. Expected learning outcomes</b>							
Upon completion of this course students will be able to:							
O1: explain the complexity of operations and algorithms,							
O2: use recursive algorithms,							
O3: create solutions based on simple data structures (list, stack, queue),							
O4: create solutions based on complex data structures (tree, heap, queue, dictionary),							
O5: describe and use sorting, search and compression algorithms,							
O6: use general techniques for algorithm construction,							
O7: program in the programming language C++ according to the given specification.							
<b>1.2. Students' obligations</b>							
Laboratory sessions							
<b>1.3. Students' performance monitoring</b>							
Class attendance		Class participation		Seminar paper		Experimental work	
Written exam	4	Oral exam	1	Essay		Research	
Project		Continuous assessment		Class report		Practical work	1
Portfolio							

<b>General information</b>				
Course instructor	Tomislav Adamović			
Course title	Database Systems			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	2 <sup>nd</sup> , WS			
ECTS	6			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>						
<b>1.1. Expected learning outcomes</b>						
Upon completion of this course students will be able to:						
O1: create and change tables in the relational data model						
O2: select data from tables						
O3: write CRUD commands for changing data in tables						
O4: explain basic types of parameters and objects in PL/SQL						
O5: create and test the RESTfull service on a database						
O6: work with fundamental commands and programming concepts in PL/SQL						
O7: work with exceptions, debug a code and perform unit tests						
<b>1.2. Students' obligations</b>						
Laboratory sessions						
Project						
<b>1.3. Students' performance monitoring</b>						
Class attendance		Class participation		Seminar paper		Experimental work
Written exam	1.8	Oral exam		Essay		Research
Project	4.2	Continuous assessment		Class report		Practical work
Portfolio						



<b>General information</b>				
Course instructor	Ivana Jurković			
Course title	Technical English 3			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	2 <sup>st</sup> , WS			
ECTS	2			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	15	APS 30	LPS 0	0

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>							
<b>1.1. Expected learning outcomes</b>							
Upon completion of the course students will be able to use the English language to:							
O1: describe regulations, standards procedures and measures related to occupational health and safety							
O2: describe automated systems, measurable parameters, readings and approximate values							
O3: explain testing procedures, conduction of experiments and describe the predicted outcomes of testing							
O4: demonstrate mastery of more complex grammatical structures							
<b>1.2. Students' obligations</b>							
2 preliminary exams or the written exam							
Oral exam							
<b>1.3. Students' performance monitoring</b>							
Class attendance		Class participation	0.5	Seminar paper		Experimental work	
Written exam	1	Oral exam	0.5	Essay		Research	
Project		Continuous assessment		Class report		Practical work	
Portfolio							

## 4<sup>th</sup> semester (SS)

<b>General information</b>				
Course instructor	<b>Zoran Vrhovski</b> <b>Danijel Radočaj</b>			
Course title	<b>Microcomputers</b>			
Programme of study	Undergraduate professional programme of study in Mechatronics Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	2 <sup>nd</sup> , SS			
ECTS	4			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	15	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>							
<b>1.1. Expected learning outcomes</b>							
<p>Upon completion of this course students will be able to:</p> <p>O1: choose a microcomputer that is optimal for a given purpose from the aspect of price, features and availability</p> <p>O2: configure microcomputer operation using registers in the development software environment</p> <p>O3: create a microcontroller control program for a given purpose in the development software environment</p> <p>O4: use microcontroller interrupts when it is required by the functionality of an electronic device koristiti</p> <p>O5: connect electronic devices to a microcontroller taking into account the purpose of an individual pin of a microcontroller</p>							
<b>1.2. Students' obligations</b>							
Laboratory sessions Project							
<b>1.3. Students' performance monitoring</b>							
Class attendance		Class participation		Seminar paper		Experimental work	
Written exam		Oral exam	0.4	Essay		Research	
Project	3.2	Continuous assessment		Class report		Practical work	0.4
Portfolio							

<b>General information</b>				
Course instructor	<b>Krunoslav Husak</b>			
Course title	<b>C# Programming</b>			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	2 <sup>nd</sup> , SS			
ECTS	5			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>						
<b>1.1. Expected learning outcomes</b>						
Upon completion of this course students will be able to:						
O1: recognise and use the syntax of the programming language C#,						
O2: use and apply the basic concepts of the object-oriented paradigm in C#,						
O3: use and apply advanced concepts of the object-oriented paradigm and collections in C#,						
O4: apply multithreading for the purpose of developing responsive C# computer programs,						
O5: develop and design programs with a graphical user interface,						
O6: develop and design programs for communicating with the external environment.						
<b>1.2. Students' obligations</b>						
Laboratory sessions						
Project						
<b>1.3. Students' performance monitoring</b>						
Class attendance		Class participation		Seminar paper		Experimental work
Written exam	1	Oral exam		Essay		Research
Project	3	Continuous assessment		Class report		Practical work
Portfolio						1

<b>General information</b>				
Course instructor	<b>Krešimir Markota</b>			
Course title	<b>Fundamentals of Programming in JAVA</b>			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	2 <sup>nd</sup> , SS			
ECTS	5			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>						
<b>1.1. Expected learning outcomes</b>						
Upon completion of this course students will be able to:						
O1: Design a solution to a given problem according to a given specification and implement it using objects and classes						
O2: Apply the inheritance principle in the programming language Java						
O3: Apply error management in the programming language Java						
O4: Apply interfaces and abstract classes in the programming language Java						
O5: Apply collections and generic structures in the programming language Java						
O6: Apply input and output streams in Java						
O7: Apply Swing classes in creating GUI applications						
O8: Design a multithreaded solution to a given problem according to the specifications						
<b>1.2. Students' obligations</b>						
Laboratory sessions						
Project						
<b>1.3. Students' performance monitoring</b>						
Class attendance		Class participation		Seminar paper		Experimental work
Written exam	1	Oral exam		Essay		Research
Project	4	Continuous assessment		Class report		Practical work
Portfolio						

<b>General information</b>				
Course instructor	Tomislav Adamović			
Course title	Web Programming 2			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	2 <sup>nd</sup> , SS			
ECTS	6			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>						
<b>1.1. Expected learning outcomes</b>						
Upon completion of this course students will be able to:						
O1: explain the concepts of backend programming and PHP settings on a server						
O2: use PHP programming elements for generating a HTML page						
O3: use PHP in object-oriented programming						
O4: use the MySQL base						
O5: integrate PHP and MySQL						
O6: explain the Node.js concept and create a web application in Node.js						
<b>1.2. Students' obligations</b>						
Laboratory sessions						
Project						
<b>1.3. Students' performance monitoring</b>						
Class attendance		Class participation		Seminar paper		Experimental work
Written exam	1.2	Oral exam		Essay		Research
Project	4.8	Continuous assessment		Class report		Practical work
Portfolio						

<b>General information</b>				
Course instructor	<b>Dario Vidić</b>			
Course title	<b>Operating Systems</b>			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	2 <sup>nd</sup> , SS			
ECTS	4			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	15	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>							
<b>1.1. Expected learning outcomes</b>							
<p>Upon completion of this course students will be able to:</p> <p>O1: interpret a simple computer model,  O2: analyse the interrupt system operation on a computer,  O3: explain the processes and inter-process communication,  O4: explain threads and inter-thread communication,  O5: explain memory management principles,  O6: interpret a file subsystem and analyse multiple disk redundant containers,  O7: analyse operating system security management techniques,  O8: analyse the main features of multiprocessor and embedded systems,  O9: develop computer programs and solutions that shall be accomplished using operating system functions.</p>							
<b>1.2. Students' obligations</b>							
Laboratory sessions							
<b>1.3. Students' performance monitoring</b>							
Class attendance	0.5	Class participation		Seminar paper		Experimental work	
Written exam	1.5	Oral exam	1	Essay		Research	
Project		Continuous assessment	0.5	Class report		Practical work	0.5
Portfolio							

<b>General information</b>				
Course instructor	Ivana Jurković			
Course title	Technical English 4			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	2 <sup>nd</sup> , SS			
ECTS	2			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	15	APS 30	LPS 0	0

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>							
<b>1.1. Expected learning outcomes</b>							
Upon completion of the course students will be able to use the English language to: O1: describe examples of advanced technologies and innovative solutions, O2: communicate in via e-mail, O3: draft a curriculum vitae and job application in standard international formats, O4: prepare and give a 10-minute presentation in English on one of the given topics in the technical area.							
<b>1.2. Students' obligations</b>							
2 preliminary exams or the written exam Oral exam							
<b>1.3. Students' performance monitoring</b>							
Class attendance		Class participation	0.5	Seminar paper		Experimental work	
Written exam	1	Oral exam		Essay		Research	
Project		Continuous assessment		Class report		Practical work	
Portfolio		Presentation	0.5				

## 5<sup>th</sup> semester (WS)

<b>General information</b>				
Course instructor	Krunoslav Husak			
Course title	.NET Programming			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	3 <sup>rd</sup> , WS			
ECTS	6			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>						
<b>1.1. Expected learning outcomes</b>						
Upon completion of this course students will be able to:						
O1: create a simple web application using Web Forms,						
O2: create a simple web application using Core Pages,						
O3: create a simple web application using Core MVC,						
O4: create a simple web application using Xamarin.						
<b>1.2. Students' obligations</b>						
Laboratory sessions						
Project						
<b>1.3. Students' performance monitoring</b>						
Class attendance		Class participation		Seminar paper		Experimental work
Written exam	1.2	Oral exam		Essay		Research
Project	4.8	Continuous assessment		Class report		Practical work
Portfolio						



<b>General information</b>				
Course instructor	<b>Krešimir Markota</b>			
Course title	<b>Mobile Application Development</b>			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	3 <sup>rd</sup> , WS			
ECTS	6			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>						
<b>1.1. Expected learning outcomes</b>						
<p>Upon completion of this course students will be able to:</p> <p>O1: describe platform architecture and use basic development components for the implementation of the development component for mobile platform solutions,</p> <p>O2: develop a basic application using basic elements for the development of a mobile application: dialogues, menus and settings,</p> <p>O3: develop and use databases and allow access to the application data,</p> <p>O4: use location, telephone, SMS, e-mail and web services.</p>						
<b>1.2. Students' obligations</b>						
Laboratory sessions Project						
<b>1.3. Students' performance monitoring</b>						
Class attendance		Class participation		Seminar paper		Experimental work
Written exam		Oral exam		Essay		Research
Project	6	Continuous assessment		Class report		Practical work
Portfolio						

<b>General information</b>				
Course instructor	<b>Krunoslav Husak</b>			
Course title	<b>Internet of Things</b>			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	3 <sup>rd</sup> , WS			
ECTS	5			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>						
<b>1.1. Expected learning outcomes</b>						
<p>Upon completion of this course students will be able to:</p> <p>O1: Explain the architecture and features of the Internet of Things,</p> <p>O2: Construct the client part of an IoT based solution using a microcontroller i suitable sensors and actuators,</p> <p>O3: Construct the server part of an IoT-based solution using your own of the implemented solution or by using services in the computer cloud,</p> <p>O4: Choose a client and server platform to implement a solution based on Internet of things. Design a complete solution based on the Internet of Things</p>						
<b>1.2. Students' obligations</b>						
Laboratory sessions Project						
<b>1.3. Students' performance monitoring</b>						
Class attendance		Class participation		Seminar paper		Experimental work
Written exam	1	Oral exam		Essay		Research
Project	3	Continuous assessment		Class report		Practical work
Portfolio						1

General information				
Course instructor	Ivan Sekovanić			
Course title	Application of Blockchain Technology			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Elective			
Year	3 <sup>rd</sup> , WS			
ECTS	4			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	15	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

1. COURSE DESCRIPTION							
<b>1.1. Expected learning outcomes</b>							
Upon completion of this course students will be able to:							
O1: describe network programming principles							
O2: describe capability and theory of blockchain technology							
O3: utilize functions and tools for interaction with blockchain							
O4: write smart contracts for blockchain network							
<b>1.2. Students' obligations</b>							
15 laboratory sessions							
<b>1.3. Students' performance monitoring</b>							
Class attendance		Class participation	0.14	Seminar paper		Experimental work	
Written exam	3.08	Oral exam		Essay		Research	
Project		Continuous assessment		Class report		Practical work	0.78
Portfolio							

<b>General information</b>				
Course instructor	Tomislav Adamović			
Course title	Field Practice 1			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	3 <sup>rd</sup> , WS			
ECTS	3			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	0	APS	LPS	10
	0	80		

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>						
<b>1.1. Expected learning outcomes</b>						
Upon completion of this course students will be able to:						
O1: analyse business processes within a company,						
O2: assess the usage proportion of individual technologies in a concrete IT project,						
O3: design their own application or a part of a concrete application, write the pseudocode and implement it.						
<b>1.2. Students' obligations</b>						
Do the field practice hours						
<b>1.3. Students' performance monitoring</b>						
Class attendance		Class participation		Seminar paper		Experimental work
Written exam		Oral exam		Essay		Research
Project		Continuous assessment		Class report		Practical work
Portfolio						3

## 6<sup>th</sup> semester (SS)

<b>General information</b>				
Course instructor	<b>Dario Vidić</b>			
Course title	<b>Computer and Data Security</b>			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	3 <sup>rd</sup> , SS			
ECTS	6			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	30	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>							
<b>1.1. Expected learning outcomes</b>							
<p>Upon completion of this course students will be able to:</p> <p>O1: describe the basic concepts of security and security threats to operating systems,</p> <p>O2: explain weaknesses of operating systems and software, and apply enhancements on a concrete operating system,</p> <p>O3: explain security weaknesses of databases and describe the methods of security risk reduction,</p> <p>O4: compare and use protocols that allow for the security or networks and mobile devices,</p> <p>O5: explain and apply basic cryptography methods while using computer systems.</p>							
<b>1.2. Students' obligations</b>							
Laboratory sessions							
<b>1.3. Students' performance monitoring</b>							
Class attendance		Class participation		Seminar paper	0.6	Experimental work	
Written exam	3	Oral exam		Essay		Research	
Project		Continuous assessment	0.6	Class report		Practical work	1.8
Portfolio							

<b>General information</b>				
Course instructor	Tomislav Adamović			
Course title	Field Practice 2			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Compulsory			
Year	3 <sup>rd</sup> , SS			
ECTS	5			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	0	APS	LPS	10
	0	0	140	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>						
<b>1.1. Expected learning outcomes</b>						
Upon completion of this course students will be able to: O1: analyse business processes within a company, O2: assess the usage proportion of individual technologies in a concrete IT project, O3: design their own application or a part of a concrete application, write the pseudocode and implement it.						
<b>1.2. Students' obligations</b>						
Do the field practice hours						
<b>1.3. Students' performance monitoring</b>						
Class attendance		Class participation		Seminar paper		Experimental work
Written exam		Oral exam		Essay		Research
Project		Continuous assessment		Class report		Practical work
Portfolio						5

<b>General information</b>				
Course instructor	<b>Ante Javor</b>			
Course title	<b>Computer and Robot Vision</b>			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Elective			
Year	3 <sup>rd</sup> , SS			
ECTS	4			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	15	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>						
<b>1.1. Expected learning outcomes</b>						
Upon completion of this course students will be able to:						
O1: differentiate between digital image management methods, formats and camera models						
O2: apply basic algorithms and operations for digital image processing						
O3: apply basic algorithms for image analysis from the field of computer vision						
O4: analyze software solutions based on image processing and computer vision algorithms						
O5: implement a software solution based on image processing and computer vision algorithms						
<b>1.2. Students' obligations</b>						
Project assignment						
Laboratory sessions						
<b>1.3. Students' performance monitoring</b>						
Class attendance		Class participation		Seminar paper		Experimental work
Written exam		Oral exam		Essay		Research
Project	4	Continuous assessment		Class report		Practical work
Portfolio						

<b>General information</b>				
Course instructor	<b>Krešimir Markota</b>			
Course title	<b>Introduction to Artificial Intelligence</b>			
Programme of study	Undergraduate professional programme of study in Computer Science			
Course status	Elective			
Year	3 <sup>rd</sup> , SS			
ECTS	4			
Type of classes (number of contact hours)	Lectures	Practical sessions*		Seminars
	30	APS	LPS	0
		0	15	

\*APS - auditory practical sessions LPS- laboratory practical sessions

<b>1. COURSE DESCRIPTION</b>						
<b>1.1. Expected learning outcomes</b>						
<p>Upon completion of this course students will be able to:</p> <p>O1: define the basic concepts of artificial intelligence</p> <p>O2: propose a way to solve a specific problem within the framework of machine learning</p> <p>O3: apply state space search algorithms and biologically inspired optimization algorithms to simpler problems</p> <p>O4: compare fuzzy logic with classical logic and give examples of fuzzy logic can apply</p> <p>O5: evaluate the applicability of individual artificial intelligence approaches to a given problem</p>						
<b>1.2. Students' obligations</b>						
Laboratory sessions						
<b>1.3. Students' performance monitoring</b>						
Class attendance		Class participation		Seminar paper		Experimental work
Written exam	4	Oral exam		Essay		Research
Project		Continuous assessment		Class report		Practical work
Portfolio						