ŠIBENIK UNIVERSITY OF APPLIED SCIENCES

PROFESSIONAL UNDERGRADUATE STUDY OF COMPUTING

Trg Andrije Hebranga 11
22000 Sibenik

Šibenik, July 2026

ŠIBENIK UNIVERSITY OF APPLIED SCIENCES

PROFESSIONAL UNDERGRADUATE STUDY OF COMPUTING

Trg Andrije Hebranga 11
22000 Sibenik

CURRICULUM

Academic year 2026/2027

Dean: PhD. Ljubo Runjić, college prof.

Head of department: PhD. Ivan Livaja, college prof.

Šibenik, July 2026.

BASIC INFORMATION ABOUT THE STUDY PROGRAMME

Name of the study programme

Name of the proposed study program: **Computing.**

Type of study programme

The proposed Computing study programme is conducted as **a professional study programme**.

Level of the study programme according to CQF (Croatian Qualifications Framework)

The proposed Computing study programme is conducted as **a professional undergraduate study programme**. According to the Law on the Croatian Qualifications Framework, the qualifications obtained at the end of professional undergraduate studies are at **the 6th level.**

Duration of studies in years

The duration of studies is **three (3) years, six (6) semesters**.

Number of ECTS points

The minimum number required to complete the studies is **180 ECTS credits**.

Place of performance of the study programme

The place of implementation of the proposed study programme is at the headquarters of the holder and executor of the study programme: **Šibenik University of Applied Sciences, Trg Andrije Hebranga 11, Šibenik**.

Scientific area and field of studies

The proposed study programme Computing is classified in **the scientific area of technical sciences, the scientific field of computing.**

Professional title that is acquired upon completion of studies

Upon completion of the proposed study, the professional title is acquired: **bachelor (baccalaureus/baccalaurea) computer engineer (bacc. eng. comp.)**

Beginning of the study programme

Start of the proposed study programme: **academic year 2025/2026.**

Study enrollment conditions

The study can be enrolled by a person who has completed the corresponding secondary school education program lasting at least four years and passed the state matura exam.

Exceptionally, a person who, before 2010, without passing the state matura, completed an appropriate secondary school education programme lasting at least four years in the Republic of Croatia, and a person who completed appropriate education for a total duration of 12 years abroad, may enroll in a study programme following the conditions prescribed by the general act of the higher education institution.

In the classification procedure, the candidate's success during high school education and success at the state matura exam is evaluated as follows:

- **for full-time students**: average of all grades from high school 50%, success at the state matura exam at least B level in Croatian language – 10%, Mathematics – 30%, English language 10%.
- **for part-time students**: average of all grades from high school 70%, success at the state matura exam at least B level in Croatian language – 10%, Mathematics – 10%, English language 10%.

A candidate who, before 2010, without passing the state matura, completed an appropriate high school education program lasting at least four years in the Republic of Croatia, and a candidate who completed an appropriate education for a total duration of 12 years abroad, will not earn the points that are acquired in the classification procedure based on the results of the state matura exam.

Conditions for enrollment in the next year of study

The student acquires the right to enroll in higher years of professional undergraduate studies in Computing following the provisions of the *Regulations on studying* which regulates the acquisition of the right to enroll in higher years of professional undergraduate studies.

Learning outcomes of the study programme

1. Design, implement and manage databases using various models and techniques to optimize performance and ensure data integrity and security
2. Design user interfaces in accordance with the latest trends in UI/UX design
3. Document software applications, maintain and update documentation in accordance with testing and development processes
4. Implement security protocols in IT systems, protect data privacy and manage risks
5. Develop and integrate software applications using programming languages and tools and integrate modules into existing or new programming environments
6. Communicate and cooperate in a team, solve project tasks and problems, and manage projects
7. Optimize and maintain software solutions
8. Develop ethical behavior and the need for continuous training, plan and implement personal and professional development
9. Plan and define the software architecture adapted to the needs of the project
10. Apply and configure network protocols and equipment, taking into account the stability and security of network communications
11. Test software solutions and report on testing
12. Manage user requests in terms of identifying, prioritizing and resolving them
13. Analyze, evaluate and apply scientific research in the IT sector
14. Organize and implement educational activities on the importance of IT security, ethics and best practices
15. Apply the skills and techniques of effective communication in native or foreign language when working with teams, clients and users
16. Use modern information and communication technology
17. Design systems and processes in the field of computing, using basic mathematical knowledge, computer concepts, and modern technologies

Number of study places

The optimal number of students who can enroll in the first semester of the professional undergraduate study in Computing is **a total of 50 students, of which 35 are full-time and 15 are part-time students**. The optimal number of students is determined with regard to the space, equipment, and teaching capacities of the Šibenik University of Applied Sciences.

Method of conducting studies

- ☒ **regular**
- ☒ **part-time**
- ☐ double major
- ☐ online – completely
- ☐ online – partially
- ☐ in English
- ☐ in another foreign language (specify which one) _____

All proposed courses, obligatory and elective, can be taught in English.

Completion of studies

The professional undergraduate study of Computing ends with having passed all exams, fulfilling all student and other obligations prescribed by the study programme, and preparing and defending the final thesis following the *Regulations on undergraduate and graduate thesis*

The student is issued a diploma and a supplementary study document confirming which exams he/she passed and with which grade, as well as other information necessary for understanding the acquired qualification.

DESCRIPTION OF THE STUDY PROGRAMME

Professional undergraduate study in Computing is structured on a semester basis and consists of 6 semesters or 3 years of study. Classes are held in the winter and summer semesters in accordance with *the academic calendar* which is determined by the decision of the University Council.

The study is structured in terms of content through compulsory and optional courses. In the compulsory courses, students acquire professional knowledge and skills related to the field of computing and knowledge and skills from courses in other scientific fields that are related in content and are necessary for the acquisition of professional competencies and carry 157 ECTS points in the programme (88% of the total ECTS points of the proposed study programme). The other 23 ECTS points refer to elective courses. In the second year of study, the student has the obligation to enroll in 2 elective courses (a total of 12 ECTS points), while in the third year of study, the student has the obligation to enroll in 2 elective courses (a total of 8 ECTS points). Elective courses are structured in such a way as to satisfy the special interests of students both in the fundamental field of computing and in other complementary scientific disciplines. The student must complete a professional practice (12 ECTS points in total) and write a final undergraduate thesis (10 ECTS points).

During studies, in addition to the obligations established by the *Statute of the Šibenik University of Applied Sciences* , the student also has obligations established *by the Regulations on studies* and *the Regulations on professional practice* .

The list of compulsory and elective courses with an indication of the load in ECTS points, structure, and form of teaching

CALENDAR FOR THE ACADEMIC YEAR 2026/2027.

The academic calendar for the academic year 2026/27 is available on the web

CALENDAR OF FINAL EXAMINATIONS FOR ACADEMIC YEAR 2026./2027.

The regular winter exam period lasts from January 26, 2026 to February 20, 2026.

The regular summer exam period lasts from June 8, 2026 to July 3, 2026.

The regular autumn exam period lasts from August 24, 2026 to September 18, 2026.

List of obligatory and elective courses with an indication of the load in ECTS points, structure, and form of teaching

LIST OF COURSES						
Year of study: 1						
Semester: 1						
COURSE	HOLDER	Lectures	Practice	Seminar	ECTS	STATUS
Mathematics 1	Beljo Ivana/Luca Olivari	2	2		6	M
Basics of programming	Hrga Milan	2	2		6	M
Introduction to computing	Hrga Milan	2	2		6	M
Digital logic and circuits	Marko Pavelić	2	2		6	M
Introduction to computer networks	Klarin Zvonimir	2	2		6	M
Year of study: 1						
Semester: 2						
COURSE	HOLDER	L	P	S	ECTS	STATUS
Mathematics 2	Beljo Ivana/Luca Olivari	2	2		6	M
Algorithms and data structures	Hrga Milan	2	2		6	M
Operating Systems	Klarin Zvonimir/Ivan Markic	2	2		6	M
Introduction to web technologies	Hrga Milan	2	2		6	M
English language for IT	Goran Crnica	2	1		3	M
Project management	Darko Jureković	2	1		3	M

LIST OF COURSES						
Year of study: 2						
Semester: 3						
COURSE	HOLDER	L	P	S	ECTS	STATUS
Probability and statistics	Ana Perišić	2	2		6	M
Object-oriented programming	Marko Pavelić	2	2		6	M
Database	Livaja Ivan	2	2		6	M
Overlay and routing in computer networks	Klarin Zvonimir	2	2		6	M
Design and analysis of information systems	Frane Urem	2	2		6	M
Year of study: 2						
Semester: 4						
COURSE	HOLDER	L	P	S	ECTS	STATUS
Design patterns in programming	Marko Pavelić	2	2		6	M
Development of web applications	Marko Pavelić	2	2		6	M
Software engineering		2	2		6	M
Cloud computing	Darko Jureković	2	2		6	E

Data warehouse	Livaja Ivan	2	2		6	E
Design of user interfaces	Marko Pavelić	2	2		6	E

Description – course holder, workload in ECTS points, content, planned learning outcomes, structure and form of teaching, method of checking acquired learning outcomes

General information		
Lead instructor	***Ivana Beljo, univ. spec. oec., dipl. ing. mat., senior lecturer*** ***Luca Olivari, mag. math., lecturer***	
Course name	**Mathematics 1**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**1**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**
Course description		
1.1. Course aims		
Introducing students to the fundamental concepts of functions of single variable, which they can apply in different courses. Adopting analytical skills, logical and critical thinking skills.		
1.2. Course enrolment requirements		
There are no course enrolment requirements.		
1.3. Intended course learning outcomes		
1. Calculate the limit of a given function 2. Differentiate single-variable functions 3. Examine the behavior of a single-variable function 4. Solve an integral using the appropriate method of integration 5. Apply methods of functional analysis to model and solve problems in various sciences		
1.4. Course content		
The course includes the acquisition of knowledge from the basics of functions of one variable using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule: 1. Introduction into the course and detailed plan. 2. Function, Basic terms, Elementary functions. (Learning outcome: 1) 3. Composition of the functions. (Learning outcome: 1) 4. Limit of a function. Continuity of a function. (Outcome: 1, 2) 5. Derivatives. Derivative of basic functions. (Outcome: 2, 3) 6. Derivatives of a composite function. (Outcome: 3) 7. Intervals of monotonicity and extrema of a function. (Outcome: 2, 3) 8. Asymptotes of a function. (Outcome: 2, 3) 9. Examination of the behavior of a function. Convexity and concavity of a function. (Outcome: 1, 2, 3) 10. Application of differential calculus. (Outcome: 3, 5)		

11. Indefinite integral. Methods of integration. (Outcome: 4)
12. Substitution method. (Outcome: 4)
13. Integration by parts. (Outcome: 4)
14. Definite integral. (Outcome: 4)
15. Application of the definite integral. (Outcome: 4, 5)

1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[x] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations

Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)

Class attendance		Participation in class		Seminar paper		Experimental work	
Written exam		Oral exam		Essay		Research	
Project		Continuous assessment of knowledge		Student report		Practical work	
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

	Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
Monitoring and evaluation of students' work	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
	4. Final exam (written + oral)	1 – 5	90	3	0 - 80
	In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**

Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2	Final exam
Description	Preparation for teaching units	Preparation/learning	Preparation/learning

	Understanding previous content Participation in solving tasks together	Theoretical knowledge Scoring and grading according to correct answers in the test.	Theoretical knowledge Scoring and grading according to correct answers in the test.
Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria

The final exam consists of: written / oral exam.

The course can be passed in three ways:

1. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold and at least 50% in each learning outcome.
2. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold, but without achieving the minimum of 50% in each learning outcome. In this case, it is possible to take the oral part of the final exam, where the learning outcomes for which the minimum threshold was not met will be examined.
3. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both the written and oral parts of the final exam, where it is necessary to achieve the minimum point threshold and at least 50% in each learning outcome. This method of passing also applies when a student requests a higher grade.

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the colloquium or final exam. (minimum -classes 50% + colloquium or final exam 50%)(minimum treshhold – classes 50% + colloquium or final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	***Number of copies***	***Number of students***
Marušić, S.: Matematika I, Zagreb, 2007.	10	50
Beljo, I., Olivari, L.: Matematika (available on the e-learning system)	50	50

1.10. Supplementary readings

Teaching material and exercises

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	***Milan Hrga, mag. ing. comp., lecturer***	
Course name	**Programming fundamentals**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**1**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description

1.1. Course aims

To teach students how to solve simple problems and implement computing algorithms by using contemporary structural and procedural programming languages

1.2. Course enrolment requirements

There are no course enrolment requirements.

1.3. Intended course learning outcomes

1. Implement the designed simple algorithm according to the guidelines using the basic elements in the selected programming language.
2. Design a simple problem solution by constructing functions in the selected programming language.
3. Implement a simple data-type in the selected programming language according to the described problem.
4. Create a solution using the data structure in the selected programming language
5. Apply complex mathematical and logical operations on the data container to store more data in the selected programming language.
6. Construct a program for reading and writing data to file in the selected programming language

1.4. Course content

The course includes the acquisition of knowledge from the basics of programming fundamentals of one variable using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule:

1. Introduction into the course and detailed plan.
2. Programming languages history, first C-program, variables (Learning outcome: 1)
3. Number systems, variable types (Learning outcome: 1)
4. Algorithm definition, expressions and operators (Learning outcome: 1)
5. Program flow control (Learning outcome: 1, 2)
6. Loops (Learning outcome: 1, 2, 3)
7. Arrays (Learning outcome: 2, 3)
8. Functions (Learning outcome: 2, 3, 4)
9. Pointers (Learning outcome: 3, 4, 5)
10. Pointers and functions (Learning outcome: 3, 4, 5)
11. Pointers and arrays, dynamic memory allocation, recursion (Learning outcome: 3, 4, 5)
12. Character arrays (strings), formatted input and output (Learning outcome: 3, 4, 5)
13. Formatted files and structures (Learning outcome: 4, 5, 6)
14. Unformatted files and unions (Learning outcome: 4, 5, 6)

15. Advanced programming techniques (function pointers, variable number of parameters, important algorithms overview) (Learning outcome: 4, 5, 6)		
1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[x] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other
1.6. Student obligations		
Regular and conscientious attendance of all forms of teaching.		

1.7. Monitoring student work (mark the appropriate boxes with an X)

Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	[x]
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

Monitoring and evaluation of students' work

Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
1. Attending and activities in class	1 – 5	90	3	0 - 20
2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
4. Final exam (written + oral)	1 – 5	90	3	0 - 80
In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**

Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2	Final exam
Description	Preparation for teaching units Understanding previous content Participation in solving tasks	Preparation/learning Theoretical knowledge	Preparation/learning Theoretical knowledge

	together	Scoring and grading according to correct answers in the test.	Scoring and grading according to correct answers in the test.
Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria
The final exam consists of: written / oral exam.

The course can be passed in three ways:

1. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold and at least 50% in each learning outcome.
2. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold, but without achieving the minimum of 50% in each learning outcome. In this case, it is possible to take the oral part of the final exam, where the learning outcomes for which the minimum threshold was not met will be examined.
3. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both the written and oral parts of the final exam, where it is necessary to achieve the minimum point threshold and at least 50% in each learning outcome. This method of passing also applies when a student requests a higher grade.

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	*Number of copies*	*Number of students*
J.Šribar, B. Motik: Demistificirani C++, Zagreb, 2014.	10	50
A.Lovrenčić, M. Konecki: Programiranje u 14 lekcija ,Varaždin, 2017.	10	10

1.10. Supplementary readings

Frank Friedman, Elliot Koffman: Problem Solving, Abstraction and Design Using C++, Pierson/Addison Wesley, 5th ed.

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	***Milan Hrga, mag. ing. comp., lecturer***	
Course name	**Introduction to computing**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**1**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description

1.1. Course aims

To introduce students to the key concepts of computer science and to equip them for further learning and a professional career in the field of computing. Through this course, students will become familiar with various aspects of computer science, ranging from the organization and storage of data in computer systems to the fundamentals of computer architecture, programming language development, databases, and the principles of artificial intelligence.

1.2. Course enrolment requirements

There are no course enrolment requirements.

1.3. Intended course learning outcomes

1. Describe number systems and data storage methods.
2. Identify methods of data compression and encoding in various media.
3. Understand computer architecture, machine language, and programming fundamentals.
4. Explain the key components and functionalities of operating systems.
5. Apply algorithmic thinking and object-oriented approaches to problem solving.
6. Describe basic concepts of software engineering and development methodologies.
7. Recognize fundamental structures and functions of database management.
8. Describe the application of artificial intelligence principles in software development.

1.4. Course content

The course includes the acquisition of knowledge from the introduction to computing using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule:

1. Introduction to the course and detailed teaching plan.
2. Introduction to computer science: representation of information as bit patterns, binary and hexadecimal number systems (Outcome: 1).
3. Organization and storage of data in computer systems: main computer memory, mass storage (Outcome: 1).
4. Methods of storing integers and floating-point numbers in computer systems (Outcome: 2).
5. Data compression techniques: introduction to data compression, image compression, audio and video compression (Outcome: 2).
6. Fundamentals of computer architecture and machine language (Outcome: 3).
7. Program execution and basic arithmetic-logical operations (Outcome: 3).
8. Communication with peripheral devices and data manipulation in programming (Outcome: 3).
9. Fundamentals of operating systems and their role in coordinating computer activities (Outcome: 4).

10. Algorithms and their applications (Outcome: 5).
11. Development of programming languages and basic programming concepts (Outcome: 5).
12. Fundamentals of data structures and object-oriented programming (Outcome: 6).
13. Basics of software engineering and development methodologies (Outcome: 6).
14. Fundamental concepts and importance of database systems (Outcome: 7).
15. Introduction to artificial intelligence and its applications (Outcome: 8).

1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[x] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations

Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)

Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

	Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
Monitoring and evaluation of students' work	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
	4. Final exam (written + oral)	1 – 5	90	3	0 - 80
	In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**

Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2	Final exam
Description	Preparation for teaching units	Preparation/learning	Preparation/learning

	Understanding previous content Participation in solving tasks together	Theoretical knowledge Scoring and grading according to correct answers in the test.	Theoretical knowledge Scoring and grading according to correct answers in the test.
Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria
The final exam consists of: written / oral exam.

The course can be passed in three ways:

1. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold and at least 50% in each learning outcome.
2. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold, but without achieving the minimum of 50% in each learning outcome. In this case, it is possible to take the oral part of the final exam, where the learning outcomes for which the minimum threshold was not met will be examined.
3. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both the written and oral parts of the final exam, where it is necessary to achieve the minimum point threshold and at least 50% in each learning outcome. This method of passing also applies when a student requests a higher grade.

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	*Number of copies*	*Number of students*
Brookshear G. : Computer Science an Overview, 11th ed, Addison Wesley I.Englander: The Architecture of Computer Hardware, Systems Software & Networking, 4th ed., John Wiley & Sons, 2010	10	50
K.C.Laudon, J.P.Laudon: Essentials of MIS, 14th edition, Pearson Education, 2020.	10	50

1.10. Supplementary readings

R.M.Stair, G.W.Reynolds: Fundamentals of Information Systems, Cengage Learning, 2018.

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	***Marko Pavelić, mag. ing. inf. et comm. techn., lecturer***	
Course name	**Digital logic and circuits**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**1**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description

1.1. Course aims

The goal of the course is to familiarize students with the fundamental principles of building digital systems, starting with the elementary procedures of their analysis and design. By acquiring and using knowledge from the subject, students will be able to design basic logic circuits

1.2. Course enrolment requirements

There are no course enrolment requirements.

1.3. Intended course learning outcomes

1. Apply the axioms and theorems of Boolean algebra to logical functions
2. Minimize and realize complex logic functions using basic logic circuits.
3. Choose the appropriate level of standard combinational and sequential components in order to design simpler digital circuits
4. Apply the circuit description language VHDL in the modeling and simulation of simpler combinational and sequential digital circuits
5. Identify and classify standard and programmable combinational and sequential digital circuits
6. Analyze simpler combinational and sequential digital circuits

1.4. Course content

The course includes the acquisition of knowledge from the digital logic and circuits using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration and simulation methods, collaborative learning according to the class schedule:

1. Introduction into the course and detailed plan.
2. Analog quantities and their digital display (Learning outcome: 1)
3. Binary system, binary arithmetic, basic operations: addition, subtraction, multiplication, Number systems and codes (Learning outcome: 1, 2)
4. Binary codes and coding. (Learning outcome: 1, 2)
5. Error detection and correction codes (Learning outcome: 1, 2)
6. Minimization of Boolean functions: algebraic, with K-tables. (Learning outcome: 1, 2, 3)
7. Basic bistable, Bistables with improved control and types, Bistable triggering and dynamic parameters (Learning outcome: 2, 3, 4)
8. Standard combination modules: decoders, demultiplexers, multiplexers (Learning outcome: 3, 4)
9. Standard combination modules: print memories (ROM), priority encoders, comparators (Learning outcome: 3, 4)
10. Describing combination modules in VHDL language, Realization of Boolean functions with standard combination modules (Learning outcome: 3, 4, 5)

11. Arithmetic circuits: adders, circuits for separate transmission generation, subtractors, multipliers, shift circuits (Learning outcome: 4, 5, 6)
12. Sequential circuits. machines with a finite number of states. (Learning outcome: 4, 5, 6)
13. Moore's and Mealy's automaton model. state change diagrams and state change tables (Learning outcome: 4, 5, 6)
14. Basic logic circuits: AND, OR, NOT, NOR, NOR and Exclusive-OR, Implementation of Boolean functions. integrated logic circuits. electrical characteristics (Learning outcome: 4, 5, 6)
15. Programmable modules: PLD and FPGA, Realization of Boolean functions with programmable modules (Learning outcome: 4, 5, 6)

1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [x] field work	[x] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations

Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)

Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	[x]
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

	Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
Monitoring and evaluation of students' work	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
	4. Final exam (written + oral)	1 – 5	90	3	0 - 80
	In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**
	Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2		Final exam

Description	Preparation for teaching units Understanding previous content Participation in solving tasks together	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.
Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria

The final exam consists of: written / oral exam.

The course can be passed in three ways:

1. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold and at least 50% in each learning outcome.
2. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold, but without achieving the minimum of 50% in each learning outcome. In this case, it is possible to take the oral part of the final exam, where the learning outcomes for which the minimum threshold was not met will be examined.
3. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both the written and oral parts of the final exam, where it is necessary to achieve the minimum point threshold and at least 50% in each learning outcome. This method of passing also applies when a student requests a higher grade.

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	*Number of copies*	*Number of students*
M. Čupić: Digitalna elektronika i digitalna logika, Zagreb, 2006.	10	50
U. Peruško, V. Glavinić: Digitalni sustavi, Zagreb, 2005.	10	50

1.10. Supplementary readings

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	***Goran Crnica, prof., senior lecturer***	
Course name	**English for IT**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**1**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**3**
	Number of hours (L+P+S)	**30 + 15 + 0**

Course description

1.1. Course aims

The goal of the course is the acquisition and development of business English language skills with an emphasis on the application of professional IT vocabulary.

1.2. Course enrolment requirements

There are no course enrolment requirements.

1.3. Intended course learning outcomes

1. Define keywords from the field of English for IT
2. Apply grammatical structures and vocabulary from the field of English for IT
3. Independently present content from the area of English language for IT
4. Analyze moderately difficult professional texts
5. Critically argue your views on the topic of English for IT
6. Use part of the general language competencies at level B1 of the Common European Language Framework (CEF) to create new ideas

1.4. Course content

The course includes the acquisition of knowledge of the English language in the field of IT using the following teaching methods: lectures, presentations, work on the text, exercises, team work, independent reading of the proposed literature, holding discussions, collaborative learning according to the class schedule:

1. Introduction to the course and detailed lesson plan
2. Companies; Career skills: Talking about your job and hierarchy (Learning outcome: 1)
3. Present tenses; Self-evaluation test (present tenses) (Learning outcome: 1, 2)
4. Leadership; Career skills: Getting things done (Learning outcome: 1, 2, 3)
5. Past tenses; Self-evaluation test (past tenses) (Learning outcome: 1, 2, 3, 4)
6. Strategy; Giving; Career skills: Giving short presentations (Learning outcome: 2, 3, 4)
7. Future tenses; Self-evaluation test (future forms) (Learning outcome: 2, 3, 4)
8. Review 1 (Unit 1-3 language and vocabulary); Discussion on review 1 (Learning outcome: 1, 2, 3, 4)
9. Pay; Career skills: Evaluating performance (Learning outcome: 4, 5)
10. Present perfect and past simple; Self-evaluation test (present perfect and past simple) (Learning outcome: 4, 5, 6)
11. Development; Career skills: Showing cause and effect (Learning outcome: 4, 5)
12. Modal verbs and modal verbs of likelihood; Self-evaluation test (modal verbs and modal verbs of likelihood) (Learning outcome: 4, 5, 6)
13. Marketing; Career skills: Considering alternatives (Learning outcome: 4, 5, 6)

14. Comparatives and superlatives; Self-evaluation test (comparatives and superlatives) (Learning outcome: 4, 5, 6) 15. Review 2 (Unit 4-6, language and vocabulary); Final discussion (Learning outcome: 4, 5, 6)

1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[x] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations
Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)							
Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge		Student report		Practical work	
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

	Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
Monitoring and evaluation of students' work	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
	4. Final exam (written + oral)	1 – 5	90	3	0 - 80
	In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**

Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2	Final exam
Description	Preparation for teaching units Understanding previous content Participation in	Preparation/learning Theoretical knowledge	Preparation/learning Theoretical knowledge

	solving tasks together	Scoring and grading according to correct answers in the test.	Scoring and grading according to correct answers in the test.
Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria

The final exam consists of: written / oral exam.

The course can be passed in three ways:

1. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold and at least 50% in each learning outcome.
2. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold, but without achieving the minimum of 50% in each learning outcome. In this case, it is possible to take the oral part of the final exam, where the learning outcomes for which the minimum threshold was not met will be examined.
3. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both the written and oral parts of the final exam, where it is necessary to achieve the minimum point threshold and at least 50% in each learning outcome. This method of passing also applies when a student requests a higher grade.

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	***Number of copies***	***Number of students***
Trappe, T., & Tullis, G. (2005). Intelligent Business Coursebook: Intermediate Business English. Pearson Longman	10	50

1.10. Supplementary readings

Krasnenko, O. M., Kucheriava, L. V., & Rebenko, M. Yu. (2019). Professional English in IT: Textbook. NUBiP Ukraine.

https://learnenglish.britishcouncil.org/business-english

https://breakingnewsenglish.com/technology.html

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	*Ivana Beljo, univ. spec. oec., dipl. ing. mat., senior lecturer* *Luca Olivari, mag. math., lecturer*	
Course name	**Mathematics 2**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**1**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description

1.1. Course aims

The goal is to introduce students to the basic concepts of linear algebra and discrete mathematics, which can later be applied in other courses, as well as to develop skills in analytical and logical thinking and reasoning.

1.2. Course enrolment requirements

There are no requirements for enrolling in the course, but taking the course is only possible after successfully passing the course Mathematics 1.

1.3. Intended course learning outcomes

1. Perform basic computational operations with matrices and vectors.
2. Recommend a method for solving systems of linear equations and solve the system.
3. Perform basic set operations and solve problems in logic.
4. Define basic concepts and solve problems in combinatorics.
5. Solve a linear problem using recursive techniques.
6. Apply basic concepts of graph theory to practical problems.

1.4. Course content

The course includes the acquisition of knowledge from the basics of derivatives and integrals using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule:

1. Introduction into the course and detailed plan.
2. Matrices and determinants. (Outcome: 1, 2)
3. Inverse matrix. (Outcome: 1, 2)
4. Systems of linear equations. (Outcome: 1, 2)
5. Matrix operations and applications. (Outcome: 1, 2)
6. Vectors. (Outcome: 1, 2)
7. Scalar, vector, and mixed product of vectors. (Outcome: 1, 2)
8. Mathematical logic. (Outcome: 3)
9. Sets. Logical sets. (Outcome: 3)
10. Fundamentals of combinatorics. (Outcome: 4)
11. Variations, permutations, combinations without and with repetition. (Outcome: 4)
12. Recursion and induction. (Outcome: 5)
13. Fundamentals of graph theory. (Outcome: 6)
14. Optimization algorithms. Shortest path problem. Chinese postman problem. Traveling salesman problem. (Outcome: 6)

15. Optimization algorithms. Minimum spanning tree. Critical path problem. (Outcome: 6)		
1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[x] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other
1.6. Student obligations		
Regular and conscientious attendance of all forms of teaching.		

1.7. Monitoring student work (mark the appropriate boxes with an X)

Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

	Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
Monitoring and evaluation of students' work	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
	4. Final exam (written + oral)	1 – 5	90	3	0 - 80
	In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**

Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2	Final exam
Description	Preparation for teaching units Understanding previous content Participation in solving tasks	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.

	together		
Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria
The final exam consists of: written / oral exam.

The course can be passed in three ways:

1. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold and at least 50% in each learning outcome.
2. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold, but without achieving the minimum of 50% in each learning outcome. In this case, it is possible to take the oral part of the final exam, where the learning outcomes for which the minimum threshold was not met will be examined.
3. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both the written and oral parts of the final exam, where it is necessary to achieve the minimum point threshold and at least 50% in each learning outcome. This method of passing also applies when a student requests a higher grade.

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	*Number of copies*	*Number of students*
Marušić, S.: Matematika I, Zagreb, 2007.	10	50
Beljo, I., Olivari, L.: Matematika (available on the e-learning system)	50	50

1.10. Supplementary readings

Teaching material and exercises

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	***Milan Hrga, mag. ing. comp., lecturer***	
Course name	**Algorithms and Data Structures**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**1**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description

1.1. Course aims

To transfer to students the basic knowledge related to standard data structures (lists, stacks, queues, binary trees) and algorithms used for work with data structures in C, C++, C# and Java.

1.2. Course enrolment requirements

There are no course enrolment requirements.

1.3. Intended course learning outcomes

1. Solve a problem using hierarchical data structures (tree, heap, priority queue) and algorithms.
2. Solve a problem using tree-based maps and algorithms.
3. Solve a problem using addressing techniques and argue their time complexity.
4. Explain sorting algorithms and solve problems based on sorting algorithms
5. Explain search algorithms and solve problems based on search algorithms
6. Determine and argue the time complexity a priori and a posteriori for a given algorithm implemented in a programming language.
7. Solve a problem using linear data structures (list, linked list, stack, queue) and algorithms.

1.4. Course content

The course includes the acquisition of knowledge of algorithms and data structures using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule:

1. Introduction into the course and detailed plan.
2. Structured and unstructured data. Definitions of algorithms, history, conventions and writing algorithms (Learning outcome: 1)
3. Binary Tree (Learning outcome: 1)
4. Algorithm complexity (Learning outcome: 1, 2)
5. Sort algorithms. Simple sort algorithms (Learning outcome: 1, 2, 3)
6. Application of recursion in algorithms (Learning outcome: 1, 2, 3)
7. Simple data structure. Static and dynamic data structures (Learning outcome: 1, 2, 3, 4)
8. Single and double linked lists (Learning outcome: 1, 2, 3, 4)
9. Data structure (Learning outcome: 1, 2, 3, 4)
10. Complex Data Structures (Learning outcome: 5, 6)
11. The heap and the priority queue as a binary tree (Learning outcome: 5, 6, 7)
12. Fast sorting algorithms (Learning outcome: 5, 6, 7)
13. Search algorithms. Sequential search, binary search and BST (Learning outcome: 5, 6, 7)
14. Techniques of direct addressing and indexing (Learning outcome: 6, 7)

15. Hashing addressing. Applying Hash functions in the encryption of data (Learning outcome: 6, 7)		
1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[ ] independent work [ ] multimedia and network [ ] laboratory [x] supervision [ ] other
1.6. Student obligations		
Regular and conscientious attendance of all forms of teaching.		

1.7. Monitoring student work (mark the appropriate boxes with an X)

Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	[x]
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

Monitoring and evaluation of students' work	**Activities**	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
	4. Final exam (written + oral)	1 – 5	90	3	0 - 80
	In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**

Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2	Final exam
Description	Preparation for teaching units Understanding previous content Participation in solving tasks	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.

	together		
Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria
The final exam consists of: written / oral exam.

The course can be passed in three ways:

1. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold and at least 50% in each learning outcome.
2. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold, but without achieving the minimum of 50% in each learning outcome. In this case, it is possible to take the oral part of the final exam, where the learning outcomes for which the minimum threshold was not met will be examined.
3. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both the written and oral parts of the final exam, where it is necessary to achieve the minimum point threshold and at least 50% in each learning outcome. This method of passing also applies when a student requests a higher grade.

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	***Number of copies***	***Number of students***
R. Manger: Strukture podataka i algoritmi, Zagreb, 2015.	10	50

1.10. Supplementary readings

Robert L. Kruse, Alexander J. Ryba: Data Structures and Program Design in C++, Prentice-Hall International, 2000.

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	*Zvonimir Klarin, mag .ing. comp., lecturer*	
Course name	**Introduction to Computer Networking**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**1**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description

1.1. Course aims

- Understanding the architecture of a computer network
- Mastering the terminology and technologies of computer networks
- Acquiring basic knowledge about transmission media, network devices, and standards
- Using reference models to explain network communication
- Applying tools for network traffic analysis
- Designing and addressing smaller networks
- Implementing smaller networks in a network simulator
- Understanding the principles and application of structured cabling in network infrastructures

1.2. Course enrolment requirements

There are no course enrolment requirements.

1.3. Intended course learning outcomes

1. Define the role of computer networks and network technologies in the context of modern business.
2. Define the technologies used in computer networks with regard to their role in communication.
3. Use OSI and TCP/IP reference models to explain communication in a computer network.
4. Define the steps in the process of establishing communication between two computers.
5. Analyze computer communication in a computer network using software tools.
6. Develop skills for solving addressing problems in simple networks.

1.4. Course content

The course includes the acquisition of knowledge of a computer network using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule:

1. Introduction into the course and detailed plan.
2. Overview of computer networks: history, topologies, network components, and trends (Learning outcome: 1)
3. Basics of data transmission and network protocols, overview of standards, reference models, and addressing (Learning outcome: 1, 2)
4. Overview of OSI layers, Internet architecture, network devices (Learning outcome: 2, 3)
5. Physical layer of the OSI model: standards, media, structured cabling (Learning outcome: 3)
6. Data link layer of the OSI model: data sublayers, Ethernet technologies (Learning outcome: 3)
7. Data layer of the OSI model: Ethernet technologies (Outcome: 3)
8. Network layer of the OSI model: IP encapsulation, IP packet headers, routing (Outcome: 3)
9. IPv4 addressing: IPv4 address, subnet mask, determining the network address, unicast, broadcast, and multicast addresses (Outcome: 4, 5, 6)

10. IPv4 addressing: private and public IPv4 addresses, class-based addressing, IPv4 subnetting (Outcome: 4, 5, 6)
11. IPv6 addressing: types of IPv6 addresses, IPv6 subnetting (Outcome: 4, 5, 6)
12. Address resolution and ICMP protocols (Outcome: 4, 5, 6)
13. Transport layer of the OSI model: TCP and UDP protocols, ports, flow control, and congestion control (Outcome: 4, 5, 6)
14. Application layer of the OSI model: TCP/IP application layer protocols (Outcome: 4, 5, 6)

1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[ ] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations

Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)

Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	[x]
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

	Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
Monitoring and evaluation of students' work	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
	4. Final exam (written + oral)	1 – 5	90	3	0 - 80
	In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**
	Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2		Final exam

Description	Preparation for teaching units Understanding previous content Participation in solving tasks together	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.
Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria

The final exam consists of: written / oral exam.

The course can be passed in three ways:

1. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold and at least 50% in each learning outcome.
2. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold, but without achieving the minimum of 50% in each learning outcome. In this case, it is possible to take the oral part of the final exam, where the learning outcomes for which the minimum threshold was not met will be examined.
3. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both the written and oral parts of the final exam, where it is necessary to achieve the minimum point threshold and at least 50% in each learning outcome. This method of passing also applies when a student requests a higher grade.

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	***Number of copies***	***Number of students***
Cisco Networking Academy (2020) Introduction to Networks Companion Guide (CCNAv7), Pearson, 1st Edition	10	50

1.10. Supplementary readings

A. Bažant i dr.: Osnove arhitekture mreža, Element, Zagreb, 2014.

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	*Milan Hrga, mag. ing. comp., lecturer*	
Course name	**Introduction to Web Technologies**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**1**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description

1.1. Course aims

To introduce students to practical and theoretical aspects of using HTML and CSS, the basic markup languages for making the Web based content and layout. Students will learn how to design and code Web pages. The process of building a modern Web site will be presented (from buying a domain name to Web site finalization).

1.2. Course enrolment requirements

There are no course enrolment requirements.

1.3. Intended course learning outcomes

1. Create the website structure according to the detailed specification.
2. Stylize the layout of the website.
3. Structure the layout of the website using client scripting.
4. With standard client scripting libraries enhance the website structure.
5. Analyze user needs for a content management system in accordance with the assigned project task.
6. Propose a content management system solution that meets the analyzed user criterium.
7. Implement a solution based on a content management system that meets the analyzed user criterium.

1.4. Course content

The course includes the acquisition of knowledge of web technologies using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule:

1. Introduction into the course and detailed plan.
2. Basics of web pages building. Website design technologies (Learning outcome: 1)
3. Marketing Aspects in Website Design (Learning outcome: 1, 2)
4. Basic syntax. Absolute and relative links (Learning outcome: 1, 2, 3)
5. Introduction to HTML5 (Learning outcome: 1, 2, 3, 4)
6. Introduction to CSS3 (Learning outcome: 1, 2, 3, 4)
7. Position of a code in CSS and the relation to HTML. (Learning outcome: 1, 2, 3, 4)
8. Website layout and basic design (Learning outcome: 5, 6, 7)
9. Creating horizontal and vertical menus (Learning outcome: 5, 6, 7)
10. Introduction to JavaScript (Learning outcome: 5, 6, 7)
11. Responsive Website Design Technology (RWD) (Learning outcome: 5, 6, 7)
12. Image navigation and image manipulation (Learning outcome: 5, 6, 7)
13. Multimedia content (Learning outcome: 5, 6, 7)
14. Web browser development tools (Learning outcome: 5, 6, 7)
15. Future-learning technologies (Learning outcome: 5, 6, 7)

1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[x] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations
Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)							
Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	[x]
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

	Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
Monitoring and evaluation of students' work	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
	4. Final exam (written + oral)	1 – 5	90	3	0 - 80
	In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**

	Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2	Final exam
	Description	Preparation for teaching units Understanding previous content Participation in solving tasks together	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.

Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classe

Final exam - evaluation criteria
The final exam consists of: written / oral exam.

The course can be passed in three ways:

1. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold and at least 50% in each learning outcome.
2. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold, but without achieving the minimum of 50% in each learning outcome. In this case, it is possible to take the oral part of the final exam, where the learning outcomes for which the minimum threshold was not met will be examined.
3. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both the written and oral parts of the final exam, where it is necessary to achieve the minimum point threshold and at least 50% in each learning outcome. This method of passing also applies when a student requests a higher grade.

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	***Number of copies***	***Number of students***
Poglavlja W3Schoolsa s e-tutorijalima o HTML-u, XHTML-u i CSS-u (http://www.w3schools.com/)	50	50
Ben Frain: Responsive Web Design with HTML5 and CSS, 2020	10	50

1.10. Supplementary readings

M. MacDonald, HTML5 - The Missing Manual, O'Reilly, 2014.

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	*Darko Jureković, dipl. ing., lecturer*	
Course name	**Project Management**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**1**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**3**
	Number of hours (L+P+S)	**30 + 15 + 0**

Course description

1.1. Course aims

This course aims to develop students' skills in managing project portfolios and analyzing risks. Throughout the course, students will learn how to create a project portfolio structure, identify and analyze project risks using various methods, and design and conduct qualitative and quantitative risk analyses for complex and simple projects. Additionally, the course will cover the planning of project activities using the PERT method and ICT tools and establish an effective process for reporting on project progress.

1.2. Course enrolment requirements

There are no course enrolment requirements.

1.3. Intended course learning outcomes

1. Create a structure for a project portfolio.
2. Identify project risks using at least one method.
3. Design and value qualitative risk and opportunity analysis and recommend a response plan for a complex project.
4. Design and establish quantitative risk analysis for a simple project.
5. Plan project activities using the PERT method with ICT tools.
6. Manage, design and establish a process for reporting project progress using ICT tools.

1.4. Course content

The course includes the acquisition of knowledge in managing project using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule:

1. Introduction into the course and detailed plan.
2. Configuration of ICT tools for project management: Selection and setting up project management software. (Learning outcome: 1)
3. Designing project portfolios: Managing multiple projects and optimizing resources. (Learning outcome: 1)
4. Methods of risk identification in projects: Learning to use specific methods for identifying potential risks. (Learning outcome: 2)
5. Qualitative analysis of risks and opportunities: Techniques and tools for assessing risks and opportunities within projects. (Learning outcome: 2, 3)
6. Quantitative risk analysis: Application of statistical methods and tools for analysis and quantification of risks. (Learning outcome: 2, 4)
7. Planning project activities with the PERT method: Developing project timelines using PERT diagrams. (Learning outcome: 5)

8. The process of reporting on project progress: Creating systems for monitoring and reporting project progress. (Learning outcome: 6)
9. Decision-making in response to risks: Developing strategies for managing identified risks. (Learning outcome: 2, 3)
10. Project portfolio management: Strategies for maximizing value and alignment with business objectives. (Learning outcome: 6)
11. Tools and techniques for managing project time. Communication plans in project management (Learning outcome: 5, 6)
12. Change management in projects: Techniques for managing changes during the project life cycle. (Learning outcome: 6)
13. Assessment and management of project quality: Devising plans and checklists to ensure quality. (Learning outcome: 6)
14. Managing costs and budget of a project: Planning and monitoring financial aspects of a project. (Learning outcome: 6)
15. Managing human resources in projects: Developing organizational, leadership, and team development plans. (Learning outcome: 6)

1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[x] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations

Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)

Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

	Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
Monitoring and evaluation of students' work	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous	**1 – 5**	**180**	**6**	**0 – 100**

teaching (1+2+3)				
4. Final exam (written + oral)	1 – 5	90	3	0 - 80
In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**

Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2	Final exam
Description	Preparation for teaching units Understanding previous content Participation in solving tasks together	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.
Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria
The final exam consists of: written / oral exam.

The course can be passed in three ways:

1. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold and at least 50% in each learning outcome.
2. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold, but without achieving the minimum of 50% in each learning outcome. In this case, it is possible to take the oral part of the final exam, where the learning outcomes for which the minimum threshold was not met will be examined.
3. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both the written and oral parts of the final exam, where it is necessary to achieve the minimum point threshold and at least 50% in each learning outcome. This method of passing also applies when a student requests a higher grade.

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	***Number of copies***	***Number of students***
D. Jurekovic, 2017., Recenzirani nastavni materijali iz predmeta, dostupno na sustavu za e-učenje	50	50

1.10. Supplementary readings

Project Management Institute (2017), “A Guide to the Project Management Body of Knowledge (PMBOK® Guide)”, 6th Edition, New Jersey, USA: Project Management Institute, ISBN: 9781628251845.

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	***Zvonimir Klarin, mag .ing. comp., lecturer/Ivan Markic***	
Course name	**Operating Systems**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**1**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description

1.1. Course aims

Understanding the basic principles and concepts of operating systems
Studying process and thread management
Analyzing synchronization mechanisms and interprocess communication
Understanding memory management and data storage
Familiarizing with the concepts of virtualization, cloud, and IoT operating systems
Studying security aspects of operating systems
Developing skills in analysis and problem solving

1.2. Course enrolment requirements

There are no course enrolment requirements.

1.3. Intended course learning outcomes

Describe the key components and functions of operating systems.
Explain the operation of the interrupt system in a simple computer model.
Explain the concept of a process in a computer.
Explain the concept of threads in a computer and how the processor allocates time to them.
Master techniques and strategies for memory management in operating systems.
Analyze methods for managing input/output and data storage.
Analyze the operation of operating systems in different scenarios, including virtualization and cloud technologies.
Critically assess the efficiency and security of operating systems with respect to performance requirements and security threats.

1.4. Course content

The course includes the acquisition of knowledge in operating systems using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule:

1. Introduction into the course and detailed plan
2. Introduction to operating systems (Learning outcome: 1)
3. Evolution of operating systems (Learning outcome: 1)
4. Basics of computer hardware (Learning outcome: 1)
5. Processes (Learning outcome: 2)
6. Threads (Learning outcome: 3)
7. Synchronization (Learning outcome: 2, 3)
8. Inter-process communication (Learning outcome: 2, 3)
9. Deadlocks(Learning outcome: 2, 3)

10. Processor scheduling (Learning outcome: 3, 4)
11. Memory management (Learning outcome: 5)
12. Input/Output and data storage (Learning outcome: 5, 6)
13. Virtualization (Learning outcome: 5, 6)
14. Cloud and IoT operating systems (Learning outcome: 5, 6)
15. Security of operating systems (Learning outcome: 5, 6)

1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[x] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations

Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)

Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	[x]
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

	Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
Monitoring and evaluation of students' work	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
	4. Final exam (written + oral)	1 – 5	90	3	0 - 80
	In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**

Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2	Final exam
Description	Preparation for teaching units	Preparation/learning	Preparation/learning

	Understanding previous content Participation in solving tasks together	Theoretical knowledge Scoring and grading according to correct answers in the test.	Theoretical knowledge Scoring and grading according to correct answers in the test.
Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria

The final exam consists of: written / oral exam.

The course can be passed in three ways:

1. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold and at least 50% in each learning outcome.
2. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both midterm colloquia by achieving the minimum point threshold, but without achieving the minimum of 50% in each learning outcome. In this case, it is possible to take the oral part of the final exam, where the learning outcomes for which the minimum threshold was not met will be examined.
3. Regular attendance and active participation in classes, as well as achieving the minimum point threshold for continuous assessment. Passing both the written and oral parts of the final exam, where it is necessary to achieve the minimum point threshold and at least 50% in each learning outcome. This method of passing also applies when a student requests a higher grade.

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	***Number of copies***	***Number of students***
William Stallings, Operating Systems: Internals and Design Principles, Ninth Edition, Global Edition, 2018	10	50

1.10. Supplementary readings

Tanenbaum, A. (2016) Modern Operating Systems, Pearson

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	***PhD Ana Perišić, college professor***	
Course name	**Probability and statistics**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**2**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description

1.1. Course aims

Acquiring knowledge in probability theory and statistics, mastering skills necessary for independent statistical analysis, and acquiring skills in the use of statistical programming tools.

1.2. Course enrolment requirements

There are no course enrolment requirements.

1.3. Intended course learning outcomes

1. Perform data grouping and calculate basic statistical quantities over grouped and ungrouped data.
2. Determine the probability distribution of discrete random variables and calculate probabilities.
3. Determine the probability distribution function of a continuous random variable and calculate probabilities.
4. Calculate the probability of simple and complex events over finite and infinite outcome space.
5. Calculate the probability of an event using the total probability formula and the Bayes formula.
6. Estimate the parameters, calculate the standard error. Construct a confidence interval.
7. Conduct a statistical test.
8. Determine and interpret the parameters of the linear regression model between two quantities by the least squares method.

1.4. Course content

The course includes the acquisition of knowledge in probability and statistics using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule:

1. Introduction into the course and detailed plan.
2. Descriptive statistics. Tabular and graphical methods. (Learning outcome: 1)
3. Measures of central tendency, dispersion measures, measures of asymmetry, measures of kurtosis. Standardized value. Data distribution rules. (Learning outcome: 1)
4. Probability. Discrete probability space. Infinite probability space. Geometric probability. (Learning outcome: 4)
5. Conditional probability. Independence. The formula of total probability. Bayesian formula. (Learning outcome: 4, 5)
6. Discrete random variables. Marginal distributions. Conditional distributions. Examples of discrete distributions. (Learning outcome: 2)
7. Continuous random variables. Functions of distribution and density functions, Functions of random variables. (Learning outcome: 3)

8. Examples of continuous distributions. (Learning outcome: 3)
9. Point estimators. Unbiasedness. Standard error. (Learning outcome: 6)
10. Confidence intervals. (Learning outcome: 6)
11. Interval estimates for the expectation, variance, proportion. (Learning outcome: 6)
12. Hypothesis testing and associated errors. (Learning outcome: 7)
13. Comparison of parameters. (Learning outcome: 6, 7)
14. Chi-square test (goodness of fit test. independence test. homogeneity test) (Learning outcome: 7)
15. Linear regression, Correlation (Learning outcome: 8)

1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[x] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations

Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)

Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	[x]
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

	Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
Monitoring and evaluation of students' work	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
	4. Final exam (written + oral)	1 – 5	90	3	0 - 80
	In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**
	Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2		Final exam

Description	Preparation for teaching units Understanding previous content Participation in solving tasks together	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.
Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria
The final exam consists of: written / oral exam.

If the student answered less than 50% of the questions correctly, it will be considered that he/she did not pass and failed the final exam. A student who answered more than 50% of the questions correctly passed the final exam and will receive a grade as follows:

% of correct answers Final exam	Numerical evaluation
90-100%	5 (excellent)
80 – 89.9%	4 (very good)
65 – 79.9 %	3 (good)
50 – 64.9%	2 (enough)

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	*Number of copies*	*Number of students*
N. Elezović, Vjerojatnost i statistika. Element, Zagreb. ISBN 978-953197-591-9	10	50
H.Wickham, G.Grolemund. R for Data Science (dostupno online besplatno)	50	50

1.10. Supplementary readings

1. Priručnici za korištenje R-a (npr. W.N. Venables i D.M. Smith

(M.Kumbatović, Kasum D.), Uvod u korištenje R-a)
2. Andrew Bruce, Peter Gedeck. Practical Statistics for Data Scientists. O'Reilly Media, Inc, USA.
3. N.Elezović. Vjerojatnost i statistika : Diskretna vjerojatnost ISBN 978-953-197-539-1
4. N.Elezović. Vjerojatnost i statistika : Slučajne varijable. ISBN 978-953-197-540-7
5. N.Elezović. Vjerojatnost i statistika : Matematička statistika, stohastički procesi. ISBN 978-953-197-542-1

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	*Marko Pavelić, mag. ing. inf. et comm. techn., lecturer*	
Course name	**Object-oriented programming**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**2**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description

1.1. Course aims

To acquaint the student with the concepts of object-oriented programming. Train students for independent and team work in the application, methodology, methods and techniques of object-oriented programming. By acquiring and using knowledge from the subject, students will be able to develop simple applications independently or in a team using object-oriented programming.

1.2. Course enrolment requirements

There are no requirements for enrolling in the course, but taking the course is only possible after successfully passing the course Basics of programming.

1.3. Intended course learning outcomes

1. Implement the designed solution to the given problem according to the framework specification using classes and objects in the selected programming language.
2. Apply the principle of inheritance in the selected programming language.
3. Determine the existence of a need for a polymorphic solution to the problem and implement it in the selected programming language.
4. Process the predicted possibilities of exceptions in the selected programming language.
5. Use programming language syntax on an open source platform.
6. Apply the concepts of the object-oriented paradigm in a programming language on an open source platform.

1.4. Course content

The course includes the acquisition of knowledge in object-oriented languages using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule:

1. Introduction into the course and detailed plan.
2. Getting to know the program framework (Learning outcome: 1)
3. Programming in object-oriented languages - basics - Creating objects (Learning outcome: 1)
4. Programming in object-oriented languages - basics – Constructors (Learning outcome: 1, 2)
5. Programming in object-oriented languages - basics – Inheritance (Learning outcome: 1, 2)
6. Programming in object-oriented languages - basics – Polymorphism (Learning outcome: 2, 3)
7. Programming in object-oriented languages - basics - Abstract classes and interfaces (Learning outcome: 2
8. Basics of UML in application with object-oriented languages (Learning outcome: 1, 2, 3)
9. Programming in object-oriented languages - basics – Exceptions (Learning outcome: 4)
10. Programming in object-oriented languages - basics - Generics (1) (Learning outcome: 5, 6)
11. Programming in object-oriented languages - basics - Generics (2) (Learning outcome: 5, 6)
12. Programming in object-oriented languages - basics – Collections (Learning outcome: 5, 6)
13. Programming in object-oriented languages - basics – Files (Learning outcome: 5, 6)

14. Programming in object-oriented languages - basics - Nested classes (Learning outcome: 5, 6) 15. 15. Programming in object-oriented languages - basics - Anonymous classes and lambda functions (Learning outcome: 5, 6)

1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[x] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations
Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)							
Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	[x]
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

	Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
Monitoring and evaluation of students' work	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
	4. Final exam (written + oral)	1 – 5	90	3	0 - 80
	In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**

Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2	Final exam
Description	Preparation for teaching units Understanding previous content Participation in	Preparation/learning Theoretical knowledge	Preparation/learning Theoretical knowledge

	solving tasks together	Scoring and grading according to correct answers in the test.	Scoring and grading according to correct answers in the test.
Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria
The final exam consists of: written / oral exam.

If the student answered less than 50% of the questions correctly, it will be considered that he/she did not pass and failed the final exam. A student who answered more than 50% of the questions correctly passed the final exam and will receive a grade as follows:

% of correct answers Final exam	Numerical evaluation
90-100%	5 (excellent)
80 – 89.9%	4 (very good)
65 – 79.9 %	3 (good)
50 – 64.9%	2 (enough)

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	*Number of copies*	*Number of students*
Bruce Eckel, Thinking in Java, 4th Edition, Pearson, 2006.	10	50

1.10. Supplementary readings

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1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	***PhD Ivan Livaja, senior lecturer***	
Course name	**Databases**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**2**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description
1.1. Course aims
Students will develop skills in the use of databases, i.e. successfully communicate with clients, users and colleagues verbally and in writing, using appropriate terminology, including the ability to communicate about the profession in a foreign language.
1.2. Course enrolment requirements
There are no course enrolment requirements.
1.3. Intended course learning outcomes
1. Use common commands to manage data in a relational database. 2. Create queries over the relational database using system and aggregate functions and grouping. 3. Apply subqueries when creating a more complex query over a relational database. 4. Construct views and triggers in a relational database. 5. Use common commands to create CRUD operations in a relational database 6. Ability to design and normalized database
1.4. Course content
The course includes the acquisition of knowledge in databases using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule: 1. Introduction into the course and detailed plan. 2. Primary and foreign, database design (Learning outcome: 1) 3. Data types (Learning outcome: 1) 4. Basic DDL and DML clauses (Learning outcome: 1, 2) 5. String, date, and agregate functions, NULL values (Learning outcome: 1, 2) 6. Cartesian product, natural join. Join (Learning outcome: 1, 2, 3) 7. Group by, having (Learning outcome: 1, 2, 3) 8. Subselect (Learning outcome: 3) 9. Query optimization (Learning outcome: 2, 3, 4) 10. Keys, indexes, full text indexes (Learning outcome: 5) 11. Data normalization (Learning outcome: 6) 12. Construction of the ERA diagram based on the requirements specification (Learning outcome: 6) 13. Implementation of the database based on the diagram (Learning outcome: 6) 14. Creating and restoring database backups (Learning outcome: 6) 15. Working with another database system and tools (Learning outcome: 1, 2, 3, 4, 5, 6)

1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures	[x] independent work

	[ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations

Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)

Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

Monitoring and evaluation of students' work

Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
1. Attending and activities in class	1 – 5	90	3	0 - 20
2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
4. Final exam (written + oral)	1 – 5	90	3	0 - 80
In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**

Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2	Final exam
Description	Preparation for teaching units Understanding previous content Participation in solving tasks together	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.

Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria
The final exam consists of: written / oral exam.

If the student answered less than 50% of the questions correctly, it will be considered that he/she did not pass and failed the final exam. A student who answered more than 50% of the questions correctly passed the final exam and will receive a grade as follows:

% of correct answers Final exam	Numerical evaluation
90-100%	5 (excellent)
80 – 89.9%	4 (very good)
65 – 79.9 %	3 (good)
50 – 64.9%	2 (enough)

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	*Number of copies*	*Number of students*
Robert Manger, Baze podataka, Element, 2012.	10	50
Nastavni materijali na e-learning sustavu VUŠ-a za kolegij : Uvod u baze podataka	50	50

1.10. Supplementary readings

C.J. Date (2003). An Introduction to Database Systems, 8th Edition, Addison Wesley
Mladen Varga (2012). Upravljanje podacima, Element

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	***PhD Frane Urem, college professor with tenure***	
Course name	**Design and Analysis of Information Systems**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**2**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description

1.1. Course aims

1.2. Course enrolment requirements

There are no course enrolment requirements.

1.3. Intended course learning outcomes

1. Create a software system specification according to user requirements.
2. Create a suitable UML diagram for a specific aspect of software system applications and their components.
3. Independently create a functionality specification document based on collected and ranked user requirements.
4. Design the application according to the given architecture.
5. Design programming tasks based on user requirements and recommend their distribution by project iterations.
6. Implement the conceptual data model in the selected database.
7. Develop a software solution using ORM tools

1.4. Course content

The course includes the acquisition of knowledge in design and analysis of information systems using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule:

1. Introduction into the course and detailed plan
2. Introduction into design and analysis of information systems (Learning outcome: 1)
3. Information System. (Learning outcome: 2)
4. Information System. (Learning outcome: 2)
5. Basics of methodologies for the development of information systems. (Learning outcome: 3)
6. Basics of methodologies for the development of information systems. (Learning outcome: 3)
7. Management of the IS (Information System) development project. (Learning outcome: 4)
8. Management of the IS (Information System) development project. (Learning outcome: 4)
9. System analysis. (Learning outcome: 5)
10. System analysis. (Learning outcome: 5)
11. System analysis. (Learning outcome: 5)
12. System design. (Learning outcome: 6, 7)
13. System design. (Learning outcome: 6, 7)
14. System design. (Learning outcome: 6, 7)
15. Development, implementation, and maintenance of systems. (Learning outcome: 6, 7)

1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[ ] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations
Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)							
Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

	Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
Monitoring and evaluation of students' work	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
	4. Final exam (written + oral)	1 – 5	90	3	0 - 80
	In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**

	Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2	Final exam
	Description	Preparation for teaching units Understanding previous content Participation in solving tasks together	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.

Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria
The final exam consists of: written / oral exam.

If the student answered less than 50% of the questions correctly, it will be considered that he/she did not pass and failed the final exam. A student who answered more than 50% of the questions correctly passed the final exam and will receive a grade as follows:

% of correct answers Final exam	Numerical evaluation
90-100%	5 (excellent)
80 – 89.9%	4 (very good)
65 – 79.9 %	3 (good)
50 – 64.9%	2 (enough)

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course		
Title	***Number of copies***	***Number of students***
F. Urem, Projektiranje i analiza IS-a, Veleučilište u Šibeniku, 2016., ISBN: 978-953-7566-30-2	10	50

1.10. Supplementary readings

1. J. A. Hoffer, J. F. George, J. S. Valacich: Modern Systems Analysis and Design, 3/e, Prentice Hall College Div, 2001.
2. Eeles, P.; O. Sims, Building Business Objects. John Wiley & Sons, 1998.

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	***Marko Pavelić, mag. ing. inf. et comm. techn., lecturer***	
Course name	**Design patterns in programming**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**2**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description

1.1. Course aims

Acquiring knowledge of form patterns in object-oriented languages. To train students for independent and team work in application, methodology, methods and programming techniques using the techniques described in form patterns. By acquiring and using knowledge from the course, students will understand that application programming is much easier compared to basic and classic approaches to programming.

1.2. Course enrolment requirements

There are no requirements for enrolling in the course, but taking the course is only possible after successfully passing the course Object-oriented programming.

1.3. Intended course learning outcomes

1. Construct a software solution using standard form components.
2. Implement recommended ways to improve the user experience in the application.
3. Apply multitasking for the purpose of developing responsive computer programs on an open source platform.
4. Design and test existing programs using unit testing.
5. Design and test existing programs using additional libraries for unit testing (Unit testing).
6. Implement the recommended way of realizing design forms in the application.

1.4. Course content

The course includes the acquisition of knowledge in design patterns in programming using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule:

1. Introduction into the course and detailed plan
2. Collection flows - basics. Creating collection streams from existing data collections or files (Learning outcome: 1)
3. Collection flows - basics. Creation of comparators and consumers over collection flows. (Learning outcome: 1)
4. Parallel collection flows (Learning outcome: 1, 2)
5. Shape patterns – basics – shape pattern Singleton (Learning outcome: 3)
6. Forms - basics - Factory form (Learning outcome: 3)
7. Forms - basics - Builder form (Learning outcome: 3)
8. Patterns - basics - Decorator pattern (Learning outcome: 3)
9. Forms - basics - Visitor form (Learning outcome: 3)
10. Patterns - basics - Observer pattern (Learning outcome: 3)
11. Application testing using unit testing (1) (Learning outcome: 4)
12. Application testing using unit testing (2) (Learning outcome: 4, 5)

13. Application testing using unit testing (3) (Learning outcome: 4, 5)
14. Advanced tools for testing applications using unit testing (1) (Learning outcome: 4, 5, 6)
15. Advanced tools for testing applications using unit testing (2) (Learning outcome: 4, 5, 6)

1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [x] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[x] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations

Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)

Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	[x]
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

	Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
Monitoring and evaluation of students' work	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
	4. Final exam (written + oral)	1 – 5	90	3	0 - 80
	In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**

Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2	Final exam
Description	Preparation for teaching units Understanding previous content Participation in	Preparation/learning Theoretical knowledge	Preparation/learning Theoretical knowledge

	solving tasks together	Scoring and grading according to correct answers in the test.	Scoring and grading according to correct answers in the test.
Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria
The final exam consists of: written / oral exam.

If the student answered less than 50% of the questions correctly, it will be considered that he/she did not pass and failed the final exam. A student who answered more than 50% of the questions correctly passed the final exam and will receive a grade as follows:

% of correct answers Final exam	Numerical evaluation
90-100%	5 (excellent)
80 – 89.9%	4 (very good)
65 – 79.9 %	3 (good)
50 – 64.9%	2 (enough)

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	*Number of copies*	*Number of students*
Java™ Design Patterns: A Tutorial by James W. Cooper ISBN: 9780201485394	10	50

1.10. Supplementary readings

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	***Marko Pavelić, mag. ing. inf. et comm. techn., lecturer***	
Course name	**Web application development**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**2**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description

1.1. Course aims

Acquiring knowledge in web application programming. To train students for independent and team work in the application, methodology, methods and techniques of programming web applications. By acquiring and using knowledge from the course, students will understand that creating a web application consists of several networked segments that need to be taken care of.

1.2. Course enrolment requirements

There are no course enrolment requirements.

1.3. Intended course learning outcomes

1. Create a solution using the HTTP protocol and a RESTfull server application.
2. Compare methods and implement state saving in a web application.
3. Integrate database retrieval and server scripting.
4. Create a RESTfull API using server-side scripting.
5. Use standard libraries and server-side frameworks.
6. Use JSON and XML methods and user-defined tabular data types in relational databases.
7. Use transactions and isolation levels in relational databases.

1.4. Course content

The course includes the acquisition of knowledge in web application development using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule:

1. Introduction into the course and detailed plan
2. Getting to know the programming framework for creating web applications (Learning outcome: 1)
3. Elements of web applications (Learning outcome: 1, 2)
4. Java Bean and Dependency Injection (Learning outcome: 1, 2, 3)
5. REST (Learning outcome: 4)
6. Object-relational mapping – ORM (Learning outcome: 4, 5)
7. Object-relational mapping - JPA and Hibernate (Learning outcome: 4, 5)
8. Model-View-Controller (MVC) (Learning outcome: 4, 5)
9. MVC and graphical interface (1) (Learning outcome: 4, 5)
10. MVC and graphical interface (2) (Learning outcome: 4, 5)
11. Testing and logging of the web application (Learning outcome: 6, 7)
12. Message communication – JMS (Learning outcome: 6, 7)
13. Creating a web application (1) (Learning outcome: 6, 7)
14. Creating a web application (2) (Learning outcome: 6, 7)

15. Creating a web application (3) (Learning outcome: 6, 7)		
1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[x] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations

Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)

Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	[x]
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

	Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
Monitoring and evaluation of students' work	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
	4. Final exam (written + oral)	1 – 5	90	3	0 - 80
	In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**

Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2	Final exam
Description	Preparation for teaching units Understanding previous content Participation in solving tasks	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.

	together		
Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria
The final exam consists of: written / oral exam.

If the student answered less than 50% of the questions correctly, it will be considered that he/she did not pass and failed the final exam. A student who answered more than 50% of the questions correctly passed the final exam and will receive a grade as follows:

% of correct answers Final exam	Numerical evaluation
90-100%	5 (excellent)
80 – 89.9%	4 (very good)
65 – 79.9 %	3 (good)
50 – 64.9%	2 (enough)

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	*Number of copies*	*Number of students*
Spring Boot in Action First Edition by Craig Walls ISBN 1617292540	10	50

1.10. Supplementary readings

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	***Zvonimir Klarin, mag .ing. comp., lecturer***	
Course name	**Switching and Routing in Computer Networks**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**M**	
Year	**2**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description

1.1. Course aims

- Understanding and applying switching and routing technologies
- Implementing logical network segmentation using VLANs
- Applying redundancy mechanisms and ensuring high network availability
- Mastering techniques of variable subnetting
- Mastering techniques and principles of static routing
- Implementing IP routing using routing protocols
- Develope skills for troubleshooting in computer networks
- Understanding the concept of wireless local area networks (WLANs)
- Implementing and maintaining campus network infrastructure

1.2. Course enrolment requirements

There are no requirements for enrolling in the course, but taking the course is only possible after successfully passing the course Introduction to Computer Networking.

1.3. Intended course learning outcomes

1. Create an address scheme for a computer network based on given parameters.
2. Design a functional computer network with multiple subnets according to requirements.
3. Develop a network topology that enables communication between multiple subnets.
4. Implement a logically segmented computer network (VLAN).
5. Understand the concepts of wireless networks and their integration into wired networks.
6. Implement network traffic routing mechanisms in accordance with the requirements of the given network topology.
7. Implement VLSM subnetting technique in network design.
8. Optimize a given computer network using the specifics of routing protocols and static routing.

1.4. Course content

The course includes the acquisition of advanced knowledge in computer networks using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule:

1. Introduction into the course and detailed plan
2. Basic concepts of switching (Learning outcome: 1, 2)
3. Virtual Local Area Networks (VLANs) (Learning outcome: 2, 3)
4. Inter-VLAN routing (Learning outcome: 3, 4)
5. Redundancy at the data link layer (Learning outcome: 2, 3)
6. Concepts of wireless local area networks (WLANs) (Learning outcome: 5)

7. Concepts of routing (Learning outcome: 6)
8. Basic router configuration (Learning outcome: 6)
9. Subnetting using Variable Length Subnet Mask (VLSM) (Learning outcome: 7)
10. Analysis of the routing table (Learning outcome: 7)
11. Static routing (Learning outcome: 8)
12. Troubleshooting connectivity issues (Learning outcome: 7, 8)
13. Dynamic routing (Learning outcome: 7, 8)
14. Distance vector protocols (Learning outcome: 7, 8)
15. Link state protocols (Learning outcome: 7, 8)

1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[x] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations

Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)

Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	[x]
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

	Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
Monitoring and evaluation of students' work	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
	4. Final exam (written + oral)	1 – 5	90	3	0 - 80
	In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**
	Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2		Final exam

Description	Preparation for teaching units Understanding previous content Participation in solving tasks together	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.
Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria
The final exam consists of: written / oral exam.

If the student answered less than 50% of the questions correctly, it will be considered that he/she did not pass and failed the final exam. A student who answered more than 50% of the questions correctly passed the final exam and will receive a grade as follows:

% of correct answers Final exam	Numerical evaluation
90-100%	5 (excellent)
80 – 89.9%	4 (very good)
65 – 79.9 %	3 (good)
50 – 64.9%	2 (enough)

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	***Number of copies***	***Number of students***
Cisco Networking Academy (2020) Switching, Routing, and Wireless Essentials Companion Guide (CCNAv7), Cisco Press; 1st edition	10	50

1.10. Supplementary readings

Cisco (2020) Campus LAN and wireless LAN solution design guide [Online]. Dostupno na: https://www.cisco.com/c/en/us/td/docs/solutions/CVD/Campus/cisco-campus-lan-wlan-design-guide.html

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	*Darko Jureković, dipl. ing., lecturer*	
Course name	**Cloud Computing**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**E**	
Year	**2**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description

1.1. Course aims

This course aims to empower students to assess and apply cloud computing technologies in the context of modern infrastructure solutions. Students will learn to evaluate the expansion of local infrastructure using cloud resources, assess the integration of local applications and virtual machines into hybrid environments, and distinguish between the use of local and cloud infrastructures. The course also includes practical application of cloud technologies in software development, focusing on using relational and non-relational databases and solutions for storing unstructured data in the cloud as data sources.

1.2. Course enrolment requirements

There are no course enrolment requirements.

1.3. Intended course learning outcomes

1. Evaluate the expansion of local infrastructure through cloud infrastructure.
2. Assess the possibility of integrating local applications and virtual machines into a hybrid cloud.
3. Evaluate the use of local and cloud infrastructure.
4. Assess the possibility of integrating local and cloud infrastructure into a hybrid cloud.
5. Develop a software solution using a relational database on the cloud as a data source.
6. Develop a software solution using solutions for storing unstructured data on the cloud as a data source.
7. Develop a practical application of cloud technologies and manage performance.

1.4. Course content

The course includes the acquisition of knowledge in computer networks using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule:

1. Introduction into the course and detailed plan
2. Introduction to Cloud Computing: Basics of cloud technology, including IaaS, PaaS, and SaaS models. (Learning outcome: 1, 2)
3. Evaluation of Local vs. Cloud Infrastructure: Advantages and disadvantages, including cost analysis and performance. (Learning outcome: 3)
4. Designing Hybrid Cloud Solutions: Integrating local resources with cloud infrastructure. (Learning outcome: 2, 3, 4)
5. Virtualization and Cloud Services: Virtual machines in a cloud environment. (Learning outcome: 2)
6. Integration of Local Applications with Cloud: Techniques and tools for migration and integration. (Learning outcome: 2, 3)
7. Security in Hybrid Cloud: Best practices and standards for data protection. (Learning outcome: 4)
8. Relational Databases in the Cloud: Selecting the right service provider and configuring relational databases. (Learning outcome: 5)

9. Unstructured Data in the Cloud: Using platforms for storage and analysis of unstructured data. (Learning outcome: 6)
10. Non-Relational (NoSQL) Databases in the Cloud: Benefits of using NoSQL databases in a cloud environment. (Learning outcome: 6)
11. Cloud Application Development: Practical skills and tools for developing cloud-native applications. (Learning outcome: 7)
12. Automation and Orchestration in the Cloud: Tools like Kubernetes and Terraform for resource management. (Learning outcome: 7)
13. Performance Management in Cloud Infrastructure: Monitoring and optimization of resources. (Learning outcome: 7)
14. Scaling Applications in the Cloud: Strategies and best practices for scaling applications. (Learning outcome: 7)
15. Development and Implementation of Cloud Solutions. Case Study: Analysis of real-world scenarios using cloud technologies in the industry. (Learning outcome: 7)

1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[x] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations

Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)

Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	[x]
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

	Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
Monitoring and evaluation of students' work	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
	4. Final exam (written + oral)	1 – 5	90	3	0 - 80

In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**

Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2	Final exam
Description	Preparation for teaching units Understanding previous content Participation in solving tasks together	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.	Preparation/learning Theoretical knowledge Scoring and grading according to correct answers in the test.
Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria
The final exam consists of: written / oral exam.

If the student answered less than 50% of the questions correctly, it will be considered that he/she did not pass and failed the final exam. A student who answered more than 50% of the questions correctly passed the final exam and will receive a grade as follows:

% of correct answers Final exam	Numerical evaluation
90-100%	5 (excellent)
80 – 89.9%	4 (very good)
65 – 79.9 %	3 (good)
50 – 64.9%	2 (enough)

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	***Number of copies***	***Number of students***
F. Urem, D. Jureković, 2020,, Recenzirana nastavni materijali iz predmeta, dostupno na sustavu za e-učenje	50	50

1.10. Supplementary readings

Oracle Academy Member Hub portal teaching materials
R. Ramklass, "Oracle Cloud Infrastructure Architect Associate All-In-One Exam Guide (Exam 1Z0-1072)", McGraw Hill, 2020

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	***PhD Ivan Livaja, senior lecturer***	
Course name	**Data Warehouse**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**E**	
Year	**2**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description

1.1. Course aims

Data warehouses (Data Warehouse, Data Mart), systems for data analysis and decision support. Planning, design, development and construction of information systems for decision support. Stock data and transaction system. Dimensional model, facts, dimensions, multidimensional model. Process data exposure, metadata, data transformation, data quality assurance, physical organization, security. Data analysis - methods, techniques and tools. Data warehouses and the Internet.

1.2. Course enrolment requirements

There are no course enrolment requirements.

1.3. Intended course learning outcomes

1. Implement a data warehouse
2. Integrate data from heterogeneous data sources
3. Give reasons for introducing a dana warehouse in the project
4. Understand the analytical functions and create reports
5. Understand the dimensional data model with special significance on dimensional and fact tables
6. Understand the difference between data warehouses and databases
7. Understand the importance and role of metadata in data warehouses

1.4. Course content

The course includes the acquisition of knowledge in data analysis and decision support using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule:

1. Introduction into the course and detailed plan
2. Data warehouse framework (Learning outcome: 1)
3. Business intelligence - Use of data warehouse (Learning outcome: 2, 3)
4. Data warehouse modeling (Learning outcome: 3, 4)
5. Dimensional data model (Learning outcome: 5)
6. Building a data warehouse (Learning outcome: 4)
7. Development and organization of the data warehouse
8. Metadata management (Learning outcome: 6)
9. Information processing (inquiries and reports) (Learning outcome: 6)
10. Analytical processing (Learning outcome: 6)
11. Fundamental computing spaces for decision support (Learning outcome: 7)

12. Data Mining (Learning outcome: 7)
13. Analysis of examples from practice (Part I) (Learning outcome: 7)
14. Analysis of examples from practice (Part II) (Learning outcome: 7)
15. State of the art (Learning outcome: 7)

1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[x] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations

Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)

Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	[x]
Portfolio							

1.8. Assessment and evaluation of student work during classes and the final exam

	Activities	**Outcomes**	**Number of hours**	**ECTS**	**points min. - max.**
Monitoring and evaluation of students' work	1. Attending and activities in class	1 – 5	90	3	0 - 20
	2. Colloquium 1/written	1 – 3	45	1,5	0 - 40
	3. Colloquium 2/written	4 – 5	45	1,5	0 - 40
	In total - continuous teaching (1+2+3)	**1 – 5**	**180**	**6**	**0 – 100**
	4. Final exam (written + oral)	1 – 5	90	3	0 - 80
	In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**

Evaluation criteria	Activities in class	Colloquium 1+ Colloquium 2	Final exam
Description	Preparation for teaching units Understanding previous content	Preparation/learning Theoretical knowledge	Preparation/learning Theoretical knowledge

	Participation in solving tasks together	Scoring and grading according to correct answers in the test.	Scoring and grading according to correct answers in the test.
Points: min. - max.	0 - 20	0 - 80	0 - 80
Minimum number of points - passing threshold	10	40	40
Total points	0 - 100		

	Passing threshold	Score range	Evaluation
Overall rating	50 points	90-100	5 (excellent)
		80-89.9	4 (very good)
		65-79.9	3 (good)
		50-64.9	2 (enough)

Conditions for taking the final exam

1. Attend classes regularly

2. Actively participate in classes

Final exam - evaluation criteria
The final exam consists of: written / oral exam.

If the student answered less than 50% of the questions correctly, it will be considered that he/she did not pass and failed the final exam. A student who answered more than 50% of the questions correctly passed the final exam and will receive a grade as follows:

% of correct answers Final exam	Numerical evaluation
90-100%	5 (excellent)
80 – 89.9%	4 (very good)
65 – 79.9 %	3 (good)
50 – 64.9%	2 (enough)

Final grade

Formation of the final grade according to the Regulations on studying is the sum of the percentages of acquired knowledge, skills and competencies achieved during classes and the percentages achieved on the final exam. (classes 50% + final exam 50%)

% of acquired knowledge, skills and competencies	Numerical evaluation	ECTS - grade
90-100%	5 (excellent)	A
80 – 89.9%	4 (very good)	B
65 – 79.9 %	3 (good)	C
50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	*Number of copies*	*Number of students*
Ralph Kimball, Margy Ross, Warren Thornthwaite, Joy Mundy, Bob Becker. The Data Warehouse Lifecycle Toolkit. Wiley. 2008.	10	50
Katarina Ćurko, Maja Španić Kezan: Skladištenje podataka, 2016., Zagreb	10	50

1.10. Supplementary readings

W. H. Inmon : Building the Data Warehouse, 4th edition, Wiley, 2005.

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

Indicators of the quality assurance system: Student survey, internal evaluation of teaching, thematic sessions of the council on the quality of teaching and results, monitoring of annual data from HZZZ (Croatian Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

General information		
Lead instructor	***PhD Frane Urem, college professor with tenure***	
Course name	**User Interface Design**	
Study programme	**Professional undergraduate study in Computing**	
Course status	**E**	
Year	**2**	
Number of credits and mode of delivery	**ECTS student workload coefficient**	**6**
	Number of hours (L+P+S)	**30 + 30 + 0**

Course description

1.1. Course aims

This course aims to empower students to design and develop efficient and functional web applications. Through the course, students will learn how to create applications aligned with professional standards, develop scalable and robust software interfaces with clear documentation, and analyze and apply basic principles of web design and user experience. Additionally, the course will cover the application of advanced techniques in creating responsive web pages and implementing sophisticated elements such as navigation, background design, and animations, preparing students to anticipate and solve potential problems in the design and functionality of web interfaces.

1.2. Course enrolment requirements

There are no course enrolment requirements.

1.3. Intended course learning outcomes

1. Design an application according to professional standards.
2. Create a scalable and robust software interface with clear documentation.
3. Determine the software interface based on the design of the user interface and anticipate potential problems.
4. Define the fundamental concepts of web design theory and different types of web interfaces.
5. Define and explain the basic elements of web design.
6. Analyze and recommend ways to improve the web user experience.
7. Apply design and coding techniques for web pages adaptable to various screen sizes.
8. Implement concepts of navigation, background design, and animations in defining the composition of a web page.

1.4. Course content

The course includes the acquisition of knowledge in user interface design using the following teaching methods: lectures, presentations, exercises, problem-based teaching, team work, independent reading of the proposed literature, demonstration methods, collaborative learning according to the class schedule:

1. Introduction into the course and detailed plan
2. Introduction to web application design: Overview of basic application design principles, the importance of professional standards, and introduction to user experience (UX). (Learning outcome: 1)
3. Web application architecture: Understanding the architecture of web applications, including client and server sides and their interactions. (Learning outcome: 1, 2)
4. Development of software interface (API): How to create scalable and robust software interfaces including clear documentation. (Learning outcome: 2, 3)
5. User interface and interaction with API: Learning how to design a user interface that effectively communicates with the software interface and analysis of potential problems. (Learning outcome: 2, 3)

6. Basics of web design: Learning fundamental concepts of web design theory and familiarization with different types of web interfaces. (Learning outcome: 4)
7. Elements of web design: Detailed exploration and explanation of basic elements of web design including typography, colors, layout, and images. (Learning outcome: 5)
8. User experience and web analytics: Analyzing websites to recommend improvements for a better user experience. (Learning outcome: 6)
9. Responsive web design: Applying techniques and tools for creating responsive web pages that adapt to different screen sizes. (Learning outcome: 6, 7)
10. Advanced CSS and HTML: Learning about advanced CSS and HTML techniques, including Flexbox, Grid, and other modern approaches. (Learning outcome: 7)
11. Navigation and layout of web pages: Developing skills in implementing navigation concepts, creating layouts, and structuring content. (Learning outcome: 7, 8)
12. Aesthetics of web pages: Understanding and applying principles of aesthetics in web design, including background design and the use of visual elements. (Learning outcome: 7, 8)
13. Animations and interactivity: Learning how to implement animations and interactive elements on a web page. (Learning outcome: 7, 8)
14. Testing and optimizing web pages: Techniques and tools for testing web pages to ensure their functionality and performance. (Learning outcome: 7, 8)
15. Web application security: Basics of web security, including data protection and prevention of common security threats. (Learning outcome: 7, 8)

1.5. Modes of delivery (mark the appropriate boxes with an X)	[x] lectures [ ] seminars and workshops [x] practicals [ ] remote learning [ ] field work	[x] independent work [ ] multimedia and network [ ] laboratory [ ] supervision [ ] other

1.6. Student obligations

Regular and conscientious attendance of all forms of teaching.

1.7. Monitoring student work (mark the appropriate boxes with an X)

Class attendance	[x]	Participation in class	[x]	Seminar paper		Experimental work	
Written exam	[x]	Oral exam	[x]	Essay		Research	
Project		Continuous assessment of knowledge	[x]	Student report		Practical work	
Portfolio							

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	3. Colloquium	4 – 5	45	1,5	0 - 40

2/written				
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4. Final exam (written + oral)	1 – 5	90	3	0 - 80
In total – examination term (1+4)	**1 – 5**	**180**	**6**	**0 – 100**

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50 -64.9 %	2 (enough)	D

1.9. Required readings and number of copies relative to the number of students currently taking the course

Title	***Number of copies***	***Number of students***
F. Urem, Recenzirani nastavni materijali iz predmeta, dostupno na sustavu za e-učenje	50	50

1.10. Supplementary readings

S. Krug, “Don’t Make Me Think: A Common Sense Approach to Web Usability,” 3rd Edition, New Riders, 2013, ISBN: 9780133597271.
B. Frain, “Responsive Web Design with HTML5 and CSS3,” Packt Publishing, 2012, ISBN: 9781849693189.

1.11. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competences

Control of the students' work quality and the acquisition of the necessary knowledge and skills will be ensured through interactive work. By keeping records of students' attendance and activities in class and the information gathered about students' progress through colloquia, the information necessary for further instructions to students will be obtained in order to increase the efficiency of their work. Students will be informed about their rights and obligations, teaching methods and necessary literature.

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Employment Service) on the annual state of student employment, employers` surveys and Alumni associations and others.

Curriculum for Professional Undergraduate Study of Computing Šibenik University of Applied Sciences, for the academic year 2026./2027. was adopted at the 41th session of the Council Šibenik University of Applied Sciences, which was held on Wednesday, July 13. 2026.

CLASS: 007-02/26-05/11
REGISTERY NUMBER: 103-05-26-01

Šibenik, 14.07.2026.

Head of Department Business Informatics
PhD Ivan Livaja, colleague professor

Dean of Šibenik University of Applied Sciences
PhD Ljubo Runjić, college professor