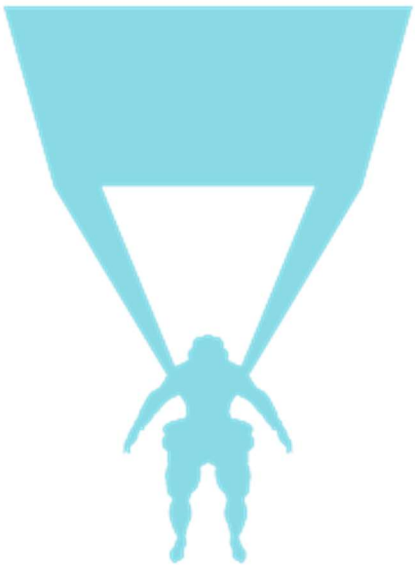
**ŠIBENIK UNIVERSITY OF APPLIED SCIENCES**

**PROFESSIONAL UNDERGRADUATE STUDY OF COMPUTING**

Trg Andrije Hebranga 11
22000 Sibenik



Šibenik, July 2025

**ŠIBENIK UNIVERSITY OF APPLIED SCIENCES**

**PROFESSIONAL UNDERGRADUATE STUDY OF COMPUTING**

Trg Andrije Hebranga 11
22000 Sibenik

# CURRICULUM

**Academic year 2025/2026**

Dean: PhD. Ljubo Runjić, college prof.

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

Šibenik, July 2025.

# 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 6$^{th}$ 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. Protect health in the workplace by applying standards and protocols
14. Analyze, evaluate and apply scientific research in the IT sector
15. Organize and implement educational activities on the importance of IT security, ethics and best practices
16. Apply the skills and techniques of effective communication in native or foreign language when working with teams, clients and users
17. Use modern information and communication technology

**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 2025/2026.

The academic calendar for the academic year 2025/26 is available on the web

## CALENDAR OF FINAL EXAMINATIONS FOR ACADEMIC YEAR 2025./2026.

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 |

**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***<br>***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 linear algebra and 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. To define elementary functions and apply their basic properties<br>2. To perform basic operations on sets and functions<br>3. To apply formulas of arithmetic and geometric series<br>4. To perform basic operations on matrices and vectors and apply matrix and vector calculus in solving systems of linear equations<br>5. To calculate determinants and apply properties of determinants in linear algebra problems | | |
| ***1.4. Course content*** | | |
| The course includes the acquisition of knowledge from the basics of linear algebra and 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:<br><br>1. Introduction into the course and detailed plan.<br>2. Sets. (Learning outcome: 2)<br>3. Sets of numbers. (Learning outcome: 2)<br>4. Functions. (Learning outcome: 1)<br>5. Basic terms, Elementary functions. (Learning outcome: 1)<br>6. Composition of the functions. (Learning outcome: 1)<br>7. Inverse function. (Learning outcome: 1)<br>8. Sequences. (Learning outcome: 3)<br>9. Arithmetic and Geometric Sequences. (Learning outcome: 3) | | |

10. Matrices and determinants. (Learning outcome: 4,5)
11. The inverse matrix. (Learning outcome: 4,5)
12. Systems of linear equations. (Learning outcome: 4,5)
13. Matrix calculus. (Learning outcome: 4,5)
14. Vectors. (Learning outcome: 4,5)
15. Scalar, vector and mixed vector product. (Learning outcome: 4,5)

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

**Monitoring and evaluation of students' work**

| **Activities** | **Outcomes** | **Number of hours** | **ECTS** | **points min. - max.** |
|---|---|---|---|---|
| Attending classes | 1 – 5 | 60 | 2 | 0 |
| Activities in class | 1 – 5 | 15 | 0.5 | 0 - 20 |
| Colloquium 1/written | 1 – 3 | 30 | 1 | 0 - 40 |
| Colloquium 2/written | 4 – 5 | 30 | 1 | 0 - 40 |
| In total | 1 – 5 | 135 | 4,5 | 0 – 100 (50% of the grade) |
| Final exam | 1 – 5 | 45 | 1.5 | 50% of the grade |
| **In total** | | 180 | 6 | 100% |

| **Evaluation criteria** | Activities in class | Colloquium 1/written | Colloquium 2/written |
|---|---|---|---|
| Description | Preparation for teaching units<br>Understanding previous content<br>Participation in solving tasks | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. |

| | | | |
|---|---|---|---|
| | together | | |
| Points: min. - max. | 0 - 20 | 0 - 40 | 0 - 40 |
| Minimum number of points - passing threshold | 10 | 20 | 20 |
| 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
3. Pass colloquia/written tests
4. Collect at least 50% points

**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*** |
|---|---|---|
| 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<br>[ ] seminars and workshops<br>[x] practicals<br>[ ] remote learning<br>[ ] field work | [x] independent work<br>[ ] multimedia and network<br>[ ] laboratory<br>[ ] supervision<br>[ ] 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.** |
|---|---|---|---|---|
| Attending classes | 1 – 6 | 60 | 2 | 0 |
| Activities in class | 1 – 6 | 15 | 0.5 | 0 - 20 |
| Colloquium 1/written | 1 – 3 | 30 | 1 | 0 - 40 |
| Colloquium 2/written | 3 – 6 | 30 | 1 | 0 - 40 |
| In total | 1 – 6 | 135 | 4,5 | 0 – 100 (50% of the grade) |
| Final exam | 1 – 6 | 45 | 1.5 | 50% of the grade |
| **In total** | | 180 | 6 | 100% |

| **Evaluation criteria** | Activities in class | Colloquium 1/written | Colloquium 2/written |
|---|---|---|---|
| Description | Preparation for teaching units<br>Understanding previous content<br>Participation in solving tasks together | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. |
| Points: min. - max. | 0 - 20 | 0 - 40 | 0 - 40 |

| | | | |
|---|---|---|---|
| Minimum number of points - passing threshold | 10 | 20 | 20 |
| 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
3. Pass colloquia/written tests
4. Collect at least 50% points

**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* |
|---|---|---|
| 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***

Introduction to information technology and its application in business. Students acquire the knowledge, skills and competencies needed to work with office applications through the local and network environment.

***1.2. Course enrolment requirements***

There are no course enrolment requirements.

***1.3. Intended course learning outcomes***

1. Describe the behavior of a computer system, communication protocol or some other technical system in formal language
2. Design a computer process using a formal model
3. Apply formal models for computer system validation
4. Evaluate the class of complexity of the problem

***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 into the course and detailed plan
2. String derivation (Learning outcome: 1)
3. String parsing (Learning outcome: 1)
4. Deterministic finite automaton (Learning outcome: 2)
5. Minimization of a deterministic finite automaton (Learning outcome: 2)
6. Non-deterministic finite automaton. (Learning outcome: 2)
7. Non-deterministic finite automaton with epsilon transitions (Learning outcome: 2)
8. Equivalence of deterministic and non-deterministic finite automaton (Learning outcome: 3)
9. Equivalence of a non-deterministic and non-deterministic finite automaton with epsilon transitions (Learning outcome: 3)
10. Regular languages ( Learning outcome: 3, 4)
11. Regular expressions (Learning outcome: 3, 4)
12. Operations on automata (Learning outcome: 3)
13. Properties of regular context-free languages. (Learning outcome: 3, 4)
14. Properties of regular recursive languages. (Learning outcome: 3, 4)
15. Properties of regular recursive-enumerable languages (Learning outcome: 3, 4)

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

| | | |
|---|---|---|
| | [ ] seminars and workshops<br>[x] practicals<br>[ ] remote learning<br>[ ] field work | [ ] multimedia and network<br>[ ] laboratory<br>[ ] supervision<br>[ ] 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.** |
|---|---|---|---|---|
| Attending classes | 1 – 4 | 60 | 2 | 0 |
| Activities in class | 1 – 4 | 15 | 0.5 | 0 - 20 |
| Colloquium 1/written | 1 – 2 | 30 | 1 | 0 - 40 |
| Colloquium 2/written | 3 – 4 | 30 | 1 | 0 - 40 |
| In total | 1 – 4 | 135 | 4,5 | 0 – 100 (50% of the grade) |
| Final exam | 1 – 4 | 45 | 1.5 | 50% of the grade |
| **In total** | | 180 | 6 | 100% |

| **Evaluation criteria** | Activities in class | Colloquium 1/written | Colloquium 2/written |
|---|---|---|---|
| Description | Preparation for teaching units<br>Understanding previous content<br>Participation in solving tasks together | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. |
| Points: min. - max. | 0 - 20 | 0 - 40 | 0 - 40 |
| Minimum number of points - passing | 10 | 20 | 20 |

| | | | | |
|---|---|---|---|---|
| threshold | | | | |
| 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
3. Pass colloquia/written tests
4. Collect at least 50% points

**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* |
|---|---|---|
| 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<br>[ ] seminars and workshops<br>[x] practicals<br>[ ] remote learning<br>[x] field work | [x] independent work<br>[ ] multimedia and network<br>[ ] laboratory<br>[ ] supervision<br>[ ] 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** | Attending classes | 1 – 6 | 60 | 2 | 0 |
| | Activities in class | 1 – 6 | 15 | 0.5 | 0 - 20 |
| | Colloquium 1/written | 1 – 3 | 30 | 1 | 0 - 40 |
| | Colloquium 2/written | 3 – 6 | 30 | 1 | 0 - 40 |
| | In total | 1 – 6 | 135 | 4,5 | 0 – 100 (50% of the grade) |
| | Final exam | 1 – 6 | 45 | 1.5 | 50% of the grade |
| | **In total** | | 180 | 6 | 100% |

| **Evaluation criteria** | Activities in class | Colloquium 1/written | Colloquium 2/written |
|---|---|---|---|
| Description | Preparation for teaching units | Preparation/learning<br>Theoretical knowledge | Preparation/learning<br>Theoretical knowledge |

| | | | |
|---|---|---|---|
| | Understanding previous content<br>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 - 40 | 0 - 40 |
| Minimum number of points - passing threshold | 10 | 20 | 20 |
| 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
3. Pass colloquia/written tests
4. Collect at least 50% points

**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* |
|---|---|---|
| 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)<br>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<br>[ ] seminars and workshops<br>[x] practicals<br>[ ] remote learning<br>[ ] field work | [x] independent work<br>[ ] multimedia and network<br>[ ] laboratory<br>[ ] supervision<br>[ ] 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***

**Monitoring and evaluation of students' work**

| **Activities** | **Outcomes** | **Number of hours** | **ECTS** | **points min. - max.** |
|---|---|---|---|---|
| Attending classes | 1 – 6 | 45 | 1,5 | 0 |
| Activities in class | 1 – 6 | 4,5 | 0,15 | 0 - 20 |
| Colloquium 1/written | 1 – 4 | 9 | 0,3 | 0 - 40 |
| Colloquium 2/written | 4 – 6 | 9 | 0,3 | 0 - 40 |
| In total | 1 – 6 | 68 | 2,25 | 0 – 100 (50% ocjene) |
| Final exam | 1 – 6 | 22,5 | 0,75 | 50% ocjene |
| **In total** | | 90 | 3 | 100% |

| **Evaluation criteria** | Activities in class | Colloquium 1/written | Colloquium 2/written |
|---|---|---|---|
| Description | Preparation for teaching units<br>Understanding previous content<br>Participation in solving tasks together | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. |
| Points: min. - | 0 - 20 | 0 - 40 | 0 - 40 |

| | | | |
|---|---|---|---|
| max. | | | |
| Minimum number of points - passing threshold | 10 | 20 | 20 |
| 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
3. Pass colloquia/written tests
4. Collect at least 50% points

**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* |
|---|---|---|
| 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*<br>*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 provide students with theoretical knowledge: to adopt knowledge and skills of the analytical way of thinking, and the logical way of concluding in further education, to familiarize with basic concepts of mathematics and prepare them for their practical application.

***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. To calculate the limes of the given function.
2. To derive the sum, difference, product, quotient and composition of functions.
3. To apply differential calculus to modeling problems from different sciences.
4. To solve the indefinite integral by applying the appropriate method.
5. To solve the definite integral by applying the appropriate method.
6. To apply integral techniques to modeling and solving problems in natural, technical or social sciences

***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. Sequences. Limit of sequences. (Learning outcome: 1)
3. Functions. Limit of the function. (Learning outcome: 1)
4. Continuity of functions. (Learning outcome: 1)
5. Derivative of a function, interpretation. Differentiation of elementary functions. (Learning outcome: 2)
6. Differentiation rules. Derivative of composition. (Learning outcome: 2)
7. Monotonicity and extrema of a function. (Learning outcome: 2, 3)
8. Asymptotes of the function (Learning outcome: 1, 3)
9. Basic analysis of functions of one variable. Convexity and concavity of a function. (Learning outcome: 1, 2, 3)
10. Differential calculus. (Learning outcome: 2, 3)
11. Indefinite Integrals. Methods of integration. (Learning outcome: 4)
12. Substitution Rule. (Learning outcome: 4, 5)
13. Integration by Parts. (Learning outcome: 4, 5)

| |
|---|
| 14. Definite Integrals. (Learning outcome: 4, 5)<br>15. Applications of Integration. (Learning outcome: 6) |

| | | |
|---|---|---|
| ***1.5. Modes of delivery (mark the appropriate boxes with an X)*** | [x] lectures<br>[ ] seminars and workshops<br>[x] practicals<br>[ ] remote learning<br>[ ] field work | [x] independent work<br>[ ] multimedia and network<br>[ ] laboratory<br>[ ] supervision<br>[ ] 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.** |
|---|---|---|---|---|
| Attending classes | 1 – 6 | 60 | 2 | 0 |
| Activities in class | 1 – 6 | 15 | 0.5 | 0 - 20 |
| Colloquium 1/written | 1 – 3 | 30 | 1 | 0 - 40 |
| Colloquium 2/written | 4 – 6 | 30 | 1 | 0 - 40 |
| In total | 1 – 6 | 135 | 4,5 | 0 – 100 (50% of the grade) |
| Final exam | 1 – 6 | 45 | 1.5 | 50% of the grade |
| **In total** | | 180 | 6 | 100% |

| **Evaluation criteria** | Activities in class | Colloquium 1/written | Colloquium 2/written |
|---|---|---|---|
| Description | Preparation for teaching units<br>Understanding previous content<br>Participation in solving tasks together | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. |
| Points: min. - max. | 0 - 20 | 0 - 40 | 0 - 40 |

| | | | |
|---|---|---|---|
| Minimum number of points - passing threshold | 10 | 20 | 20 |
| 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
3. Pass colloquia/written tests
4. Collect at least 50% points

**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*** |
|---|---|---|
| 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<br>[ ] seminars and workshops<br>[x] practicals<br>[ ] remote learning<br>[ ] field work | [ ] independent work<br>[ ] multimedia and network<br>[ ] laboratory<br>[x] supervision<br>[ ] 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.** |
|---|---|---|---|---|
| Attending classes | 1 – 7 | 60 | 2 | 0 |
| Activities in class | 1 – 7 | 15 | 0.5 | 0 - 20 |
| Colloquium 1/written | 1 – 4 | 30 | 1 | 0 - 40 |
| Colloquium 2/written | 5 – 7 | 30 | 1 | 0 - 40 |
| In total | 1 – 7 | 135 | 4,5 | 0 – 100 (50% of the grade) |
| Final exam | 1 – 7 | 45 | 1.5 | 50% of the grade |
| **In total** | | 180 | 6 | 100% |

| **Evaluation criteria** | Activities in class | Colloquium 1/written | Colloquium 2/written |
|---|---|---|---|
| Description | Preparation for teaching units<br>Understanding previous content<br>Participation in solving tasks together | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. |
| Points: min. - max. | 0 - 20 | 0 - 40 | 0 - 40 |

| | | | |
|---|---|---|---|
| Minimum number of points - passing threshold | 10 | 20 | 20 |
| 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
3. Pass colloquia/written tests
4. Collect at least 50% points

**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* |
|---|---|---|
| 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. Network layer of the OSI model: IP encapsulation, IP packet headers, routing (Learning outcome: 3)
8. IPv4 addressing: IPv4 address, subnet mask, determining the network address (Learning outcome: 4, 5, 6)
9. IPv4 addressing: unicast, broadcast, and multicast addresses (Learning outcome: 4, 5, 6)

10. IPv4 addressing: private and public IPv4 addresses, classful addressing, IPv4 subnetting (Learning outcome: 4, 5, 6)
11. IPv6 addressing: IPv6 address types, IPv6 subnetting (Learning outcome: 4, 5, 6)
12. IPv6 addressing: IPv6 subnetting (Learning outcome: 4, 5, 6)
13. Address resolution and ICMP protocols (Learning outcome: 4, 5, 6)
14. Transport layer of the OSI model: TCP and UDP protocol, sockets, flow control, congestion control (Learning outcome: 4, 5, 6)
15. Application layer of the OSI model: TCP/IP application layer protocols (Learning outcome: 4, 5, 6)

| ***1.5. Modes of delivery (mark the appropriate boxes with an X)*** | [x] lectures<br>[ ] seminars and workshops<br>[x] practicals<br>[ ] remote learning<br>[ ] field work | [ ] independent work<br>[ ] multimedia and network<br>[ ] laboratory<br>[ ] supervision<br>[ ] 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** | Attending classes | 1 – 6 | 60 | 2 | 0 |
| | Activities in class | 1 – 6 | 15 | 0.5 | 0 - 20 |
| | Colloquium 1/written | 1 – 3 | 30 | 1 | 0 - 40 |
| | Colloquium 2/written | 4 – 6 | 30 | 1 | 0 - 40 |
| | In total | 1 – 6 | 135 | 4,5 | 0 – 100 (50% of the grade) |
| | Final exam | 1 – 6 | 45 | 1.5 | 50% of the grade |
| | **In total** | | 180 | 6 | 100% |

| **Evaluation criteria** | Activities in class | Colloquium 1/written | Colloquium 2/written |
|---|---|---|---|
| Description | Preparation for teaching units<br>Understanding previous content | Preparation/learning<br>Theoretical knowledge | Preparation/learning<br>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 - 40 | 0 - 40 |
| Minimum number of points - passing threshold | 10 | 20 | 20 |
| 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
3. Pass colloquia/written tests
4. Collect at least 50% points

**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) 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<br>[ ] seminars and workshops<br>[x] practicals<br>[ ] remote learning<br>[ ] field work | [ x ] independent work<br>[ ] multimedia and network<br>[ ] laboratory<br>[ ] supervision<br>[ ] 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.** |
|---|---|---|---|---|
| Attending classes | 1 – 7 | 60 | 2 | 0 |
| Activities in class | 1 – 7 | 15 | 0.5 | 0 - 20 |
| Colloquium 1/written | 1 – 4 | 30 | 1 | 0 - 40 |
| Colloquium 2/written | 5 – 7 | 30 | 1 | 0 - 40 |
| In total | 1 – 7 | 135 | 4,5 | 0 – 100 (50% of the grade) |
| Final exam | 1 – 7 | 45 | 1.5 | 50% of the grade |
| **In total** | | 180 | 6 | 100% |

| **Evaluation criteria** | Activities in class | Colloquium 1/written | Colloquium 2/written |
|---|---|---|---|
| Description | Preparation for teaching units<br>Understanding previous content<br>Participation in solving tasks together | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. |
| Points: min. - max. | 0 - 20 | 0 - 40 | 0 - 40 |
| Minimum number of | 10 | 20 | 20 |

| | | | |
|---|---|---|---|
| points - passing threshold | | | |
| 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
3. Pass colloquia/written tests
4. Collect at least 50% points

**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* |
|---|---|---|
| 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<br>[ ] seminars and workshops<br>[x] practicals<br>[ ] remote learning<br>[ ] field work | [x] independent work<br>[ ] multimedia and network<br>[ ] laboratory<br>[ ] supervision<br>[ ] 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** | Attending classes | 1 – 6 | 45 | 1,5 | 0 |
| | Activities in class | 1 – 6 | 4,5 | 0,15 | 0 - 20 |
| | Colloquium 1/written | 1 – 3 | 9 | 0,3 | 0 - 40 |
| | Colloquium 2/written | 3 – 6 | 9 | 0,3 | 0 - 40 |
| | In total | 1 – 6 | 68 | 2,25 | 0 – 100 (50% ocjene) |
| | Final exam | 1 – 6 | 22,5 | 0,75 | 50% ocjene |

| | | | | |
|---|---|---|---|---|
| **In total** | | 90 | 3 | 100% |

| **Evaluation criteria** | Activities in class | Colloquium 1/written | Colloquium 2/written |
|---|---|---|---|
| Description | Preparation for teaching units<br>Understanding previous content<br>Participation in solving tasks together | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. |
| Points: min. - max. | 0 - 20 | 0 - 40 | 0 - 40 |
| Minimum number of points - passing threshold | 10 | 20 | 20 |
| 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
3. Pass colloquia/written tests
4. Collect at least 50% points

**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* |
|---|---|---|
| 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.
Learning process management and threads.
Analyzing synchronization mechanisms and inter-process communication.
Understanding memory management and data storage.
Familiarization 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***

1. Explain the operation of the interrupt system on a model of a simple computer.
2. Explain the concept of a process in a computer.
3. Explain the concept of threads in a computer and how the processor allocates time to them.
4. Identify the capabilities of open-source systems, package systems, and administration.
5. Recommend configuration of users, groups, disk subsystems, and basic services.
6. Recommend configuration of mechanisms for storing system and hardware operation logs with an emphasis on network interfaces.

***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<br>[ ] seminars and workshops<br>[x] practicals<br>[ ] remote learning<br>[ ] field work | [x] independent work<br>[ ] multimedia and network<br>[ ] laboratory<br>[ ] supervision<br>[ ] 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** | Attending classes | 1 – 6 | 60 | 2 | 0 |
| | Activities in class | 1 – 6 | 15 | 0.5 | 0 - 20 |
| | Colloquium 1/written | 1 – 3 | 30 | 1 | 0 - 40 |
| | Colloquium 2/written | 3 – 6 | 30 | 1 | 0 - 40 |
| | In total | 1 – 6 | 135 | 4,5 | 0 – 100 (50% of the grade) |
| | Final exam | 1 – 6 | 45 | 1.5 | 50% of the grade |
| | **In total** | | 180 | 6 | 100% |

| | | | |
|---|---|---|---|
| **Evaluation criteria** | Activities in class | Colloquium 1/written | Colloquium 2/written |
| Description | Preparation for teaching units<br>Understanding previous content<br>Participation in solving tasks together | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. | Preparation/learning<br>Theoretical knowledge<br>Scoring and grading according to correct answers in the test. |

| | | | |
|---|---|---|---|
| Points: min. - max. | 0 - 20 | 0 - 40 | 0 - 40 |
| Minimum number of points - passing threshold | 10 | 20 | 20 |
| 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
3. Pass colloquia/written tests
4. Collect at least 50% points

**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* |
|---|---|---|
| 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.

**Curriculum for Professional Undergraduate Study of Computing Šibenik University of Applied Sciences, for the academic year 2025./2026.** was adopted at the 24th session of the Council Šibenik University of Applied Sciences, which was held on Wednesday, July 07. 2025.

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Šibenik, 07.07.2025.

**Head of Department Business Informatics**
PhD Ivan Livaja, colleague professor

**Dean of Šibenik University of Applied Sciences**
PhD Ljubo Kunjić, college professor