Šibenik University of Applied Sciences

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DEPARTMENT OF BUSINESS INFORMATICS

UNDERGRADUATE PROFESSIONAL STUDY OF BUSINESS INFORMATICS

# Erasmus+ Course Catalogue

# Academic year 2024-2025

*Dean: PhD Ljubo Runjić, college professor*

*Head of department: PhD Ivan Livaja., college professor*

**Šibenik, April 2024**

# Contents

# Course list

| Professor | Component code | Course | ECTS |
|---|---|---|---|
| Livaja I. | 140755 | Introduction to databases | 4 |
| Urem F. | 146379 | Infromation systems analysis and design | 6 |
| Pavelić M. | 142638 | Object oriented programming | 6 |
| Pavelić M. | NC03 | Introduction to computer science | 4 |
| Pavelić M. | NC04 | Programming fundamentals | 5 |
| Beljo I. | NC05 | Operations research | 4 |
| Beljo I. | 146563 | Financial mathematics | 6 |
| Mečev D. | PINF-1 | Principles of ecomonics | 5 |
| Perišić A. | 146563 | Mathematics | 6 |
| Crnica G. | 201304 | English for information technology II | 3 |
| Crnica G. | 202201 | English for information technology I | 3 |
| Pavelić M. | 201307 | Computer architecture | 5 |
| Urem F. | 201315 | Business information systems | 6 |
| Perišić A. | 201321 | Business statistics | 6 |
| Livaja I. | 187581 | Protection and security of information Systems | 4 |
| Žaja J. | 141499 | Financial management (IM) | 6 |
| Vukičević A. | NC06 | Business organization (IM) | 4 |

# Full Course Curriculums

| 1. GENERAL INFORMATION | | | |
|---|---|---|---|
| 1.1. Course lecturer | Ivan Livaja | 1.8. Course code in ISVU | 140755 |
| 1.2. Course title | **Introduction to databases** | 1.9. Course code in MOZVAG | |
| 1.3. Assistants and/or associates | | 1.10. Forms of teaching (number of hours Lecturing +Practical exercises + Seminars + e learning) | (30+30+0+0) |
| 1.4. Study programme (specialist, undergraduate, graduate) | Undergraduate Professional Study of Business informatics | 1.11. Level of e- learning application (1st, 2nd, 3rd level), percentage of on line course performance (max. 20%) | 1st, course materials are on-line, 0% |
| 1.5. Course status (obligatory, optional) | Obligatory | 1.12. Number of course revisions | 2 |
| 1.6. Year of study | 2st | 1.13.Modernization | Yes |
| 1.7. Credit score (ECTS) | 4 | 1.14. Percentage estimate of course changes and/or supplements | Less than 20% X□<br>More than 20 % □ |

| 2. COURSE DESCRIPTION | |
|---|---|
| 2.1. Course objectives | • Understanding database development in business process shaping<br>• Adopting and expanding knowledge in the field:<br>• Adopting knowledge, techniques for working with databases<br>- Relational Database Design<br>- Database Managment<br>- Create an Entity Relationship Diagram<br>- Adopt the basics of sql language<br>- Adopting knowledge, techniques for working with databases<br>• - The aim of the course is to train students to understand database development in business process design so that they can independently participate in creating applications |
| 2.2. Terms of course entry and required competences | 4 year secondary education completed; qualification level 4.2 according to the CROQF. |
| 2.3. Learning outcomes on the study programme level | LO2: to define and evaluate process of thinking, planning, decision making and management in terms of electronically supported business and production |
| | LO3: to evaluate database design according to business requirements |

| | |
|---|---|
| | LO15: to compare and select appropriate development tools at a professional level |
| | LO16: to valorize elevant factors that affect organization`s and individual`s business and apply basic methods and concepts of planning, management and ac |
| | LO19: to conclude what the basic principles and methods of good project management are and work successfully in a team |

| 2.4. Expected learning outcomes on the course level | **Learning outcomes** accroding to the Bloom`s taxonomy: (up to two verbs per LO) | **Level of LO:** *1- remembering, 2- understanding, 3- application, 4-analysis, 5-evaluation, 6-synthesis* |
|---|---|---|
| | 1. Classify and explain common features, similarities and differences between current and relevant information and communication technologies, and database structures and organizations | 2, 4 |
| | 2. Implement database implementation procedures | 3 |
| | 3. Describe and make a diagram of the relational scheme of simpler databases | 1, 4 |
| | 4. Propose and argue proposals for the application of databases | 5, 6 |
| | 5. Present the acquired knowledge, ideas, problems and solutions independently and in a team. | 6 |
| | 6. Use materials and tools to search scientific and professional literature in native and English languages | 3 |

2.5. Course content according to detailed curriculum schedule

**Constructive allignement**

| no | Thematic unit | LO of the course | Content/teaching methods | Evaluation | Time |
|---|---|---|---|---|---|
| 1. | Introduction (history, DBMS solution overview) | - | Listen to lectures. Work independently on computer, get to know course content and elearning documents. | - | 9 h |
| 2. | Introduction to SQL Language | 2, 3 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the midterm or the written / oral exam define the basic concepts of databases. | 6 h |
| 3. | Introduction to SQL Language | 15 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the midterm or the written / oral exam define the basic concepts of databases. | 6 h |
| 4. | Reational model and data normalization | 16, 19 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the midterm or the written / oral exam define the basic concepts of databases. They are analyze databases. | 9 h |
| 5. | Reational model and data normalization | 3, 15, 16, 19 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the midterm or the written / oral exam define the basic concepts of databases. Analyze and apply data normalization and relational model. | 9h |
| 6. | Data Modeling Using Entity Relationship Model | 3, 15, 16, 19 | Write the colloquium. | - | 8 h |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 7. | Data Modeling Using Entity Relationship Model | 3, 15, 16, 19 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the midterm or the written / oral exam define the basic concepts of databases. They model the data by using E-R models. | 9 h | |
| | 8. | SQL commands for creating and editing a database | 3, 15, 16, 19 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the midterm or the written / oral exam define the basic concepts of databases. They model the data by using E-R models. | 9 h | |
| | 9. | SQL Data Objects | 3, 15, 16, 19 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the midterm or the written / oral exam define the basic concepts of databases. They create a database and make changes to the data within it. | 7 h | |
| | 10. | Relational database management system | 3, 15, 16, 19 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the midterm or the written / oral exam, they can define and use development environments for working with databases. | 7 h | |
| | 11. | CASE tools and development environments for working in databases - Visual Studio | 3, 15, 16, 19 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the midterm or the written / oral exam, they can define and use development environments for working with databases. | 7 h | |
| | 12. | CASE tools and development environments for working in databases - Visual Studio | 3, 15, 16, 19 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the midterm or the written / oral exam, they can define and use development environments for working with databases. | 8 h | |
| | 13. | CASE tools and development environments for working in databases - Visual Studio | 3, 15, 16, 19 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the midterm or the written / oral exam, they can define and use development environments for working with databases. | 8 h | |
| | 14. | Introduction to XML | 3, 15, 16, 19 | Write the colloquium. | - | 9 h | |
| | 15. | Defense and presentation of the seminar, recurrence of colloquia | | Listen to lectures and read literature. | - | 9 h | |

**3. EVALUATION OF STUDENTS` WORK**

| | | | | | | |
|---|---|---|---|---|---|---|
| 3.1. Students` obligations | In accordance with the Regulations on Studying and the Regulations onStudentAssessment and Evaluation: for all full-time students attendance of at least 70%. Part-time students are required to attend classes at least50%.All students are required to carry calculator and formulae list.<br>Students who have during the course achieved:<br>• from 0 - 24,9% ECTS credits- are rated F (unsuccessful) and cannot obtain ECTS credits, and must re-enroll in the next academic year;<br>• from 25 - 49,9% - are assessed by FX (insufficient) and must pass the written exam (test). Written exam (test) can be held in a regular or extraordinary exam period;<br>• more than 50% - students have the right to take the final exam.<br>Students cantake the final exam from the course in two ways: a) during the course ofteaching through continuous monitoring of students (active participationin classes and through two colloquia); b) by passing the exam (writtenand oralpart of the exam). | | | | | |
| 3.2. Monitoring student work (enter the share of ECTS credits for each activity so that the total number of ECTS points corresponds to the credit score of the course) | Attendance | 1,0 | Written exam | 2,0 (without colloquia) | Project | |
| | Experimental work | | Research | | Practical work | |
| | Essay | | Report | | Continuous examination | 0,5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Colloquium | 2,0 (without written exam) | Seminar paper | | Other | |
| | Class activity | | Oral exam | 0,5 | Other | |
| 3.3. Student workload | Student workload on all bases for 1 ECTS credit is 30 hours in a semester and is estimated as:<br>1. Attending classes and exercises 45 hours<br>2. Preparing colloquia or exams through individual work 75 hours | | | | | |

**4. GRADING SYSTEM**

4.1. Grading seminar papers

4.2. Grading colloquia/ written and oral exam

| **Unsatisfactory** | **Satisfactory** | **Above average** |
|---|---|---|
| Responds by memory, without a deeper understanding. Does not know or apply basic terms and concepts. Does not know how to apply or explain the contents of the course with examples. | Reproduces the basic concepts and without difficulty imparts new knowledge, understands the material, explains the terms and concepts supported with examples. | Knowledge is at the level of analysis, synthesis and evaluation. Observes the principles, accurately and thoroughly explains the content of the material, and logically connects and explains the terms and concepts supported with examples. Finds solutions that were not originally given. Notes correlations with related material. |
| | | |

4.3. Final grade according to evaluation elements

| | | | | |
|---|---|---|---|---|
| Active course attendance | 70-74,9% of attendance | 75-79,9% of attendance | 80-89,9% of attendance | 90-100% of attendance |
| | 2 points | 5 points | 10 points | 20 points |
| Colloquia/ Written exam | 2 | 3 | 4 | 5 |
| | 50-64,9% | 65-79,9% | 80-89,9% | 90-100% |
| | 25 points | 30 points | 35 points | 40 points |
| Oral exam | 2 | 3 | 5 | 5 |
| | 25 points | 30 points | 35 points | 40 points |

4.3. Final grade according to absolute division

| Percentage of acquired knowledge, skills and competences (teaching + final exam) | Numerical grade | ECTS grade |
|---|---|---|
| 90 – 100% | 5 (excellent) | A |
| 80 – 89,9% | 4 (very good) | B |
| 65 – 79,9% | 3 (good) | C |
| 60 – 64,9% | 2 (satisfactory) | D |
| 50 – 59,9% | 2 (satisfactory) | E |

| 5. ADDITIONAL COURSE INFORMATION | | | |
|---|---|---|---|
| 5.1. Compulsory literature (available in the library and via other media) | **Title** | **Number of copies in the library** | **Availability via other media** |
| | An Introduction to Database Systems, 8th Edition; C.J. Date; Addison Wesley | 7 | |
| | | 5 | |
| 5.2. Additional literature (at the moment of changes and/or amended of study programme) | Teaching material and exercises<br>A First Course in Database Systems; J. D. Ullman, J. Widom; Prentice-Hall; 2007; ISBN: 9780136006374<br>Database Systems: A Practical Approach to Design, Implementation, and Management; T. M. Connolly, C. E. Begg; Addison Wesley; 2004 | | |
| 5.3. Quality assurance methods that ensure the acquisition of knowledge, skills and competences | The control of students' work quality and the acquisition of necessary knowledge and skills will be ensured through interactive work. By keeping track of attendance and student activity during classes and provided information on students` progress through short colloquiums and homework, information for further guidance to students will be provided in order to increase the efficiency of their work. Students will be informed about their rights and obligations as well as the methods of work and the required literature.<br>Indicators of quality assurance system: Student survey, monitoring of annual data from the Croatian employment service on the annual state of student employment, surveys from employers and Alumni association. | | |
| 5.4. Informing about the course and contacting the teacher | It is the responsibility of each student to be regularly informed about the course, the coursework, and the classroom activities. All notices of classes or possible adjournment will be published in a timely manner on the e-learning site of the course and on the website of the Polytechnic. Students can contact teachers during the consultation period (at least one hour per week), while for short questions and explanations they can be contacted during class. It is also possible to ask questions by e-mail (from the official e-mail address at @ vus.hr), which will be answered as soon as possible (no later than five working days after receiving the e-mail). | | |

| 1. GENERAL INFORMATION ABOUT THE SUBJECT | | | |
|---|---|---|---|
| 1.1. Title | **Information systems analysis and design** | 1.8. ISVU course code | 146379 |
| 1.2. Lecturer | Frane Urem PhD prof | 1.9. MOZVAG course code | |
| 1.3. Assistants and/or associates | | 1.10. Forms of teaching (number of hours Lecturing +Practical exercises + Seminars + e learning) | (30+30+0+0) |
| 1.4. Study programme (specialist, undergraduate, graduate) | undergraduate | 1.11. Level of e- learning application (1st, 2nd, 3rd level), percentage of on line course performance (max. 20%) | 3rd – materials available On-line,<br>0% |
| 1.5. Course status (obligatory, optional) | obligatory | 1.12. Number of course revisions | 1. |
| 1.6. Study year | 3 | 1.13. Modernization | ■ yes □ no |
| 1.7. Credit score (ECTS) | 6 | 1.14. Percentage estimate of course changes and/or supplements | Less than 20% ■<br>More than 20 % □ |

| 2. COURSE DESCRIPTION | |
|---|---|
| 2.1. Course objectives | Acquiring knowledge in logical design and analysis of information systems (IS). To equip students for independent and team work in the application, methodology, methods and techniques of designing information systems for business organizational systems. By acquiring and using course knowledge, students will understand that there is no realization of a real and complex information system without a |

| | | |
|---|---|---|
| | detailed analysis and preparation of a documented project of the information system on the basis of which the development (physical realization) of the IS is carried out. | |
| 2.2. Terms of course entry and required competences | Four-year high school education completed; having a qualification at level 4.2 | |
| 2.3. Learning outcomes on the study programme level | IU9 Select appropriate professional literature in Croatian and foreign languages, prepare and independently deliver presentations in Croatian and foreign languages to expert and general audiences, and critically evaluate the presented professional topics | |
| | IU12. Apply key aspects of information technology (programming, algorithms, data structures, databases and project management in the field of information technology) | |
| | IU15. Compare and select appropriate development tools at expert level | |
| | IU17. Conclude what are the basic principles and methods of quality project management and work successfully in a team | |
| 2.4. Expected learning outcomes on the course level | **Learning outcomes** towards Bloom's taxonomy:<br>(up to two verbs per LO) | **LO Level:**<br>*1. Recapture,*<br>*2. Understanding,*<br>*3. Application,*<br>*4. Analysis,*<br>*5. Evaluation,*<br>6. *Synthesis* |
| | 1. Conduct business analysis in a real system in order to obtain the necessary information about the current state of IS | 3, 4, 5, 6 |
| | 2. Break down business functions into elemental processes - perform functional decomposition of a real system | 2, 3, 4, 6 |
| | 3. Demonstrate business processes | 2, 3, 4, 6 |
| | 4. Describe data flows and data repositories | 2, 3, 4, 6 |
| | 5. Create a conceptual data model | 2, 3, 4, 6 |
| | 6. Translate the conceptual data model into a relational data model. | 2, 3, 4, 6 |
| | 7. Develop algorithms for obtaining the most important information from the set relational data model | 2, 3, 4, 6 |
| | 8. Select IT technology resources according to the IS project created | 2, 3, 4, 6 |
| | 9. Estimate the cost of a new (engineered) IS | 2, 3, 4, 6 |

| | **Constructive alignment** | | | | | |
|---|---|---|---|---|---|---|
| 2.5. Course content according to detailed curriculum schedule | **No:** | **Thematic ensemble / Lecture Topic** | **Course LO** | **Content / Teaching Method** | **Evaluation** | **Time needed** |
| | 16. | Introduction to the course and detailed curriculum. | - | | | 2 hours |
| | | Basic terms | 1,2,3 | Listening to lectures, working on a computer, reading literature. | Basic terms | 8 hours |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 17. | Information system | 1,2,3 | Listening to lectures, working on a computer, reading literature. | Describe key stakeholders in building and using an information system<br>Analyze business needs in building and using an information system<br>Identify the impact of technological development on the construction and use of information systems | 10 hours |
| | 18. | Information system | 1,2,3 | Listening to lectures, working on a computer, reading literature. | Interpret a simplified description of information system development<br>Expose different views of stakeholders on parts of the information system | 10 hours |
| | 19. | Basics of information systems development methodologies | 1,2,3,4 | Listening to lectures, working on a computer, reading literature. | Explain Capability Maturity Model for evaluating development quality<br>Identify basic principles in the development of information systems<br>Interpret more important methodologies for developing information systems | 10 hours |
| | 20. | Basics of information systems development methodologies | 1,2,3,4 | Listening to lectures, working on a computer, reading literature. | Explain the methodology of waterfall development<br>Explain the methodology of rapid application development<br>Explain the methodology of information engineering<br>Explain the methodology of the unified development process<br>Expose the most famous agile methodologies and explain their features | 10 hours |
| | 21. | Project management | 1,2,3,4,5,9 | Listening to lectures, working on a computer, reading literature. | Analyze project success<br>Identify competencies of project managers | 10 hours |
| | 22. | Project management | 1,2,3,4,5,9 | Listening to lectures, working on a computer, reading literature. | Identify core project management functions<br>Apply project management methods | 10 hours |
| | 23. | System Analysis | 1,2,3,4,5,6,9 | Listening to lectures, working on a computer, reading literature. | Collect information from stakeholders of the information system and identify project requirements<br>Apply requirements determination processes to the system and<br>fact-finding techniques<br>Review existing documentation, forms and database<br>Perform a work environment observation<br>Design questionnaires<br>Interviewing<br>Analyze and model data<br>Identify entities, attributes, keys, connections, foreign keys<br>Apply ERD tagging<br>Use logical matrices in modeling the connections between entities | 15 hours |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 24. | System Analysis | 1,2,3,4,5,6,9 | Listening to lectures, working on a computer, reading literature. | Identify special forms of connections: non-specific links, redundant links, recursive links<br>Perform data normalization<br>Use CASE tools in data modeling<br>Model processes<br>Perform system decomposition<br>Develop a data flow model | 15 hours |
| | 25. | System Analysis | 1,2,3,4,5,6,9 | Listening to lectures, working on a computer, reading literature. | Interpret the basic settings of object-oriented analysis<br>Design classes and objects<br>Design methods and messages between objects<br>Apply encapsulation and hide information<br>Analyze inheritance<br>Apply polymorphism<br>Develop class and object diagrams<br>Develop component and layout diagrams<br>Make use cases<br>Develop activity diagrams<br>Develop interaction diagrams<br>Develop state diagrams<br>Analyze the feasibility and cost-benefits of system enhancements (operational feasibility, technical and technological feasibility, time feasibility, economic feasibility) | 15 hours |
| | 26. | System Design | 5,6,7,8,9 | Listening to lectures, working on a computer, reading literature. | Develop your own simple information system solution<br>Analyze procurement of ready-made solutions<br>Identify business management systems<br>To substantiate the decision to procure the finished solution<br>Select the appropriate system architecture | 15 hours |
| | 27. | System Design | 5,6,7,8,9,10 | Listening to lectures, working on a computer, reading literature. | Describe distributed systems<br>Explain architectures with clients and servers<br>Explain network architectures<br>Explain web architecture | 15 hours |
| | 28. | System Design | 5,6,7,8,9,10 | Listening to lectures, working on a computer, reading literature. | Explain service oriented architectures<br>Design information system security architecture<br>Design a database<br>Design a user interface | 15 hours |
| | 29. | System design, implementation and maintenance | 5,6,7,8,9,10 | Listening to lectures, working on a computer, reading literature. | Apply standards and recommendations in programming<br>Generate part of the code according to the default specification | 15 hours |
| | 30. | System design, implementation and maintenance | 5,6,7,8,9,10 | Listening to lectures, working on a computer, reading literature. | Check the correctness of the created program code<br>Provide user documentation and documentation for system maintenance | 15 hours |

## 3. EVALUATION OF STUDENT WORK

### 3.1. Students` obligations

In accordance with the Book of Rules and the Rulebook on Student Assessment and Evaluation: for all regular students attend at least 70% attendance. Part-time students have the obligation to attend at least 50% of lectures. All students must create, present and positively colloquy seminar paper.

Students who have during the course achieved:

- From 0 – 24,9% ECTS credits- is rated F (unsuccessful) and cannot get ECTS credits and must re-enrol the subject in the next academic year;
- From 25 – 49,9% ECTS credits - is rated FX (inadequate) and has to come out and pass the test (exam). A written exam can be held in a regular or extraordinary exam period;
- More than 50% ECTS credits - students have the right to access the final exam of the subject.

Students can take the final exam in the course in two ways: a) during the course of teaching through continuous monitoring of students (active participation in classes and exercises and two exams); b) during class (active participation in classes and exercises) and passing exams (written and oral examinations).

### 3.2. Monitoring student work (enter the share of ECTS credits for each activity so that the total number of ECTS points corresponds to the credit score of the course)

| | | | | | |
|---|---|---|---|---|---|
| Attendance | 2 | Written exam | 2 (by submitting both colloquiums the student is relieved of an written examination) | Project | |
| Experimental work | | Research | | Practical work | 1 |
| Essay | | Report | | Continuous examination | |
| Colloquium | 3 (by submitting both colloquiums the student is relieved of a written and oral examination) | Seminar paper | | Other (inscribe) | |
| Class activities | | Oral exam | 1 (by submitting both colloquiums the student is relieved of an oral examination) | Other (inscribe) | |

### 3.3. Student workload

The student's workload on all bases amounts to 1 ECTS point for 30 hours of work per semester and is estimated as:

| ***Commitment*** | ***Hours (estimate)*** |
|---|---|
| 1. Attending classes | 60 |
| 2. Practical work | 30 |
| 3. Preparation for the Colloquium / exam through self-study | 90 |
| | |

## 4. GRADING

**4.1. Seminar paper grading**

| Valuation Element | Poor | Satisfying | Above average |
|---|---|---|---|
| | | | |

**4.2. Colloquium / exam grading**

| Poor | Satisfying | Above average |
|---|---|---|
| Give answer by memory, no deeper understanding. Does not know and does not apply the basic terms and concepts. Cannot apply or explain the contents of the course. | Reproduces basic terms, without difficulty transfers new knowledge, understands subject matter, explains the terms and the notions that substantiate by examples. | Knowledge is at the level of analysis, synthesis and evaluation. It observes legitimacy, accurately and thoroughly explains the content of the subject, and logically links and explains the terms and concepts that it encapsulates. Find solutions that are not originally given. There is a correlation with correlative subjects. |

**4.3. Creating a final grade according to evaluation elements**

| | | | | |
|---|---|---|---|---|
| Active participation in the lessons | 70-75% of attendance | 76-86% of attendance | 87-100% of attendance | Created mental map. Solved case study. |
| | 4 points | 7 points | 10 points | 3 points |
| Seminar paper | 2 | 3 | 4 | 5 |
| | 5 points | 7 points | 8 points | 10 points |
| Colloquium / written exam | 2 | 3 | 4 | 5 |
| | 50-64,9% | 65-79,9% | 80-89,9% | 90-100% |
| | 25 points | 30 points | 35 points | 40 points |
| Oral exam | 2 | 3 | 5 | 5 |
| | 25 points | 30 points | 35 points | 40 points |

**4.4. Creating a final grade according to absolute allocation**

| Percentage of adopted knowledge, skills and competences (teaching + final exam) | Numerous grade | ECTS grade |
|---|---|---|
| 90 – 100% | 5 (excellent) | A |
| 80 – 89,9% | 4 (very good) | B |
| 65 – 79,9% | 3 (good) | C |
| 60 – 64,9% | 2 (sufficient) | D |
| 50 – 59,9% | 2 (sufficient) | E |

| 5. ADDITIONAL INFORMATION ABOUT THE COURSE | | | |
|---|---|---|---|
| 5.1. Compulsory literature (available in the library and through other media) | **Title** | **Number of copies in the library** | **Availability via other media** |
| | F. Urem, Projektiranje i analiza IS-a, Veleučilište u Šibeniku, 2016., ISBN: 978-953-7566-30-2 | | Available online at e-learning system |
| 5.2. Additional literature (at the moment of changes and/or amended of study programme) | J. A. Hoffer, J. F. George, J. S. Valacich: Modern Systems Analysis and Design, 3/e, Prentice Hall College Div, 2001.<br>Eeles, P.; O. Sims, Building Business Objects. John Wiley & Sons, 1998. | 3 | Available online at e-learning system |
| 5.3. Quality assurance methods that ensure the acquisition of knowledge, skills and competences | The control of students' work quality and the acquisition of necessary knowledge and skills will be ensured through interactive work. By keeping track of attendance and student activity during classes and provided information on students` progress through short colloquiums and homework, information for further guidance to students will be provided in order to increase the efficiency of their work. Students will be informed about their rights and obligations as well as the methods of work and the required literature.<br>Indicators of quality assurance system: Student survey, monitoring of annual data from the Croatian employment service on the annual state of student employment, surveys from employers and Alumni association. | | |
| 5.4. information on the course and contact with the teacher | It is obligatory for every student to regularly inform about the course, teaching and teaching activities. All information about teaching or any delay in teaching will be published on the e-learning pages of the course and on the web pages of the Polytechnic. Students can contact the teachers during the consultation term (at least one hour per week), while brief questions and explanations can be addressed during classes. It is possible to ask questions by e-mail (from the official e-mail address from the domain @ vus.hr) that will be answered in a short time (no later than five working days from the receipt of e-mail). | | |

| 1. GENERAL INFORMATION ABOUT THE SUBJECT | | | |
|---|---|---|---|
| 1.1. Title | **Object oriented programming** | 1.8. ISVU course code | 142638 |
| 1.2. Lecturer | Marko Pavelić | 1.9. MOZVAG course code | |
| 1.3. Assistants and/or associates | | 1.10. Forms of teaching (number of hours Lecturing +Practical exercises + Seminars + e learning) | (30+30+0+0) |
| 1.4. Study programme (specialist, undergraduate, graduate) | undergraduate | 1.11. Level of e- learning application (1st, 2nd, 3rd level), percentage of on line course performance (max. 20%) | 3rd – materials available On-line,<br>0% |
| 1.5. Course status (obligatory, optional) | obligatory | 1.12. Number of course revisions | 1. |
| 1.6. Study year | 2 | 1.13. Modernization | ■ yes □ no |
| 1.7. Credit score (ECTS) | 6 | 1.14. Percentage estimate of course changes and/or supplements | Less than 20% ■<br>More than 20 % □ |

| 2. COURSE DESCRIPTION | |
|---|---|
| 2.1. Course objectives | Introduce the student to the concepts of object-oriented programming |
| 2.2. Terms of course entry and required competences | Four-year high school education completed; having a qualification at level 4.2 |

| | | |
|---|---|---|
| 2.3. Learning outcomes on the study programme level | IU9 Select appropriate professional literature in Croatian and foreign languages, prepare and independently deliver presentations in Croatian and foreign languages to expert and general audiences, and critically evaluate the presented professional topics | |
| | IU12. Apply key aspects of information technology (programming, algorithms, data structures, databases and project management in the field of information technology) | |
| | IU15. Compare and select appropriate development tools at expert level | |
| 2.4. Expected learning outcomes on the course level | **Learning outcomes** towards Bloom's taxonomy:<br>(up to two verbs per LO) | **LO Level:**<br>*7. Recapture,*<br>*8. Understanding,*<br>*9. Application,*<br>*10. Analysis,*<br>*11. Evaluation,*<br>12. *Synthesis* |
| | 1. Write a simple program based on object-oriented principles and UML paradigms | 3,4,6 |
| | 2. Select the option of developing applications in object-oriented or procedural programming language | 3,4,6 |
| | 3. Organize application parts into classes, interfaces, and packages in accordance with object-oriented programming principles | 3,4,6 |
| | 4. Create an object-oriented model of the class hierarchy on which the implementation of the application will be based | 4,5, 6 |
| | 5. Self-assess whether more complex classes need to be structured into simpler ones for better modularity | 4,6 |
| | 6. Organize the classes so that they use the other application components over other classes | 4,6 |
| | 7. Manage tools that generate program code with a basic structure based on the graphical model of the classes | 3 |

| | **Constructive alignment** | | | | | |
|---|---|---|---|---|---|---|
| 2.5. Course content according to detailed curriculum schedule | **No:** | **Thematic ensemble / Lecture Topic** | **Course LO** | **Content / Teaching Method** | **Evaluation** | **Time needed** |
| | 31. | Introduction to the course and detailed curriculum. | - | | | 2 hours |
| | | Introduction to object-oriented design | 2, 3, 4, 5, 6 | Listening to lectures, working on a computer, reading literature. | At the midterm or the written and oral exam they define the basic concepts in object oriented programming. They describe the role of the object-oriented approach in programming. | 8 hours |
| | 32. | Objects and classes, parts of classes and objects,<br>inheritance with examples | 2, 3, 4, 5, 6 | Listening to lectures, working on a computer, reading literature. | They can enumerate parts of the class at the colloquium or the written and oral exam. They create an object-oriented model of the class hierarchy on which the implementation of the application will be based | 10 hours |
| | 33. | Defining links between objects, polymorphism, encapsulation of objects | 2, 3, 4, 5, 6 | Listening to lectures, working on a computer, reading literature. | At the midterm or the written and oral exam they know:<br>To model different behaviors of an object according to the interactions that it must have towards the environment. | 10 hours |

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| | | | | | They use a private access modifier on parts of the class.<br>They analyze the effect of different access modifiers.<br>Recognize software development stages and their order<br>They recognize the basic properties of an object and a class. | |
| | 34. | UML - Introduction, Class Diagrams | 2, 3, 4, 5, 6 | Listening to lectures, working on a computer, reading literature. | At the midterm or the written and oral exam they can define what UML notation is for and list the major UML notations. At the colloquium or the written and oral exam they can make a class diagram according to the set use case. | 10 hours |
| | 35. | UML-Interaction diagrams, Activity diagrams, use of patterns in object-oriented design | 2, 3, 4, 5, 6 | Listening to lectures, working on a computer, reading literature. | At the midterm or the written and oral exam they can make appropriate interaction and activity diagrams according to the set use case. | 10 hours |
| | 36. | Programming in Object Oriented Languages - C # Basics - Syntax and Language Architecture | 1,2,3,4,5,6,7 | Listening to lectures, working on a computer, reading literature. | Identify the main types of variables (boolean, int, double, String). Declare a variable and assign a corresponding value to it. Use variable naming conventions.<br>Differentiate the representation of integers (byte, short, int, long). Differentiate the representation of decimal numbers (float, double). Perform arithmetic operations on different numerical data types.<br>Declare char and String variables. Perform String variables merge. Perform console printing.<br>Take advantage of automatic promotion of data types. Identify situations where an error may occur. Convert data types. Identify situations where an error may occur. Convert String variable to numeric value | 10 hours |
| | 37. | Programming in Object Oriented Languages - C # Basics - Syntax and Language Architecture | 1,2,3,4,5,6,7 | Listening to lectures, working on a computer, reading literature. | Design a simple class containing variables and a method for printing the contents of variables. Instance an object from a formatted class.<br>Invoke method from instated object. Design a method that contains input parameters. Pass input arguments to method.<br>Design the method so that it can return the result of the computation. Print the result of the method call. | 10 hours |
| | 38. | Programming in Object Oriented Languages - C # Basics - Syntax and Language Architecture | 1,2,3,4,5,6,7 | Listening to lectures, working on a computer, reading literature. | Access the class by specifying the full package name and class. Perform the package import procedure using the import command. Determine which packages do not need to be imported separately. Using the (*) operator when importing packages. Find and view online String class documentation. Invoke the most important methods | 15 hours |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | of the String class. Compare two String objects by content. Retrieve parts of the String object.<br>Explain the need to use random numbers in programming. Invoke Random-class methods that generate random numbers while controlling the range of values obtained.<br>Use different methods from the Random class for different mathematical calculations. Access the values of mathematical constants from the Math class. Comment on method calls relative to the Random class. | |
| | 39. | Programming in Object Oriented Languages - C # Basics - Syntax and Language Architecture | 1,2,3,4,5,6,7 | Listening to lectures, working on a computer, reading literature. | Declare and initialize the boolean type of the variable. Perform a comparison of the two expressions using relational operators.<br>Use the if and if / else command.<br>Analyze the problem of comparing String objects using relational operators. Use the compare method to compare two String objects.<br>Describe logical operators. Associate multiple logical expressions using logical operators.<br>Use ternary operators to execute if / else block.<br>Use else if command. Create nested block if commands.<br>Create switch block logical branching. Compare switch block with if / else command block.<br>Analyze the use of break commands in the switch block of commands. | 15 hours |
| | 40. | Programming in Object Oriented Languages - C # Basics - Syntax and Language Architecture | 1,2,3,4,5,6,7 | Listening to lectures, working on a computer, reading literature. | Analyze the elements of standard for loop. Make for loop.<br>Analyze the reach of a variable used within a loop. Use a debugger tool for loop analysis. Analyze cases where an infinite loop occurs.<br>Create a while loop.<br>Create a do-while loop.<br>Analyze cases where the advantage of using a particular type of loop is observed.<br>Use the break loop to exit the loop.<br>Use the continue command to skip a specific block of commands within a loop.<br>Identify the need to make comments within a loop. | 15 hours |
| | 41. | Programming in Object Oriented Languages - C # Basics - Syntax and Language Architecture | 1,2,3,4,5,6,7 | Listening to lectures, working on a computer, reading literature. | Analyze the problem posed and describe it with the classes.<br>Analyze cases of variable reach in different parts of the class.<br>Model class variables and methods by default.<br>Analyze the organization of virtual machine memory when instantiating a new object<br>Access the contents of an object by using an object reference | 15 hours |

| | | | | | | |
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| | | | | | Analyze different ways of instantiating a String object<br>Demonstrate the importance of initializing variables within a class. Analyze problems that arise with null values of variables.<br>Construct a constructor that initializes the initial values of the variables.<br>Use the keyword this as a reference to an object.<br>Model multiple class constructor versions.<br>Create multiple versions of one method. Define what is the signature of a method. Analyze cases where method overload is not possible.<br>Model the various behaviors of an object according to the interactions it must exert toward the environment.<br>Use the private access modifier on parts of the class. Analyze the effect of different access modifiers.<br>Model "getter" and "setter" methods for the given class.<br>Define the purpose of static variables and show an example of usage.<br>Define the purpose of static methods and show an example of use<br>Demonstrate the purpose of using the final keyword on static variables | |
| | 42. | Programming in Object Oriented Languages - C # Basics - Syntax and Language Architecture | 1,2,3,4,5,6,7 | Listening to lectures, working on a computer, reading literature. | Create and initialize a one-dimensional field.<br>Access and change individual field values.<br>Cross all the elements of the array using for loops. | 15 hours |
| | 43. | Programming in Object Oriented Languages - C # Basics - Syntax and Language Architecture | 1,2,3,4,5,6,7 | Listening to lectures, working on a computer, reading literature. | Create an ArrayList object and manage its contents.<br>Cross all list items using the for-each loop.<br>Analyze ways to add simple data types to the list, using wrapper classes<br>Explain the purpose of using exceptions in program code.<br>Manage exceptions using try-catch block<br>Identify common exceptions (attempt to access an object that is not instantiated or a non-existent file)<br>Test an example code that contains errors.<br>Describe three sets of bugs.<br>Identify a bug using a print technique.<br>Identify a bug using the debugger tool. | 15 hours |
| | 44. | Programming in Object Oriented Languages - C # Basics - Syntax and Language Architecture | 1,2,3,4,5,6,7 | Listening to lectures, working on a computer, reading literature. | Instance a StringBuilder object. Manage the StringBuilder object.<br>Describe the differences between String and StringBuilder objects.<br>Search for a String object using regular expressions | 15 hours |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | Describe linear recursion. Develop a simple software solution that uses a linear recursion algorithm.<br>Describe nonlinear recursion. Develop a simple software solution that uses nonlinear recursions. | |
| | 45. | Programming in Object Oriented Languages - C # Basics - Syntax and Language Architecture | 1,2,3,4,5,6,7 | Listening to lectures, working on a computer, reading literature. | Develop a software solution that manages files using finished classes from the .NET directory.<br>Program access rights on folders and files.<br>Perform serialization and deserialization of the facility.<br>Create your own class package and name it correctly. Distribute the application. | 15 hours |

## 3. EVALUATION OF STUDENT WORK

**3.1. Students` obligations**

In accordance with the Book of Rules and the Rulebook on Student Assessment and Evaluation: for all regular students attend at least 70% attendance. Part-time students have the obligation to attend at least 50% of lectures. All students must create, present and positively colloquy seminar paper.

Students who have during the course achieved:

- From 0 – 24,9% ECTS credits- is rated F (unsuccessful) and cannot get ECTS credits and must re-enrol the subject in the next academic year;
- From 25 – 49,9% ECTS credits - is rated FX (inadequate) and has to come out and pass the test (exam). A written exam can be held in a regular or extraordinary exam period;
- More than 50% ECTS credits - students have the right to access the final exam of the subject.

Students can take the final exam in the course in two ways: a) during the course of teaching through continuous monitoring of students (active participation in classes and exercises and two exams); b) during class (active participation in classes and exercises) and passing exams (written and oral examinations).

**3.2. Monitoring student work (enter the share of ECTS credits for each activity so that the total number of ECTS points corresponds to the credit score of the course)**

| | | | | | |
|---|---|---|---|---|---|
| Attendance | 2 | Written exam | 2 (by submitting both colloquiums the student is relieved of an written examination) | Project | |
| Experimental work | | Research | | Practical work | 1 |
| Essay | | Report | | Continuous examination | |
| Colloquium | 3 (by submitting both colloquiums the student is relieved of a written and oral examination) | Seminar paper | | Other (inscribe) | |
| Class activities | | Oral exam | 1 (by submitting both colloquiums the student is relieved of an oral examination) | Other (inscribe) | |

**3.3. Student workload**

The student's workload on all bases amounts to 1 ECTS point for 30 hours of work per semester and is estimated as:

| ***Commitment*** | ***Hours (estimate)*** |
|---|---|
| 4. Attending classes | 60 |
| 5. Practical work | 30 |

| | | |
|---|---|---|
| | 6. Preparation for the Colloquium / exam through self-study | 90 |
| | | |

## 4. GRADING

### 4.1. Seminar paper grading

| Valuation Element | Poor | Satisfying | Above average |
|---|---|---|---|
| | | | |

### 4.2. Colloquium / exam grading

| Poor | Satisfying | Above average |
|---|---|---|
| Give answer by memory, no deeper understanding. Does not know and does not apply the basic terms and concepts. Cannot apply or explain the contents of the course. | Reproduces basic terms, without difficulty transfers new knowledge, understands subject matter, explains the terms and the notions that substantiate by examples. | Knowledge is at the level of analysis, synthesis and evaluation. It observes legitimacy, accurately and thoroughly explains the content of the subject, and logically links and explains the terms and concepts that it encapsulates. Find solutions that are not originally given. There is a correlation with correlative subjects. |

### 4.3. Creating a final grade according to evaluation elements

| | | | | |
|---|---|---|---|---|
| Active participation in the lessons | 70-75% of attendance | 76-86% of attendance | 87-100% of attendance | Created mental map. Solved case study. |
| | 4 points | 7 points | 10 points | 3 points |
| Seminar paper | 2 | 3 | 4 | 5 |
| | 5 points | 7 points | 8 points | 10 points |
| Colloquium / written exam | 2 | 3 | 4 | 5 |
| | 50-64,9% | 65-79,9% | 80-89,9% | 90-100% |
| | 25 points | 30 points | 35 points | 40 points |
| Oral exam | 2 | 3 | 5 | 5 |
| | 25 points | 30 points | 35 points | 40 points |

### 4.4. Creating a final grade according to absolute allocation

| Percentage of adopted knowledge, skills and competences (teaching + final exam) | Numerous grade | ECTS grade |
|---|---|---|
| 90 – 100% | 5 (excellent) | A |
| 80 – 89,9% | 4 (very good) | B |

| | | | | | |
|---|---|---|---|---|---|
| | | 65 – 79,9% | 3 (good) | C | |
| | | 60 – 64,9% | 2 (sufficient) | D | |
| | | 50 – 59,9% | 2 (sufficient) | E | |

## 5. ADDITIONAL INFORMATION ABOUT THE COURSE

| | Title | Number of copies in the library | Availability via other media |
|---|---|---|---|
| 5.1. Compulsory literature (available in the library and through other media) | F.Urem „Uvod u objektno orijentirano programiranje s primjenama“, Veleučilište u Šibeniku, 2016., ISBN: 978-953-7566-20-3. | | Available online at e-learning system |
| 5.2. Additional literature (at the moment of changes and/or amended of study programme) | Booch, Grady, Object-Oriented Analysis and Design with Applications, Addison-Wesley, 1997.<br>P. Eeles, O. Sims, Building Business Objects. John Wiley & Sons, 1998. | 3 | Available online at e-learning system |
| 5.3. Quality assurance methods that ensure the acquisition of knowledge, skills and competences | The control of students' work quality and the acquisition of necessary knowledge and skills will be ensured through interactive work. By keeping track of attendance and student activity during classes and provided information on students` progress through short colloquiums and homework, information for further guidance to students will be provided in order to increase the efficiency of their work. Students will be informed about their rights and obligations as well as the methods of work and the required literature.<br>Indicators of quality assurance system: Student survey, monitoring of annual data from the Croatian employment service on the annual state of student employment, surveys from employers and Alumni association. | | |
| 5.4. information on the course and contact with the teacher | It is obligatory for every student to regularly inform about the course, teaching and teaching activities. All information about teaching or any delay in teaching will be published on the e-learning pages of the course and on the web pages of the Polytechnic. Students can contact the teachers during the consultation term (at least one hour per week), while brief questions and explanations can be addressed during classes. It is possible to ask questions by e-mail (from the official e-mail address from the domain @ vus.hr) that will be answered in a short time (no later than five working days from the receipt of e-mail). | | |

| **2. GENERAL INFORMATION** | | | |
|---|---|---|---|
| 1.1. Course lecturer | Marko Pavelić | 1.7. Credit score (ECTS) | 3 |
| 1.2. Course title | **Introduction to computer science** | 1.8. Forms of teaching (number of hours Lecturing +Practical exercises + Seminars + e learning) | 30 L + 30 P |
| 1.3. Assistants and/or associates | Milan Hrga | 1.9. Level of e- learning application (1st, 2nd, 3rd level), percentage of on line course performance (max. 20%) | Materials available on-line, use of on-line tools (LMC – simulator) 15% |
| 1.4. Study programme (specialist, undergraduate, graduate) | undergraduate professional | 2.10. Number of course revisions | 1 |
| 1.5. Course status (obligatory, optional) | Obligatory | 2.11. Modernization | New |
| 1.6. Year of study | I. | 1.12. Percentage estimate of course changes and/or supplements | Less than 20% ■<br>More than 20 % □ |

| **2. COURSE DESCRIPTION** | |
|---|---|
| 2.1. Course objectives | Students are acquainted with: functioning principles of digital computers, role, complexity and representation of algorithms and with the basics of computational/algorithmic thinking. Understanding abstraction and its role in problem definition and solution finding. Establishing capability for problem solving algorithms selection/accommodation. Understanding interactions between algorithm complexity and its efficiency. Rising knowledge about use of computers and its influence on problem solving, based on the way how computers are functioning, their limitations and the way how information is represented in digital computers. |
| 2.2. Terms of course entry and required competences | none |
| 2.3. Learning outcomes on the study programme level | · To apply and link economic terms in more complex written and oral communication in Croatian and foreign languages<br>· To individually and responsibly search relevant literature for reaching solutions and conclusions in Croatian and foreign languages<br>· To apply key aspects of information technologies (programming, algorithms, data structures, databases and project management in the field of information technologies)<br>· To interpret mechanisms for the control of: data flow, errors and fragmentation, data transfer multiplexing methods using routing methods in computer networks; as well as to configure and maintain active network devices<br>· To know the processor architecture, memory, and input-output components of computers, as well as their advantages and limitations, and to evaluate which changes to hardware and the operating system can best improve computer performance for certain types of tasks |
| 2.4. Expected learning outcomes on the course level | Student understands how to transform different types of information (numerical, textual, visual, audio) into data suitable for recording and manipulating in computers. He is able to categorise data and select suitable coding which is best adopted for the given problem.<br>Student understands how computer functions and is able to distinguish different building parts according to von Neumann model. |

| | |
|---|---|
| | Student understands role of algorithms and how are they defined in different categories of programming languages.<br>Student understands how computers exercise algorithms and is able to evaluate their efficiency.<br>Student applies basic control structures in algorithms as are: conditional execution, program branches program loops etc.<br>Student can evaluate which type of algorithm of iterative or recursive type is effective and efficient in solving of the given problem. |

**2.5. Course content according to detailed curriculum schedule**

| LECTURES | | EXERCISES | |
|---|---|---|---|
| Introduction to computer science | 2 | Binary numbers | 2 |
| Number representation in computers, | 2 | Binary arithmetic | 2 |
| Bool's logic, logic functions/gates | 2 | Non number data representation in computers | 2 |
| Combinatorial and sequential devices | 2 | Bool's functions, logical gates | 2 |
| Computer architecture principles, von Neumann model | 2 | Optimization of logical functions, minimization | 2 |
| LMC functioning analysis, ISA, Assembler | 2 | Von Neumann model, LMC | 2 |
| Algorithms, definition, examples | 2 | Programing LMC-a | 2 |
| Sorting algorithms | 2 | Sort algorithm | 2 |
| Algorithm complexity, O-notation | 2 | Algorithm programming, LMC Assembler | 2 |
| Formal languages – Programming language | 2 | Algorithm programming, LMC Assembler | 2 |
| Programming | 2 | Programming in Phyton | 2 |
| Computer types and architecture | 2 | Computer architecture basics | 2 |
| Communication networks and protocols | 2 | Operating system Windows | 2 |
| Operation systems | 2 | Operating system Linux | 2 |
| Future development and applications of information technologies | 2 | Internet, e-mail, Web applications | 2 |

| 2.6. Teaching methods | | | 2.7. Comments: |
|---|---|---|---|
| | ■ lectures<br>□ seminars and workshops<br>■ practical exercises<br>□ distance education<br>□ mixed e-learning<br>□ field teaching | ■ independent tasks<br>□ multimedia and network<br>■ laboratory<br>□ mentoring<br>□ other | This course prepares students for Programming Basics and Computer Architecture and Operating Systems courses |

**2.8. Students` obligations**

Minimal attendance for full-time students is 70% of all lectures and exercises. Students who do not satisfy minimal attendance condition will not be allowed to the exam. Part time students can supplement attendance with regular consultations with lecturer on the be-weekly basis.
It is strongly recommended that students take active part during lectures (in discussions, readings, rising questions, problem solving etc.) Part time students who will not be able to attend lectures regularly should contact lecturer in advance during consultation hours or via e-mail (zelimir.mikulic@vus.hr). It is duty of a student to inform itself about lectures on the daily basis. Lecture's weekly schedule is available on the web site of Polytechnic of Šibenik (http://www.vus.hr/?stranice=raspored-predavanja-preddiplomski-informaticki-menadzment&id=129). Notifications about possible changes will be sent to students via e-mail and posted on the web page of course e-learning site, together with all information about course, learning materials, assignments etc.

| 2.9. Monitoring student work (enter the share of ECTS credits for each activity so that the total number of | | | | | | |
|---|---|---|---|---|---|---|
| | Attendance | 2 | Written exam | 0.5 | Project | |
| | Experimental work | | Research | | Practical work | |

| | | | | | | |
|---|---|---|---|---|---|---|
| ECTS points corresponds to the credit score of the course) | Essay | | Report | | Continuous examination | |
| | Colloquium | | Seminar paper | | Other | |
| | Class activity | | Oral exam | 0.5 | Other | |

| | | | |
|---|---|---|---|
| 2.10. Grading and evaluating students` work during classes and on the exam | Attendance 10%<br>Activity in the Class 15%<br>Writen Exam 25%<br>Oral Exam 50% | | |
| 2.11. Compulsory literature (available in the library and via other media) | **Title** | **Number of copies in the library** | **Availability via other media** |
| | Brookshear G. : Computer Science an Overview, 11th ed, Addison Wesley<br>I.Englander: The Architecture of Computer Hardware, Systems Software & Networking, 4th ed., John Wiley & Sons, 2010 | 1<br>5 | pdf<br>pdf |
| 2.12. Additional litearature (at the moment of changes and/or amended of study programme) | Evans D. : Introduction to Computing, Creative Commons, 2011 | | pdf |
| 2.13. Quality assurance methods that ensure the acquisition of knowledge, skills and competences | The control of students' work quality and the acquisition of necessary knowledge and skills will be ensured through interactive work. By keeping track of attendance and student activity during classes and provided information on students` progress through short colloquiums and homework, information for further guidance to students will be provided in order to increase the efficiency of their work. Students will be informed about their rights and obligations as well as the methods of work and the required literature.<br>Indicators of quality assurance system: Student survey, monitoring of annual data from the Croatian employment service on the annual state of student employment, surveys from employers and Alumni association. | | |

| 3. GENERAL INFORMATION | | | |
|---|---|---|---|
| 1.1. Course lecturer | Marko Pavelić | 1.7. Credit score (ECTS) | 5 |
| 1.2. Course title | **Programming fundamentals** | 1.8. Forms of teaching (number of hours Lecturing +Practical exercises + Seminars + e learning) | 30 L + 45 P |
| 1.3. Assistants and/or associates | Milan Hrga | 1.9. Level of e- learning application (1st, 2nd, 3rd level), percentage of on line course performance (max. 20%) | Materials available on-line, use of on-line tools 10% |
| 1.4. Study programme (specialist, undergraduate, graduate) | undergraduate professional | 3.10. Number of course revisions | I |
| 1.5. Course status (obligatory, optional) | Obligatory | 3.11. Modernization | ■ |
| 1.6. Year of study | I. | 1.12. Percentage estimate of course changes and/or supplements | Less than 20% ■<br>More than 20 % □ |

| 2. COURSE DESCRIPTION | |
|---|---|
| 2.1. Course objectives | This single semester course in programming requires no prior programming experience. Introduces students to the basics of C++ programming language. Goal of this course is to familiarise students with computer and algorithmic thinking, introduce them to the data abstractions and train for problem solving. Students will be able to develop program solutions for problems of basic to medium complexity using C++ programming language. Students rise capability of abstract thinking, are able to select and apply algorithm for solving of typical known problem and define data abstraction for complex data sets. |
| 2.2. Terms of course entry and required competences | Student has attended Introduction to Computer Science Course |
| 2.3. Learning outcomes on the study programme level | · To apply and link economic terms in more complex written and oral communication in Croatian and foreign languages<br>· To individually and responsibly search relevant literature for reaching solutions and conclusions in Croatian and foreign languages<br>· To apply key aspects of information technologies (programming, algorithms, data structures, databases and project management in the field of information technologies)<br>· To link activities of business process modelling with the activities of designing, building and maintaining the information system according to the needs of the client and user |
| 2.4. Expected learning outcomes on the course level | Student understands and applies basic programming constructs of C/C++ programming language.<br>Is capable to select and define data structure for specific problem, manipulate different basic and user defined data types, as well as complex data structures like arrays, structures and use pointers where applicable.<br>Students are able to read and test C++ code and locate and correct typical programming errors. |

| | |
|---|---|
| | Students are able to model given simple problem, find solution and transform it to C++ code using above mentioned skills. (basic outcomes for passing grade)<br>Student can analyse problem and is able to apply object oriented approach in data modelling using standard classes (grade C).<br>Student is able to define and apply complex abstract data types using inheritance. (grade B)<br>Then solving complex tasks student applies procedures for dynamic memory allocation and deallocation. (grade A) |

2.5. Course content according to detailed curriculum schedule

| LECTURES | | | EXERCISES/LABS | | |
|---|---|---|---|---|---|
| Week | Hour | Theme | Week | Hour | Theme |
| 1 | 2 | Algorithms. | 1 | 3 | Scratch. Working in MS Visual Studio |
| 2 | 2 | Programming languages, commands, operators, expressions, dana types. | 2 | 3 | Expressions, default data types, implicit transformation |
| 3 | 2 | Variables, algebraic and logical expressions | 3 | 3 | Variables, constants (literal and declared). Expressions (operator precedence, evaluation) |
| 4 | 2 | Program sequence control: conditional execution and loops | 4 | 3 | Sequence control: conditional execution and loops. |
| 5 | 2 | Programming functions | 5 | 3 | Programming functions |
| 6 | 2 | Arguments passing and recursion | 6 | 3 | Argument passing (by value/reference), recursion |
| 7 | 2 | Array, strings and user defined data | 7 | 3 | Arrays: declaration, use (in expression and as arguments) |
| 8 | 2 | Pointers and references | 8 | 3 | Use of pointers and references, advantages and pitfalls |
| 9 | 2 | Introduction to object oriented programming. Encapsulation, "private" and "public" access. | 9 | 3 | Repetition |
| 10 | 2 | Class, object, members (attributes and methods). | 10 | 3 | Defining and using of classes |
| 11 | 2 | Polymorphism and overloading. Constructor and operator overloading. | 11 | 3 | Polymorphism and operator overloading |
| 12 | 2 | Inheritance, friends (functions and operators). | 12 | 3 | Inheritance |
| 13 | 2 | Template classes | 13 | 3 | Template classes |
| 14 | 2 | Structuring of programming project and team work. | 14 | 3 | Project |
| 15 | 2 | Dynamic memory control, exceptions handling etc | 15 | 3 | Project |

| 2.6. Teaching methods | | | 2.7. Comments: |
|---|---|---|---|
| | ■ lectures<br>□ seminars and workshops<br>■ practical exercises<br>□ distance education<br>□ mixed e-learning | ■ independent tasks<br>□ multimedia and network<br>■ laboratory<br>□ mentoring<br>□ other | Course starts in the second half of winter semester after introduction in Computer Science finishes |

| 2.8. Students` obligations | |
|---|---|
| | Minimal attendance for full-time students is 70% of all lectures and exercises. Students who do not satisfy minimal attendance condition will not be allowed to the exam. Part time students can supplement attendance with regular consultations with lecturer on the be-weekly basis. |

<table>
<tr><td></td><td colspan="6">It is strongly recommended that students take active part during lectures (in discussions, readings, rising questions, problem solving etc.) Part time students who will not be able to attend lectures regularly should contact lecturer in advance during consultation hours or via e-mail (zelimir.mikulic@vus.hr). It is duty of a student to inform itself about lectures on the daily basis. Lecture's weekly schedule is available on the web site of Polytechnic of Šibenik (http://www.vus.hr/?stranice=raspored-predavanja-preddiplomski-informaticki-menadzment&id=129). Notifications about possible changes will be sent to students via e-mail and posted on the web page of course e-learning site, together with all information about course, learning materials, assignments etc.</td></tr>
<tr><td rowspan="5">2.9. Monitoring student work (enter the share of ECTS credits for each activity so that the total number of ECTS points corresponds to the credit score of the course)</td><td>Attendance</td><td>2.5</td><td>Written exam</td><td>2</td><td>Project</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Research</td><td></td><td>Practical work</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Report</td><td></td><td>Continuous examination</td><td></td></tr>
<tr><td>Colloquium</td><td></td><td>Seminar paper</td><td></td><td>Other</td><td></td></tr>
<tr><td>Class activity</td><td></td><td>Oral exam</td><td>0.5</td><td>Other</td><td></td></tr>
<tr><td>2.10. Grading and evaluating students` work during classes and on the exam</td><td colspan="6">Student's attendance is regularly registered as is activity in class during lectures and exercises. Three colloquiums are organized during semester (not obligatory for students) and student who scores over 50% points on each of them can go directly to oral exam. Total score from all three colloquiums is then used instead of written exam score. If student passes only two out of three colloquiums, he can repeat one he has missed at the end of semester. Students who do not pass all three colloquiums have to approach to the written exam. On the written exam student has to score minimum of 50% points to be allowed to the oral exam. Final grade is based on the following criteria: 10% based on attendance , 15% on activity during lectures and exercises, 25% based on results of written exam and 50% based on results of oral exam.</td></tr>
<tr><td rowspan="2">2.11. Compulsory literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">Julijan Šribar, Boris Motik: Demistificirani C++, Element, Zagreb 2001. 2. izdanje (ili novije izdanje)<br>Želimir Mikulić: Osnove programiranja, Veleučilište u Šibeniku, 2018<br>Dawson M.: Beginning C++ Through Game Programming, 3ed, Course Technology 2011<br>Downey A.: How to think like a computer scientist, C++ Edition</td><td>10<br>-<br>-<br>-</td><td>-<br>pdf<br>pdf<br>pdf</td></tr>
<tr><td>2.12. Additional literature (at the moment of changes and/or amended of study programme)</td><td colspan="4">Frank Friedman, Elliot Koffman: Problem Solving, Abstraction and Design Using C++, Pierson/Addison Wesley, 5th ed.</td><td>1</td><td></td></tr>
<tr><td>2.13. Quality assurance methods that ensure the acquisition of knowledge, skills and competences</td><td colspan="6">The control of students' work quality and the acquisition of necessary knowledge and skills will be ensured through interactive work. By keeping track of attendance and student activity during classes and provided information on students` progress through short colloquiums and homework, information for further guidance to students will be provided in order to increase the efficiency of their work. Students will be informed about their rights and obligations as well as the methods of work and the required literature.<br>Indicators of quality assurance system: Student survey, monitoring of annual data from the Croatian employment service on the annual state of student employment, surveys from employers and Alumni association.</td></tr>
</table>

| 1. GENERAL INFORMATION ABOUT THE SUBJECT | | | |
|---|---|---|---|
| 1.1. Title | **Operational research** | 1.8. ISVU course code | |
| 1.2. Lecturer | Marko Pavelić | 1.9. MOZVAG course code | |
| 1.3. Assistants and/or associates | | 1.10. Forms of teaching (number of hours Lecturing +Practical exercises + Seminars + e learning) | (30+30+0+0) |
| 1.4. Study programme (specialist, undergraduate, graduate) | **Professional undergraduate study Business Informatics** | 1.11. Level of e- learning application (1st, 2nd, 3rd level), percentage of on line course performance (max. 20%) | 1st – materials available On-line, (lectures recorded)<br><br>20% |
| 1.5. Course status (obligatory, optional) | Obligatory | 1.12. Number of course revisions | 0. |
| 1.6. Study year | 3 | 1.13. Modernization | □ yes ■ no |
| 1.7. Credit score (ECTS) | 4 | 1.14. Percentage estimate of course changes and/or supplements | Less than 20% □<br>More than 20 % □ |

| 2. COURSE DESCRIPTION | |
|---|---|
| 2.1. Course objectives | .The aim of this course is to train students in use of quantitative methods for decision making:<br>• Creating mathematical models of various business problems;<br>• Finding best method for getting optimal solution based on model;<br>• Evaluate solution and perform sensitivity analysis;<br>• Apply the learned content of this course in business practice. |

| | | |
|---|---|---|
| 2.2. Terms of course entry and required competences | Four-year high school education completed; having a qualification at level 4.2 Finished courses: Mathematics, Business Statistics | |
| 2.3. Learning outcomes on the study programme level | LO2. Evaluate and define steps in planning, decision making, operations and control then applying computer aided business and manufacturing | |
| | LO7. Select and use quantitative/mathematical methods, models and techniques appropriate for solving problems from informatics and business domain. | |
| | LO9. To individually and responsibly search and select relevant literature in Croatian and foreign languages, prepare papers and presentations for general and professional audience and critically evaluate presented professional topics. | |
| | LO14. Successfully communicates with clients, users and colleagues, both verbal and in writing, using suitable terminology, what also includes ability to communicate in foreign language about professional topics. | |
| | LO15. Compare and select suitable development tools from professional viewpoint. | |
| | LO16. Evaluate deciding factors that have impact on businesses and individual and apply basic methods and concepts of planning, managing and auditing business. | |
| 2.4. Expected learning outcomes on the course level | **Learning outcomes** towards Bloom's taxonomy:<br>(up to two verbs per LO) | **LO Level:**<br>*13. Recapture,*<br>*14. Understanding,*<br>*15. Application,*<br>*16. Analysis,*<br>*17. Evaluation,*<br>18. *Synthesis* |
| | 1. Recognize and analyze problems from the business domain which can be solved by linear programming. | 2,3 |
| | 2. Design linear programming model for recognized problems. | 3,4 |
| | 3. Apply Simplex method for solving common problems in business. | 3,4 |
| | 4. Present advantages and limitations of methods and techniques for linear programming on given problem. | 4,5 |
| | 5. Apply streamlined Simplex method on specific business problems (transport, assignment, stock control, scheduling, network etc. | 3,4 |
| | 6. Understand and apply different approach in decision making based on problem characteristics. | 2,3 |
| | 7. Use software tools (Excel add-ins) for creating and solving linear, non-linear and integer problems. | 3 |
| | 8. Recognize biases and fallacies that impact rationality of decision maker and avoid them. | 2,3 |
| | 9. Evaluate and interpret results of model solving and perform sensitivity analysis for common problems met in the business. | 4,5 |

| 2.5. Course content according to detailed curriculum schedule | **Constructive alignment** | | | | | |
|---|---|---|---|---|---|---|
| | **No:** | **Thematic ensemble / Lecture Topic** | **Course LO** | **Content / Teaching Method** | **Evaluation** | **Time needed** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 46. | Introduction to Operations Research. | 1,2 | Listen to the lecture and read the literature. | Checked by written test and oral exam: student can estimate influence of technology development on capabilities and performance of computers. | 2 hours |
| | 47. | Linear problems, mathematical model and geometric visualization. | 1,2,3 | Listen to the lecture, read the literature and solving exercises. | -"- : student can create mathematical model of common linear problem | 6 hours |
| | 48. | Simplex method | 1,2,3 | Listen to the lecture + solving exercises using computer tools. | -"- : student designs and solves model of the given problem | 8 hours |
| | 49. | Solving linear problems in Excel | 2,3,4,7 | Listen to the lecture + solving exercises using computer tools. | -"- : student designs and solves model of the given problem | 10 hours |
| | 50. | Post-optimal analysis, sensitivity and shadow price | 2,3,4,7,9 | Listen to the lecture + solving exercises using computer tools. | -"- : student evaluate results of model solution | 8 hours |
| | 51. | Special cases of linear problems, transport problems | 1,2,4,5,6,7 | Listen to the lecture + solving exercises using computer tools. | -"- : student designs and solves model of the given problem | 10 hours |
| | 52. | Problem of assignation, modelling in Excel | 1,2,4,5,6,7 | Listen to the lecture + solving exercises using computer tools. | -"- : student designs and solves model of the given problem | 8 hours |
| | 53. | Network models: Minimum Price Maximal Flow Problem | 1,2,4,5,6,7 | Listen to the lecture + solving exercises using computer tools. | -"- : student designs and solves model of the given problem | 10 hours |
| | 54. | Network models for project management. | 1,2,4,5,6,7 | Listen to the lecture + solving exercises using computer tools. | -"- : student designs and solves model of the given problem | 8 hours |
| | 55. | Dynamic programming | 4,5,6 | Listen to the lecture + solving exercises using computer tools. | -"- : student designs and solves model of the given problem | 8 hours |
| | 56. | Integer programming in Excel | 4,5,6,7,8 | Listen to the lecture + solving exercises using computer tools. | -"- : student designs and solves model of the given problem | 8 hours |
| | 57. | Decision-making theory: Decisions tree. | 4,5,6,7,8 | Listen to the lecture + solving exercises using computer tools. | -"- : student designs and solves model of the given problem | 10 hours |
| | 58. | Methods for solving nonlinear problems in Excel | 6,7,8,9 | Listen to the lecture + solving exercises using computer tools. | -"- : student designs and solves model of the given problem | 8 hours |
| | 59. | Selecting best methods for solving common business problems | 4,5,6,7,9 | Listen to the lecture + solving exercises using computer tools. | Checked by oral exam: Student can select optimal method for modelling given business problem and understand it's advantages and limitations | 8 hours |
| | 60. | Common fallacies in decision making | 8,9 | Listen to the lecture and individual preparation for the exam. | Checked by oral exam: Student recognises common fallacies and biases in decision making | 8 hours |
| | | | | | | |
| 3.1. Students` obligations | In accordance with the Book of Rules and the Rulebook on Student Assessment and Evaluation: for all regular students attend at least 70% attendance. Part-time students have the obligation to attend at least 50% of lectures through physical presence or via on-line attendance.<br><br>Students who have during the course: | | | | | |

<table>
<tr><td></td><td>
<ul>
<li>satisfied minimal attendance condition, may approach colloquium or written exam.</li>
<li>past 50% score from all colloquium or from written exam (exam can be held in a regular or extraordinary exam period) may approach final oral exam</li>
<li>past both written and oral exams receive grade and all ECTS credits for that course</li>
</ul>
</td></tr>
<tr><td>3.2. Monitoring student work (enter the share of ECTS credits for each activity so that the total number of ECTS points corresponds to the credit score of the course)</td><td>
<table>
<tr><td>Attendance</td><td>0.4</td><td>Written exam</td><td>1.6 (by submitting both colloquiums the student is relieved of an written examination)</td><td>Project</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Research</td><td></td><td>Practical work</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Report</td><td></td><td>Continuous examination</td><td></td></tr>
<tr><td>Colloquium</td><td>3 (by submitting both colloquiums the student is relieved of a written and oral examination)</td><td>Seminar paper</td><td></td><td>Other (inscribe)</td><td></td></tr>
<tr><td>Class activities</td><td>0.4</td><td>Oral exam</td><td>1.6 (by submitting both colloquiums the student is relieved of an oral examination)</td><td>Other (inscribe)</td><td></td></tr>
</table>
</td></tr>
<tr><td>3.3. Student workload</td><td>
The student's workload on all bases amounts to 1 ECTS point for 30 hours of work per semester and is estimated as:
<table>
<tr><th>Commitment</th><th>Hours (estimate)</th></tr>
<tr><td>7. Attending classes</td><td>45</td></tr>
<tr><td>8. Creating and Presenting seminar paper</td><td>10</td></tr>
<tr><td>9. Preparation for the Colloquium / exam through self-study</td><td>65</td></tr>
<tr><td></td><td></td></tr>
</table>
</td></tr>
<tr><td colspan="2">4. GRADING</td></tr>
<tr><td>4.1. Seminar paper grading</td><td></td></tr>
<tr><td>4.2. Colloquium / exam grading</td><td>
<table>
<tr><th>Poor</th><th>Satisfying</th><th>Above average</th></tr>
<tr><td>Give answer by memory, no deeper understanding. Does not know and does not apply the basic terms</td><td>Reproduces basic terms, without difficulty transfers new knowledge, understands subject matter, explains</td><td>Knowledge is at the level of analysis, synthesis and evaluation. It observes legitimacy, accurately and</td></tr>
</table>
</td></tr>
</table>

| | | | |
|---|---|---|---|
| | and concepts. Cannot apply or explain the contents of the course. | the terms and the notions that substantiate by examples. | thoroughly explains the content of the subject, and logically links and explains the terms and concepts that it encapsulates. Find solutions that are not originally given. There is a correlation with correlative subjects. |

| 4.3. Creating a final grade according to evaluation elements | | | | | |
|---|---|---|---|---|---|
| | Active participation in the lessons | 70-75% of attendance | 76-86% of attendance | 87-100% of attendance | Activity in class |
| | | 2 points | 5 points | 10 points | +10 points |
| | Colloquium / written exam | 2 | 3 | 4 | 5 |
| | | 50-64,9% | 65-79,9% | 80-89,9% | 90-100% |
| | | 25 points | 30 points | 35 points | 40 points |
| | Oral exam | 2 | 3 | 5 | 5 |
| | | 25 points | 30 points | 35 points | 40 points |

4.4. Creating a final grade according to absolute allocation

| Percentage of adopted knowledge, skills and competences (teaching + final exam) | Numerous grade | ECTS grade |
|---|---|---|
| 88 – 100% | 5 (excellent) | A |
| 78 – 87.9% | 4 (very good) | B |
| 62 – 77.9% | 3 (good) | C |
| 50 – 61,9% | 2 (sufficient) | D |
| 0 – 49.9% | 1 (unsufficient) | F |

## 5. ADDITIONAL INFORMATION ABOUT THE COURSE

| | Title | Number of copies in the library | Availability via other media |
|---|---|---|---|
| 5.1. Compulsory literature (available in the library and through other media) | 1. Kalpić D., Mornar V., Operacijska istraživanja, DRIP, Zagreb 1996.<br>2. Hillier F., Lieberman G. : Introduction to operations Research, McGraw Hill 8th ed. 2005,<br>3. Ragsdale C., Spreadsheet Modeling & Decision Making, Thompson South-Western, 5th ed., 2008 | 5<br>1<br>1 | -<br>On-line, pdf<br>On-line, pdf |
| 5.2. Additional literature (at the moment of changes and/or amended of study programme) | 1. Swift L., Piff S.: Quantitative Methods for Business, Menagement and Finance, Palgrave, 3rd Ed.<br>2. Bradley, Hax, and Magnanti : Applied Mathematical Programming, Addisson-Wesley, 1977 | 1<br>1 | -<br>On-line, pdf |

| | |
|---|---|
| 5.3. Quality assurance methods that ensure the acquisition of knowledge, skills and competences | The control of students' work quality and the acquisition of necessary knowledge and skills will be ensured through interactive work. By keeping track of attendance and student activity during classes and provided information on students` progress through short colloquiums and homework, information for further guidance to students will be provided in order to increase the efficiency of their work. Students will be informed about their rights and obligations as well as the methods of work and the required literature.<br>Indicators of quality assurance system: Student survey, monitoring of annual data from the Croatian employment service on the annual state of student employment, surveys from employers and Alumni association. |

| | |
|---|---|
| 5.4. information on the course and contact with the teacher | It is obligatory for every student to regularly inform about the course, teaching and teaching activities. All information about teaching or any delay in teaching will be published on the e-learning pages of the course and on the web pages of the Polytechnic. Students can contact the teachers during the consultation term (at least one hour per week), while brief questions and explanations can be addressed during classes. It is possible to ask questions by e-mail (from the official e-mail address from the domain @ vus.hr) that will be answered in a short time (no later than five working days from the receipt of e-mail). |

**PK-SP-2. Description of a new course or an amended and/or changed or modernized course**

| **4. GENERAL INFORMATION** | | | |
|---|---|---|---|
| 1.1. Course lecturer | Ivana Beljo | 1.8. Course code in ISVU | 146563 |
| 1.2. Course title | **Financial mathematics** | 1.9. Course code in MOZVAG | |
| 1.3. Assistants and/or associates | | 1.10. Forms of teaching (number of hours Lecturing +Practical exercises + Seminars + e learning) | (30+30+0+0) |
| 1.4. Study programme (specialist, undergraduate, graduate) | Undergraduate Professional Study of Business informatics | 1.11. Level of e- learning application (1st, 2nd, 3rd level), percentage of on line course performance (max. 20%) | 1st, course materials are on-line, 0% |
| 1.5. Course status (obligatory, optional) | Obligatory | 1.12. Number of course revisions | 2 |
| 1.6. Year of study | 1st | 1.14. Modernization | Yes |
| 1.7. Credit score (ECTS) | 6 | 1.14. Percentage estimate of course changes and/or supplements | Less than 20% X□<br>More than 20 % □ |
| **2. COURSE DESCRIPTION** | | | |
| 2.1. Course objectives | The goal is to provide students with theoretical knowledge:<br>• To adopt knowledge and skills of the analytical way of thinking, and the logical way of concluding in further education.<br>• To introduce students with basic concepts of financial mathematics with appropriate economic applications. | | |
| 2.2. Terms of course entry and required competences | 4 year secondary education completed; qualification level 4.2 according to the CROQF. | | |
| 2.3. Learning outcomes on the study programme level | LO 1: To analyze the situation, identify opportunities and anticipate the problems encountered by organizations and individuals in the application of information technologies.<br>LO 2: To define and evaluate process of thinking, planning, decision making and management in terms of electronically supported business and production.<br>LO 6: To properly write and interpret basic concepts in the field of economics of enterprises, entrepreneurs and entrepreneurship and properly interpret their interdependence.<br>LO 7: To select and apply mathematical methods, models and techniques that are appropriate for solving problems in the area of information and business systems. | | |

| | | |
|---|---|---|
| 2.4. Expected learning outcomes on the course level | **Learning outcomes** accroding to the Bloom`s taxonomy: (up to two verbs per LO) | **Level of LO:** *1- remembering, 2- understanding, 3- application, 4-analysis, 5-evaluation, 6-synthesis* |
| | 7. To solve economic account and apply to the problem from economic practice. | 4, 3 |
| | 8. To differentiate arithmetic and geometric sequences and perform basic sequence operations. | 4, 4 |
| | 9. To examine the properties of basic economic functions and comment on them. | 4, 4 |
| | 10. To solve the problems of a simple and compound interest account. | 4 |
| | 11. To select appropriate method of transforming the nominal interest rate into a conformal or relative interest rate. | 3 |
| | 12. To make a loan repayment schedule | 4 |

2.5. Course content according to detailed curriculum schedule

**Constructive allignement**

| no | Thematic unit | LO of the course | Content/teaching methods | Evaluation | Time |
|---|---|---|---|---|---|
| 61. | Introduction into the course and detailed plan. | - | Listen to lectures. Work independently on computer, get to know course content and elearning documents. | - | 2 h |
| 62. | Basic Economic Accounts. Percentage and per mille account. The triple rule. Division account. | 1 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | In colloquium or written and oral exams students elect the appropriate economic account and apply to the problem from the economic practice. | 6 h |
| 63. | Sequences. Arithmetic and Geometric Sequences | 2 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | In colloquium or written and oral exams students know how to differentiate arithmetic and geometric sequences. Solve exercises. | 4 h |
| 64. | Economic Functions. Demand and Supply Function. | 3 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | In colloquium or written and oral exams students know how to define economic functions, sketch a graph of functions, and examine the demand and supply variability | 4 h |
| 65. | Elasticity. Equilibrium. | 3 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | In colloquium or written and oral exams students know how to define and calculate the equilibrium of functions, solve the elasticity of supply and demand functions. | 4 h |
| 66. | Economic Functions. Revision for colloquium. Colloquium. | 1, 2, 3 | Write the colloquium. | - | 40 h |
| 67. | Simple Interest Account. Anticipative and Decursive Interest Calculation. | 4 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | In colloquium or written and oral exams students know how to define and solve the tasks of a simple interest account. | 4 h |
| 68. | Compound Interest Account. | 4 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | In colloquium or written and oral exams students know how to define and differentiate the type of interest account, solve the tasks of a compound interest account. | 4 h |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 69. | Interest rates. Conformal and Relative interest rate. | 4, 5 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | In colloquium or written and oral exams students know how to define and differentiate the interest rate, and choose the appropriate method of transforming the nominal interest rate into a conformal or relative one. | 4 h | |
| | 70. | Prenumerando and postnumerando Present and Final Value. Perpetual annuity. | 4, 5 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | In colloquium or written and oral exams students know how to calculate and interpret the elements in the examples with periodic payments. | 4 h | |
| | 71. | Loan. Repayment model of the loan. | 6 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | In colloquium or written and oral exams students know how to calculate the loan according to the repayment models with equal annuities, models with equal repayment quotas and agreed annuities, and make a loan repayment schedule. | 4 h | |
| | 72. | Loan. The conversion of the loan. | 6 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | In colloquium or written and oral exams students know how to calculate the loan after the loan conversion, and make a loan repayment schedule. | 4 h | |
| | 73. | Loan. Combined loan repayment model. | 6 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | In colloquium or written and oral exams students know how to calculate combined loan repayment and make a loan repayment schedule. | 4 h | |
| | 74. | Loan. Revision for colloquium. Colloquium. | 4,5,6 | Write the colloquium. | - | 40 h | |
| | 75. | Revision | | Listen to lectures and read literature. | - | 40 h | |

**3. EVALUATION OF STUDENTS` WORK**

| | | | | | | |
|---|---|---|---|---|---|---|
| 3.1. Students` obligations | In accordance with the Regulations on Studying and the Regulations on Student Assessment and Evaluation: for all full-time students attendance of at least 70%. Part-time students are required to attend classes at least 50%. All students are required to carry calculator and formulae list.<br>Students who have during the course achieved:<br>• from 0 - 24,9% ECTS credits- are rated F (unsuccessful) and cannot obtain ECTS credits, and must re-enroll in the next academic year;<br>• from 25 - 49,9% - are assessed by FX (insufficient) and must pass the written exam (test). Written exam (test) can be held in a regular or extraordinary exam period;<br>• more than 50% - students have the right to take the final exam.<br>Students can take the final exam from the course in two ways: a) during the course of teaching through continuous monitoring of students (active participation in classes and through two colloquia); b) by passing the exam (written and oral part of the exam). | | | | | |
| 3.2. Monitoring student work (enter the share of ECTS credits for each activity so that the total number of ECTS points corresponds to the credit score of the course) | Attendance | 0,5 | Written exam | 3,5 (without colloquia) | Project | |
| | Experimental work | | Research | | Practical work | |
| | Essay | | Report | | Continuous examination | 0,5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Colloquium | 3,5 (without written exam) | Seminar paper | | Other | |
| | Class activity | 0,5 | Oral exam | 1 | Other | |
| 3.3. Student workload | Student workload on all bases for 1 ECTS credit is 30 hours in a semester and is estimated as:<br>3. Attending classes and exercises 60 hours<br>4. Preparing colloquia or exams through individual work 120 hours | | | | | |

**4. GRADING SYSTEM**

4.1. Grading seminar papers

4.2. Grading colloquia/ written and oral exam

| **Unsatisfactory** | **Satisfactory** | **Above average** |
|---|---|---|
| Responds by memory, without a deeper understanding. Does not know or apply basic terms and concepts. Does not know how to apply or explain the contents of the course with examples. | Reproduces the basic concepts and without difficulty imparts new knowledge, understands the material, explains the terms and concepts supported with examples. | Knowledge is at the level of analysis, synthesis and evaluation. Observes the principles, accurately and thoroughly explains the content of the material, and logically connects and explains the terms and concepts supported with examples. Finds solutions that were not originally given. Notes correlations with related material. |
| | | |

4.3. Final grade according to evaluation elements

| | | | | |
|---|---|---|---|---|
| Active course attendance | 70-74,9% of attendance | 75-79,9% of attendance | 80-89,9% of attendance | 90-100% of attendance |
| | 2 points | 5 points | 10 points | 20 points |
| Colloquia/ Written exam | 2 | 3 | 4 | 5 |
| | 50-64,9% | 65-79,9% | 80-89,9% | 90-100% |
| | 25 points | 30 points | 35 points | 40 points |
| Oral exam | 2 | 3 | 5 | 5 |
| | 25 points | 30 points | 35 points | 40 points |

4.3. Final grade according to absolute division

| Percentage of acquired knowledge, skills and competences (teaching + final exam) | Numerical grade | ECTS grade |
|---|---|---|
| 90 – 100% | 5 (excellent) | A |
| 80 – 89,9% | 4 (very good) | B |
| 65 – 79,9% | 3 (good) | C |
| 60 – 64,9% | 2 (satisfactory) | D |
| 50 – 59,9% | 2 (satisfactory) | E |

| 5. ADDITIONAL COURSE INFORMATION | | | |
|---|---|---|---|
| | **Title** | **Number of copies in the library** | **Availability via other media** |
| 5.1. Compulsory literature (available in the library and via other media) | Šorić K., Zbirka zadataka iz matematike s primjenom u ekonomiji, Element, Zagreb, 2011. (selected chapters) | 7 | |
| | Šego B., Lukač Z., Financijska matematika, Udžbenici Sveučilišta u Zagrebu, Zagreb, 2011(selected chapters) | 5 | |
| 5.2. Additional literature (at the moment of changes and/or amended of study programme) | Teaching material and exercises<br>Babić Z., Tomić Plazibat N., Poslovna matematika, Ekonomski fakultet Split, 2003 (selected chapters)<br>Babić Z., Tomić N., Aljinović Z., Matematika za ekonomiste, Ekonomski fakultet Split, 2004 (selected chapters)<br>Harshbarger R.J., Reynolds J.J., Mathematical Applications for the Management, Life and Social Sciences, Houghton Mifflin Company, Boston, 2004. (selected chapters) | | |
| 5.3. Quality assurance methods that ensure the acquisition of knowledge, skills and competences | The control of students' work quality and the acquisition of necessary knowledge and skills will be ensured through interactive work. By keeping track of attendance and student activity during classes and provided information on students` progress through short colloquiums and homework, information for further guidance to students will be provided in order to increase the efficiency of their work. Students will be informed about their rights and obligations as well as the methods of work and the required literature.<br>Indicators of quality assurance system: Student survey, monitoring of annual data from the Croatian employment service on the annual state of student employment, surveys from employers and Alumni association. | | |
| 5.4. Informing about the course and contacting the teacher | It is the responsibility of each student to be regularly informed about the course, the coursework, and the classroom activities. All notices of classes or possible adjournment will be published in a timely manner on the e-learning site of the course and on the website of the Polytechnic. Students can contact teachers during the consultation period (at least one hour per week), while for short questions and explanations they can be contacted during class. It is also possible to ask questions by e-mail (from the official e-mail address at @ vus.hr), which will be answered as soon as possible (no later than five working days after receiving the e-mail). | | |

| 1. GENERAL INFORMATION ABOUT THE SUBJECT | | | |
|---|---|---|---|
| 1.1. Title | **Principles of economics** | 1.8. ISVU course code | PINF-1 |
| 1.2. Lecturer | Dijana Mečev, PhD, s. lec. | 1.9. MOZVAG course code | |
| 1.3. Assistants and/or associates | | 1.10. Forms of teaching (number of hours Lecturing +Practical exercises + Seminars + e learning) | (30+30+0+0) |
| 1.4. Study programme (specialist, undergraduate, graduate) | **Professional Undergraduate study of Business informatics** | 1.11. Level of e- learning application (1st, 2nd, 3rd level), percentage of on line course performance (max. 20%) | 1st – materials available On-line,<br>0% |
| 1.5. Course status (obligatory, optional) | Obligatory | 1.12. Number of course revisions | 0 |
| 1.6. Study year | 1st | 1.13. Modernization | □ yes ■ no |
| 1.7. Credit score (ECTS) | 5 | 1.14. Percentage estimate of course changes and/or supplements | Less than 20% ■<br>More than 20 % □ |

| 2. COURSE DESCRIPTION | |
|---|---|
| 2.1. Course objectives | The main objectice of the course is to ensure students have the ability to understand main economic relationships and processes from different areas of real economic issues. |
| 2.2. Terms of course entry and required competences | Four-year high school education completed; having a qualification at level 4.2 |

| | | |
|---|---|---|
| 2.3. Learning outcomes on the study programme level | LO6: To properly write and interpret basic concepts in the field of economics of enterprises, entrepreneurs and entrepreneurship and properly interpret their interdependence. | |
| | LO16: To valorize elevant factors that affect organization`s and individual`s business and apply basic methods and concepts of planning, management and accounting. | |
| | LO14: To communicate successfully with clients, users and colleagues using appropriate terminology, including the ability to communicate professionally in a foreign language, both in written and spoken manner. | |
| 2.4. Expected learning outcomes on the course level | **Learning outcomes** towards Bloom's taxonomy:<br>(up to two verbs per LO) | **LO Level:**<br>*19. Recapture,*<br>*20. Understanding,*<br>*21. Application,*<br>*22. Analysis,*<br>*23. Evaluation,*<br>24. *Synthesis* |
| | 1. To demonstrate knowledge and understanding of course content by **defining** and **describing** basic concepts of economics as a science that addresses the problem of scarcity. | 1, 1 |
| | 2. To **analyze** economic trends using supply and demand analysis. | 4 |
| | 3. To **analyze** consumer behavior regarding product demand. | 4 |
| | 4. To **explain** how input markets work. | 2 |
| | 5. To **calculate** and i**nterpret** different measures of macroeconomic activity, such as gross national product, inflation and unemployment | 3, 5 |
| | 6. To a**nalyze** the business cycle by analyzing aggregate demand and aggregate supply. | 4 |
| | 7. To **link** fundamental economic principles and insights, their overall nature and appearance, and similarities and differences. | 6 |

.5. Course content according to detailed curriculum schedule

**Constructive alignment**

| No: | Thematic ensemble / Lecture Topic | Course LO | Content / Teaching Method | Evaluation | Time needed |
|---|---|---|---|---|---|
| 76. | Introduction into the course and detailed plan. | - | Listen to lectures. By working independently on a computer, they are introduced to the course content and the documents on the e-learning page of the course. | - | 2 hours |
| | Introduction to economics. | 1 | Listen to the lecture and read the literature, write homework. | In colloquium or written and oral exams they can define and describe the basic economic concepts; explain the circuit diagram and its application and the law of diminishing returns. | 8 hours |
| 77. | Supply and demand. How do markets work? | 1, 2 | Listen to the lecture and read the literature. Individually or in pairs solve case studies, discuss on the exposed topic. Solve exercises. | In colloquium or written and oral exams they can define supply / demand and analyze the impact of individual variables on supply and demand curves | 10 hours |
| 78. | Elasticity and its application. | 1, 2 | Listen to the lecture and read the literature. Solve exercises. | In colloquium or written and oral exams they can define supply / demand elasticity and analyze its application. | 8 hours |
| 79. | Demand and Consumer Behavior. | 1, 2, 3 | Listen to the lecture and read the literature. Individually or in pairs solve case studies. Solve exercises. | In colloquium or written and oral exams they know how to define the utility and paradox of value and explain their application. | 8 hours |
| 80. | Production and business organization. | 1 | Listen to the lecture and read the literature, discuss on the exposed topic. | In colloquium or written and oral exams they know how to define the term and forms of enterprise and describe the economic characteristics of large and | 6 hours |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | small enterprises. They can explain the law of diminishing returns, and calculate and interpret marginal and average products. | |
| | 81. | Cost analysis. | 1 | Listen to the lecture and read the literature. Solve exercises. | In colloquium or written and oral exams they can define types of costs. They know how to calculate and interpret marginal, average, fixed, variable and total costs. They know how to use cost curves in business analysis. | 8 hours |
| | 82. | Perfect competition.<br>Market failure. | 1, 2, 7 | Listen to the lecture and read the literature. They use multimedia and network. Individually or in pairs solve case studies. Solve exercises. | In colloquium or written and oral exams they know how to define perfect competition, analyze the income of companies in the market of perfect competition. They know how to determine the point of enterprise closing down. They can list and explain market failures. | 10 hours |
| | 83. | Monopoly | 1, 2, 3, 7 | Listen to the lecture and read the literature. They discuss on the exposed topic. Solve exercises. | In colloquium or written and oral exams they know how to define a monopoly and explain causal factors driving. They know how to calculate and interpret the total, average and marginal revenue of monopolists. They know how to use the demand curve to analyze monopolist profit maximization. They know how to distinguish between monopoly and perfect competition. | 8 hours |
| | 84. | Oligopoly and game theory.<br>Monopolistic competition. | 1, 2, 3, 7 | Listen to the lecture and read the literature. They use multimedia and network. They discuss on the exposed topic. Individually or in pairs solve case studies. | In colloquium or written and oral exams they know how to define an oligopoly and explain causal factors driving. They know how to determine Nash Equilibrium in the oligopoly market. They can define monopolistic competition. They know how to distinguish the behavior of companies in the monopolistic competition in the short term from the behavior in the long term. | 8 hours |
| | 85. | Input Markets. | 1, 2, 3, 4 | Listen to the lecture and read the literature. They discuss on the exposed topic. Solve exercises. | In colloquium or written and oral exams they know how to define and explain factors of production (inputs). They know how to analyze the impact of individual variables on labor market supply and demand curves. They know how to explain the impact of unions and collective bargaining on wages and employment. They can think critically about the reasons for the existence of wage differences and the justification for rent payments. They know how to calculate and interpret the present value of a capital good. | 10 hours |
| | 86. | The State and the Economy. | 7 | Listen to the lecture and read the literature. They use multimedia and network. They discuss on the exposed topic | In colloquium or written and oral exams they can explain the reasons for state intervention, critically consider ways of state intervention in economic developments. They are able to explain public choice theory and the majority paradox. | 6 hours |
| | 87. | Income distribution and poverty. | 4, 7 | Listen to the lecture and read the literature. Student explore the content | In colloquium or written and oral exams they can define poverty and its forms, explain Lorenz curve | 6 hours |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | of this topic area by searching the database. | and interpret Gini coefficient. They can explain why income inequalities occur. | |
| | 88. | Basic concepts of macroeconomics. | 1, 5 | Listen to the lecture and read the literature. They discuss on the exposed topic. Solve exercises. | In colloquium or written and oral exams they are able to define GDP, inflation and unemployment and explain their components. They know how to calculate and interpret nominal and real GDP, GDP deflator, consumer price index and inflation rate. They are capable of thinking critically about GDP as a measure of welfare and about causes of unemployment. | 10 hours |
| | 89. | Aggregate supply and demand.<br>The financial market and a money issue.<br>Central Banking and Monetary Policy. | 2, 6, 7 | Listen to the lecture and read the literature. They discuss on the exposed topic. Solve exercises. | In colloquium or written and oral exams they can use the aggregate supply and aggregate demand model to analyze fluctuations in the economy. They know how to calculate and interpret the extent of an investment multiplier. They can explain the role of fiscal and monetary policy in the economy. | 10 hours |
| | 90. | Concluding Considerations / Repetition and preparation for the exam. | | Listen to the lecture and individual preparation for the exam. | | 32 hours |

**3. EVALUATION OF STUDENT WORK**

| | | | | | | |
|---|---|---|---|---|---|---|
| 3.1. Students` obligations | In accordance with the Book of Rules and the Rulebook on Student Assessment and Evaluation: for all regular students attend at least 70% attendance. Part-time students have the obligation to attend at least 50% of lectures.<br><br>Students who have during the course achieved:<br>• From 0 – 24,9% ECTS credits- is rated F (unsuccessful) and cannot get ECTS credits and must re-enrol the subject in the next academic year;<br>• From 25 – 49,9% ECTS credits - is rated FX (inadequate) and has to come out and pass the test (exam). A written exam can be held in a regular or extraordinary exam period;<br>• More than 50% ECTS credits - students have the right to access the final exam of the subject.<br><br>Students can pass the final exam in two ways: a) during the course through continuous student attendance (active participation in the lessons, solving case studies and passing three colloquia); b) during the course (active participation in the lessons, solving case studies) and passing the exam (written and oral exam). | | | | | |
| 3.2. Monitoring student work (enter the share of ECTS credits for each activity so that the total number of ECTS points corresponds to the credit score of the course) | Attendance | 0,5 | Written exam | 3 (by submitting all colloquiums the student is relieved of an written examination) | Project | |
| | Experimental work | | Research | | Practical work | |
| | Essay | | Report | | Continuous examination | |
| | Colloquium | 4 (by submitting both colloquiums the student is | Seminar paper | | Other (inscribe) | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | relieved of a written and oral examination) | | | | |
| | Class activities | 0,5 | Oral exam | 1 (by submitting all colloquiums the student is relieved of an oral examination) | Other (inscribe) | |

3.3. Student workload

The student's workload on all bases amounts to 1 ECTS point for 30 hours of work per semester and is estimated as:

| ***Commitment*** | ***Hours (estimate)*** |
|---|---|
| 10. Attending classes | 60 |
| 11. Concluding Considerations / Repetition and preparation for the exam. | 90 |

**4. GRADING**

4.1. Seminar paper grading

4.2. Colloquium / exam grading

| **Poor** | **Satisfying** | **Above average** |
|---|---|---|
| Give answer by memory, no deeper understanding. Does not know and does not apply the basic terms and concepts. Cannot apply or explain the contents of the course. | Reproduces basic terms, without difficulty transfers new knowledge, understands subject matter, explains the terms and the notions that substantiate by examples. | Knowledge is at the level of analysis, synthesis and evaluation. It observes legitimacy, accurately and thoroughly explains the content of the subject, and logically links and explains the terms and concepts that it encapsulates. Find solutions that are not originally given. There is a correlation with correlative subjects. |

4.3. Creating a final grade according to evaluation elements

| | | | | | |
|---|---|---|---|---|---|
| Active participation in the lessons | 70-75% of attendance | 76-86% of attendance | 87-100% of attendance | Created mental map. Solved case study. |
| | 3 points | 5 points | 7 points | 3 points |
| Colloquium / written exam | 2 | 3 | 4 | 5 |
| | 50-64,9% | 65-79,9% | 80-89,9% | 90-100% |
| | 27 points | 33 points | 39 points | 45 points |
| Oral exam | 2 | 3 | 5 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| | | 27 points | 33 points | 39 points | 45 points |

4.4. Creating a final grade according to absolute allocation

| Percentage of adopted knowledge, skills and competences (teaching + final exam) | Numerous grade | ECTS grade |
|---|---|---|
| 90 – 100% | 5 (excellent) | A |
| 80 – 89,9% | 4 (very good) | B |
| 65 – 79,9% | 3 (good) | C |
| 60 – 64,9% | 2 (sufficient) | D |
| 50 – 59,9% | 2 (sufficient) | E |

## 5. ADDITIONAL INFORMATION ABOUT THE COURSE

| | Title | Number of copies in the library | Availability via other media |
|---|---|---|---|
| 5.1. Compulsory literature (available in the library and through other media) | 1. Samuelson, P. A. i Nordhaus, W. (2007). Ekonomija, 18th edition, Zagreb: Mate d.o.o. | 15 | |
| 5.2. Additional literature (at the moment of changes and/or amended of study programme) | 3. Polovina, S. i Medić Đ. Š. (2002). Osnove ekonomije: priručnik za studij ekonomije. Zagreb: Medinek.<br>4. Mankiw N.G. (2006). Osnove ekonomije. Zagreb: Mate d.o.o. (chapters 2,3, 4, 5, 6) | 5<br>5 | |
| 5.3. Quality assurance methods that ensure the acquisition of knowledge, skills and competences | The control of students' work quality and the acquisition of necessary knowledge and skills will be ensured through interactive work. By keeping track of attendance and student activity during classes and provided information on students` progress through short colloquiums and homework, information for further guidance to students will be provided in order to increase the efficiency of their work. Students will be informed about their rights and obligations as well as the methods of work and the required literature.<br>Indicators of quality assurance system: Student survey, monitoring of annual data from the Croatian employment service on the annual state of student employment, surveys from employers and Alumni association. | | |
| 5.4. information on the course and contact with the teacher | It is obligatory for every student to regularly inform about the course, teaching and teaching activities. All information about teaching or any delay in teaching will be published on the e-learning pages of the course and on the web pages of the Polytechnic. Students can contact the teachers during the consultation term (at least one hour per week), while brief questions and explanations can be addressed during classes. It is possible to ask questions by e-mail (from the official e-mail address from the domain @ vus.hr) that will be answered in a short time (no later than five working days from the receipt of e-mail). | | |

| **5. GENERAL INFORMATION** | | | |
|---|---|---|---|
| 1.1. Course lecturer | Ana Perišić | 1.8. Course code in ISVU | 146563 |
| 1.2. Course title | **Mathematics** | 1.9. Course code in MOZVAG | |
| 1.3. Assistants and/or associates | | 1.10. Forms of teaching (number of hours Lecturing +Practical exercises + Seminars + e learning) | (30+30+0+0) |
| 1.4. Study programme (specialist, undergraduate, graduate) | Undergraduate Professional Study of Business informatics | 1.11. Level of e- learning application (1st, 2nd, 3rd level), percentage of on line course performance (max. 20%) | 1st, course materials are on-line, 0% |
| 1.5. Course status (obligatory, optional) | Obligatory | 1.12. Number of course revisions | 1 |
| 1.6. Year of study | 1st | 1.15. Modernization | Yes |
| 1.7. Credit score (ECTS) | 6 | 1.14. Percentage estimate of course changes and/or supplements | Less than 20% X□<br>More than 20 % □ |

| **2. COURSE DESCRIPTION** | |
|---|---|
| 2.1. Course objectives | Introducing students to the fundamental concepts of linear algebra and functions of single variable, which they can apply in different economics courses. Adopting analytical skills, logical and critical thinking skills. |
| 2.2. Terms of course entry and required competences | 4 year secondary education completed; qualification level 4.2 according to the CROQF. |
| 2.3. Learning outcomes on the study programme level | LO7: to select and apply mathematical methods, models and techniques that are appropriate for solving problems in the area of information and business systems<br><br>LO16: to valorize elevant factors that affect organization`s and individual`s business and apply basic methods and concepts of planning, management and accounting |
| 2.4. Expected learning outcomes on the course level | |

| **Learning outcomes** accroding to the Bloom`s taxonomy: (up to two verbs per LO) | **Level of LO:**<br>*1- remembering,*<br>*2- understanding,*<br>*3- application,*<br>*4-analysis,*<br>*5-evaluation,*<br>*6-synthesis* |
|---|---|
| 13. Perform fundamental operations on sets | 4 |
| 14. Carry out fundamental operations on matrices | 4 |

| | | |
|---|---|---|
| 15. | Propose a method and solve systems of linear equations; | 5,4 |
| 16. | Conduct basic analysis of functions of one variable | 4 |
| 17. | Apply linear algebra and functional analysis methods in economic problems solving | 3,4 |

2.5. Course content according to detailed curriculum schedule

**Constructive alignment**

| no | Thematic unit | LO of the course | Content/teaching methods | Evaluation | Time |
|---|---|---|---|---|---|
| 91. | Introduction into the course and detailed plan.<br>Introduction to set theory. | 1 | Attending lectures. Familiarize with course content, e-learning documents, literature and students' obligations. | Students perform fundamental operations on sets through colloquia or written/oral exams. | 1 h<br>3h<br>8h |
| 92. | Matrices: definitions, properties and calculus. | 2 | Attending lectures. Actively involving students through problem solving and discussion. | Students carry out fundamental operations on matrices through colloquia or written/oral exams. | 4h<br>8h |
| 93. | Determinants: definition and calculus | 2 | Attending lectures. Actively involving students through problem solving and discussion. | Students carry out fundamental operations on matrices through colloquia or written/oral exams. | 4h<br>8h |
| 94. | Inverse matrix. Matrix equations. | 2 | Attending lectures. Actively involving students through problem solving and discussion. | Students carry out fundamental operations on matrices through colloquia or written/oral exams. | 4h<br>8h |
| 95. | Systems of linear equations. Cramer rule. Matrix equations. | 3,5 | Attending lectures. Actively involving students through problem solving and discussion. | Students will propose a method and solve systems of linear equations; they will apply linear algebra methods in economic problems solving through colloquia or written/oral exams. | 4h<br>8h |
| 96. | Systems of linear equations. Gaussian elimination. | 3,5 | Attending lectures. Actively involving students through problem solving and discussion. | Students will propose a method and solve systems of linear equations; they will apply linear algebra methods in economic problems solving through colloquia or written/oral exams. | 4h<br>8h |
| 97. | Matrix calculus. Application in economics. Exam preparation | 2, 3,5 | Attending lectures. Actively involving students through problem solving and discussion. Group problem solving and discussion. | Students will carry out fundamental operations on matrices, propose a method and solve systems of linear equations; they will apply linear algebra methods in economic problems solving through colloquia or written/oral exams. | 4h<br>8h |
| 98. | Functions. Definition, properties. | 4 | Attending lectures. Actively involving students through problem solving and discussion. | Students will conduct basic analysis of functions of one variable through colloquia or written/oral exams. | 4h<br>8h |
| 99. | Elementary functions. Domain. | 4 | Attending lectures. Actively involving students through problem solving and discussion. | Students will conduct basic analysis of functions of one variable through colloquia or written/oral exams. | 4h<br>8h |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | 100. | Elementary functions. | 4 | Attending lectures. Actively involving students through problem solving and discussion. | Students will conduct basic analysis of functions of one variable through colloquia or written/oral exams. | 4h<br>8h | |
| | 101. | Limit of a function. Asymptote. | 4 | Attending lectures. Actively involving students through problem solving and discussion. | Students will conduct basic analysis of functions of one variable through colloquia or written/oral exams. | 4h<br>8h | |
| | 102. | The derivative of a function | 4, 5 | Attending lectures. Actively involving students through problem solving and discussion. | Students will conduct basic analysis of functions of one variable, they will apply functional analysis methods in economic problems solving through colloquia or written/oral exams. | 4h<br>8h | |
| | 103. | Monotonicity and local extrema. | 4,5 | Attending lectures. Actively involving students through problem solving and discussion. | Students will conduct basic analysis of functions of one variable, they will apply functional analysis methods in economic problems solving through colloquia or written/oral exams. | 4h<br>8h | |
| | 104. | Function graphs | 4, 5 | Attending lectures. Actively involving students through problem solving and discussion. | Students will conduct basic analysis of functions of one variable, they will apply functional analysis methods in economic problems solving through colloquia or written/oral exams. | 4h<br>8h | |
| | 105. | An application of functional analysis in economics. Exam preparation | 4, 5 | Attending lectures. Actively involving students through problem solving and discussion. Group problem solving and discussion. | Students will conduct basic analysis of functions of one variable, they will apply functional analysis methods in economic problems solving through colloquia or written/oral exams. | 4h<br>8h | |

**3. EVALUATION OF STUDENTS` WORK**

| | | | | | | |
|---|---|---|---|---|---|---|
| 3.1. Students` obligations | In accordance with the Regulations on Studying and the Regulations on Student Assessment and Evaluation: for all full-time students attendance of at least 70%. Part-time students are required to attend classes at least 50%. All students are required to carry calculator and formulae list.<br>Students who have during the course achieved:<br>• from 0 - 24,9% ECTS credits- are rated F (unsuccessful) and cannot obtain ECTS credits, and must re-enroll in the next academic year;<br>• from 25 - 49,9% - are assessed by FX (insufficient) and must pass the written exam (test). Written exam (test) can be held in a regular or extraordinary exam period;<br>• more than 50% - students have the right to take the final exam.<br>Students can take the final exam from the course in two ways: a) during the course of teaching through continuous monitoring of students (active participation in classes and through two colloquia); b) by passing the exam (written and oral part of the exam). | | | | | |
| 3.2. Monitoring student work (enter the share of ECTS credits for each | Attendance | 0,5 | Written exam | 3,5 (without colloquia) | Project | |

<table>
<tr><td rowspan="4">activity so that the total number of ECTS points corresponds to the credit score of the course)</td><td>Experimental work</td><td></td><td>Research</td><td></td><td>Practical work</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Report</td><td></td><td>Continuous examination</td><td>0,5</td></tr>
<tr><td>Colloquium</td><td>3,5 (without written exam)</td><td>Seminar paper</td><td></td><td>Other</td><td></td></tr>
<tr><td>Class activity</td><td>0,5</td><td>Oral exam</td><td>1</td><td>Other</td><td></td></tr>
<tr><td>3.3. Student workload</td><td colspan="6">Student workload on all bases for 1 ECTS credit is 30 hours in a semester and is estimated as:<br>5. Attending classes and exercises 60 hours<br>6. Preparing colloquia or exams through individual work 120 hours</td></tr>
<tr><td colspan="7">4. GRADING SYSTEM</td></tr>
<tr><td>4.1. Grading seminar papers</td><td colspan="6"></td></tr>
<tr><td>4.2. Grading colloquia/ written and oral exam</td><td colspan="6"><table>
<tr><th>Unsatisfactory</th><th>Satisfactory</th><th>Above average</th></tr>
<tr><td>Responds by memory, without a deeper understanding. Does not know or apply basic terms and concepts. Does not know how to apply or explain the contents of the course with examples.</td><td>Reproduces the basic concepts and without difficulty imparts new knowledge, understands the material, explains the terms and concepts supported with examples.</td><td>Knowledge is at the level of analysis, synthesis and evaluation. Observes the principles, accurately and thoroughly explains the content of the material, and logically connects and explains the terms and concepts supported with examples. Finds solutions that were not originally given. Notes correlations with related material.</td></tr>
<tr><td></td><td></td><td></td></tr>
</table></td></tr>
<tr><td>4.3. Final grade according to evaluation elements</td><td colspan="6">During the semester, students have the possibility to partially take written exams through colloquia (twice during the semester). In order to have access to the oral exam, students need to achieve at least 50% on each colloquium. Also, students have a possibility to retake one colloquium. Students who did not pass at least one colloquia (or retaken colloquia) need to take part in the written exam. In this case, in order to have access to the oral exam, students need to achieve at least 50% on written exam. The final grade is formed after the oral exam by aggregating scores achieved<br>In the written exam/colloquia, oral exam and during classes.</td></tr>
<tr><td>4.3. Final grade according to absolute division</td><td colspan="6"><table>
<tr><th>Percentage of acquired knowledge, skills and competences (teaching + final exam)</th><th>Numerical grade</th><th>ECTS grade</th></tr>
<tr><td>90 – 100%</td><td>5 (excellent)</td><td>A</td></tr>
<tr><td>80 – 89,9%</td><td>4 (very good)</td><td>B</td></tr>
<tr><td>65 – 79,9%</td><td>3 (good)</td><td>C</td></tr>
<tr><td>60 – 64,9%</td><td>2 (satisfactory)</td><td>D</td></tr>
<tr><td>50 – 59,9%</td><td>2 (satisfactory)</td><td>E</td></tr>
</table></td></tr>
<tr><td colspan="7">5. ADDITIONAL COURSE INFORMATION</td></tr>
</table>

| | Title | Number of copies in the library | Availability via other media |
|---|---|---|---|
| 5.1. Compulsory literature (available in the library and via other media) | Perišić, A. i Devčić, K. (2016) Matematika s primjenom u ekonomiji. Veleučilište u Šibeniku, Šibenik.<br>Babić, Z., Tomić Plazibat, N. (2003) Poslovna matematika. Ekonomski fakultet Split, Split. (selected chapters)<br>Šorić, K. (2011) Zbirka zadataka iz matematike s primjenom u ekonomiji. Element, Zagreb. (selected chapters) | <br>2<br>7<br>7 | <br>Yes<br>Yes<br>yes |
| 5.2. Additional literature (at the moment of changes and/or amended of study programme) | Lukač, Z (2014) Matematika za ekonomske analize, Udžbenici Sveučilišta u Zagrebu, Element, Zagreb.<br>Babić Z.,Tomić N., Aljinović Z. (2004) Matematika za ekonomiste , Ekonomski fakultet Split..<br>Harshbarger R.J., Reynolds J.J.(2004) Mathematical Applications for the management, life and social sciences, 7th edition, Boston New York, Houghton Company.<br>Teaching materials | | |
| 5.3. Quality assurance methods that ensure the acquisition of knowledge, skills and competences | The control of students' work quality and the acquisition of necessary knowledge and skills will be ensured through interactive work. By keeping track of attendance and student activity during classes and provided information on students` progress through short colloquiums and homework, information for further guidance to students will be provided in order to increase the efficiency of their work. Students will be informed about their rights and obligations as well as the methods of work and the required literature.<br>Indicators of quality assurance system: Student survey, monitoring of annual data from the Croatian employment service on the annual state of student employment, surveys from employers and Alumni association. | | |
| 5.4. Informing about the course and contacting the teacher | It is the responsibility of each student to be regularly informed about the course, the coursework, and the classroom activities. All notices of classes or possible adjournment will be published in a timely manner on the e-learning site of the course and on the website of the Polytechnic. Students can contact teachers during the consultation period (at least one hour per week), while for short questions and explanations they can be contacted during class. It is also possible to ask questions by e-mail (from the official e-mail address at @ vus.hr), which will be answered as soon as possible (no later than five working days after receiving the e-mail). | | |

| 1. GENERAL INFORMATION | | | |
|---|---|---|---|
| 1.1. Course title | **English for Information Technology I** | 1.8. Course code in ISVU | 201304 |
| 1.2. Course lecturer | Goran Crnica, prof., pred. (lecturer) | 1.9. Course code in MOZVAG | |
| 1.3. Assistants and/or associates | - | 1.10. Forms of teaching (number of hours Lecturing +Practical exercises + Seminars + e learning) | (30+15+0+0) |
| 1.4. Study programme (specialist, undergraduate, graduate) | **Undergraduate professional study of Business Informatics** | 1.11. Level of e-learning application (1st, 2nd, 3rd level), percentage of online course performance (max. 20%) | 1st, course materials are on-line, % |
| 1.5. Course status (obligatory, optional) | Obligatory | 1.12. Number of course revisions | 2 |
| 1.6. Year of study | 1st | 1.13. Modernization | ■ yes □ no |
| 1.7. Credit score (ECTS) | 3 | 1.14. Percentage estimate of course changes and/or supplements | Less than 20% ■<br>More than 20 % □ |

| 2. COURSE DESCRIPTION | |
|---|---|
| 2.1. Course objectives | The aim of the course is to develop language structures, lexis and grammar from the business English language at the intermediate and higher level. Special attention is given to perfecting the techniques of listening, reading, speaking and writing. Professional vocabulary should be mastered at an intermediate and higher level. The objectives also include the repetition and determination of basic tenses, the adoption of professional vocabulary related to the language of information technologies, as well as international and intercultural economic issues. |

| | | |
|---|---|---|
| 2.2. Terms of course entry and required competences | Four-year secondary education completed; possessing a Level 4.2 qualification according to the CROQF. Proficiency in English at minimum B1 level. | |
| 2.3. Learning outcomes on the study programme level | LO 1: To apply and link economic terms in more complex written and oral communication in Croatian and foreign language | |
| | LO 3: To individually and responsibly search relevant literature for reaching solutions and conclusions in Croatian and foreign languages | |
| | LO 10: Develop team and interpersonal teamwork skills, master communication skills and presentation skills for assigned topics and tasks (case studies, projects, seminars) using advanced software tools for document creation, presentation and budget implementation | |
| 2.4. Expected learning outcomes on the course level (4-10 learning outcomes) | **Learning outcomes according to Bloom's taxonomy:** | **LO level:** 1 - memory, 2 - understanding, 3 - application, 4 - analysis, 5- evaluation, 6 - synthesis |
| | 18. To **define** and **explain** business English keywords | 1,2 |
| | 19. To **explain** and **apply** correctly grammatical structures and vocabulary in the field of Business English | 2,3 |
| | 20. To create independently and present content in the field of Business English | 3 |
| | 21. To **analyse** medium-sized professional texts and **solve** language tasks | 4 |
| | 22. To **argue critically** the views expressed and express your own views on the topic of Business English | 5 |
| | 23. To use part of the Common European Framework of Reference for Languages (CEF) level B1-B1-B2 language competences to generate new ideas | 6 |

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|---|---|---|---|---|---|---|---|
| 2.5. Course content according to detailed curriculum schedule | **Constructive alignment** | | | | | | |
| | **r.br.** | **Thematic topic of the lecture** | **Thematic topic of the language exercises** | **LO of the course** | **Content / teaching method** | **Evaluation** | **Hours needed** |
| | 106. | Introduction into the course | Students introduce themselves to each other in English | 3,5,6 | Students listen to the lectures. They work independently on the computer, inform themselves about the course content and eLearning documents. Students get to know each other in small groups, discuss the reasons for choosing their studies and explain what they expect from the studies. Group representatives present to their colleagues the similarities and differences in the reasons for choosing their studies. Students are introduced to the Polytechnic's Code of Ethics. | In the oral part of the final exam, you introduce yourself or your colleagues. They express their opinion about their own linguistic progress and point out the shortcomings and strengths. | 3 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 107. | Companies; A matter of choice | Company structure | 1,4,5,6 | Students listen to the lecture and take an active part by asking questions and answering questions. In the lectures, students are encouraged to engage in dialogue and discussion, as well as to express opinions and points of view. The use of all language skills (listening, speaking, reading and writing) is recommended. | At the colloquium or in the written part of the final exam, the pupils define and explain the most important terms of the learning units. They solve language exercises that demonstrate an understanding of the meaning of key terms.<br>In the oral part of the final exam, the students critically discuss their views on the unit topics and texts and use part of the general language skills at level B1-B2 of the Common European Framework of Reference for Languages by presenting their ideas and findings. | 3 |
| | 108. | Grammar notes (present tenses) | Language check (present tenses) | 2,3,4,6 | Students listen to a lecture on grammar and spelling. The students exchange their own experiences on a certain topic and practice language structures by formulating their own examples. | Students apply grammar structures and solve grammar and spelling problems at the colloquium or in the written part of the final exam.<br>In the oral part of the final exam, students use everyday examples to explain how to use certain grammatical structures. | 3 |
| | 109. | Leadership; when to terrorize talent | Reading, vocabulary, collocations | 1,4,5,6 | Students listen to the lecture and take an active part by asking questions and answering questions. In the lectures, students are encouraged to engage in dialogue and discussion, as well as to express opinions and points of view. The use of all language skills (listening, speaking, reading and writing) is recommended. | At the colloquium or in the written part of the final exam, the pupils define and explain the most important terms of the learning units. They solve language exercises that demonstrate an understanding of the meaning of key terms.<br>In the oral part of the final exam, the students critically discuss their views on the unit topics and texts and use part of the general language skills at level B1-B2 of the Common European Framework of Reference for Languages by presenting their ideas and findings. | 3 |
| | 110. | Past tenses | Language check (past tenses) | 2,3,4,6 | Students listen to a lecture on grammar and spelling. The students exchange their own experiences on a certain topic and practice language structures by formulating their own examples. | Students apply grammar structures and solve grammar and spelling problems at the colloquium or in the written part of the final exam.<br>In the oral part of the final exam, students use everyday examples to explain how to use certain grammatical structures. | 3 |
| | 111. | Strategy; The big picture | Reading, vocabulary exercises | 1,4,5,6 | Students listen to the lecture and take an active part by asking questions and answering questions. In the lectures, students are encouraged to engage in dialogue and discussion, as well as to express opinions and points of view. The use of all language skills (listening, speaking, reading and writing) is recommended. | At the colloquium or in the written part of the final exam, the pupils define and explain the most important terms of the learning units. They solve language exercises that demonstrate an understanding of the meaning of key terms.<br>In the oral part of the final exam, the students critically discuss their views on the unit topics and texts and use part of the general language skills at level B1-B1-B2 of the Common European Framework of Reference for Languages by presenting their ideas and findings. | 3 |
| | 112. | Grammar notes (future forms) | Career skills; Talking about your job | 2,3,4,6 | Students listen to a lecture on grammar and spelling. The students exchange their own experiences on a | Students apply grammar structures and solve grammar and spelling problems at the colloquium or in the written part of the final exam. | 3 |

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| | | | | | certain topic and practice language structures by formulating their own examples. | In the oral part of the final exam, students use everyday examples to explain how to use certain grammatical structures. | |
| | 113. | Articles | Case study | 2,3,4,6 | Students listen to a lecture on grammar and spelling. The students exchange their own experiences on a certain topic and practice language structures by formulating their own examples. | Students apply grammar structures and solve grammar and spelling problems at the colloquium or in the written part of the final exam.<br>In the oral part of the final exam, students use everyday examples to explain how to use certain grammatical structures. | 3 |
| | 114. | Pay; the rewards of failure<br>Review 1 | Vocabulary; multi- part words | 1,2,4,5,6 | The students listen to the lecture and prepare individually for the exam. Before the colloquium, students are asked to ask questions about content or grammar. | At the colloquium or in the written part of the final exam, the pupils define and explain the most important terms of the learning units. They solve language exercises that demonstrate an understanding of the meaning of key terms.<br>In the oral part of the final exam, the students critically discuss their views on the unit topics and texts and use part of the general language skills at level B1-B2 of the Common European Framework of Reference for Languages by presenting their ideas and findings. | 25 |
| | 115. | Grammar notes (present perfect) | Career skills; Getting things done | 2,3,4,6 | Students listen to a lecture on grammar and spelling. The students exchange their own experiences on a certain topic and practice language structures by formulating their own examples. | Students apply grammar structures and solve grammar and spelling problems at the colloquium or in the written part of the final exam.<br>In the oral part of the final exam, students use everyday examples to explain how to use certain grammatical structures. | 3 |
| | 116. | Development; Prosperity or preservation | Vocabulary exercises; understanding | 1,4,5,6 | Students listen to the lecture and take an active part by asking questions and answering questions. In the lectures, students are encouraged to engage in dialogue and discussion, as well as to express opinions and points of view. The use of all language skills (listening, speaking, reading and writing) is recommended. | At the colloquium or in the written part of the final exam, the pupils define and explain the most important terms of the learning units. They solve language exercises that demonstrate an understanding of the meaning of key terms.<br>In the oral part of the final exam, the students critically discuss their views on the unit topics and texts and use part of the general language skills at level B1-B2 of the Common European Framework of Reference for Languages by presenting their ideas and findings. | 3 |
| | 117. | Language check; Modal verbs of likelihood | Career skills; Giving short presentations | 2,3,4,6 | Students listen to a lecture on grammar and spelling. The students exchange their own experiences on a certain topic and practice language structures by formulating their own examples. | Students apply grammar structures and solve grammar and spelling problems at the colloquium or in the written part of the final exam.<br>In the oral part of the final exam, students use everyday examples to explain how to use certain grammatical structures. | 3 |
| | 118. | Marketing; Seducing the masses | Writing | 1,4,5,6 | Students listen to the lecture and take an active part by asking questions and answering questions. In the lectures, students are encouraged to engage in dialogue and discussion, as well as to | At the colloquium or in the written part of the final exam, the pupils define and explain the most important terms of the learning units. They solve language exercises that demonstrate an understanding of the meaning of key terms. | 3 |

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|---|---|---|---|---|---|---|---|
| | | | | | express opinions and points of view. The use of all language skills (listening, speaking, reading and writing) is recommended. | In the oral part of the final exam, the students critically discuss their views on the unit topics and texts and use part of the general language skills at level B1-B2 of the Common European Framework of Reference for Languages by presenting their ideas and findings. | |
| | 119. | Comparatives and superlatives | Skills; Considering alternatives | 2,3,4,6 | Students listen to a lecture on grammar and spelling. The students exchange their own experiences on a certain topic and practice language structures by formulating their own examples. | Students apply grammar structures and solve grammar and spelling problems at the colloquium or in the written part of the final exam.<br>In the oral part of the final exam, students use everyday examples to explain how to use certain grammatical structures. | 3 |
| | 120. | Review 2 | Final discussion and signatures | 1,2,4,5,6 | The students listen to the lecture and prepare individually for the exam. Before the colloquium, students are asked to ask questions about content or grammar. | Students apply grammar structures and solve grammar and spelling problems at the colloquium or in the written part of the final exam.<br>In the oral part of the final exam, students use everyday examples to explain how to use certain grammatical structures. | 26 |

**3. EVALUATION OF STUDENTWORK**

| | |
|---|---|
| 3.1. Student obligations | Following the Rulebook on Studying and the Rulebook on Student Assessment and Evaluation: for all full-time students, the required attendance is at least 70%. Part-time students are required to attend classes and teach at least 50%; they are also required to write homework. Students are required to bring writing materials (paper and pen/ballpoint pen) to the exercises. The student's acquired knowledge is tested during the course content. Students are evaluated during the teaching process, with particular attention being paid to the student's active participation in teaching and their presentation of homework. Of particular importance for the final grade are the two written tests that the student takes during the semester. If the student passes both exams, he/she is exempted from the written part of the final exam and is obliged to take the oral final exam.<br>Student achievements:<br>• Students with 0 - 24.9% of ECTS credits - are graded with an F (unsuccessful) and cannot earn ECTS credits and must re-enrol the course in the next academic year;<br>• Students with 25 - 49.9% of ECTS credits - are graded FX (insufficient) and must pass the written exam (test). The written exam can be held in a regular or extraordinary exam period;<br>• Students with more than 50% of ECTS credits - students have the right to take the final exam.<br>Students can pass the final exam in two ways:<br>a) by passing two colloquia and an oral exam during the regular or extraordinary exam;<br>b) by passing the final exam consisting of a written and an oral exam during the regular or extraordinary exam. |

| 3.2. Monitoring student work (enter the share of ECTS credits for each activity so that the total number of ECTS points corresponds to the credit score of the course) | | | | | | |
|---|---|---|---|---|---|---|
| | Attendance | 0,5 | Written exam | 1 (without colloquia) | Project | |
| | Experimental work | | Research | | Practical work | |
| | Essay | | Report | | Continuous evaluation | |
| | Colloquium | 1 (without written exam) | Seminar paper | | (Homework for part-time students) | 0,5 |
| | Active participation | 0,5 | Oral exam | 1 | (Other) | |

| | |
|---|---|
| 3.3. Student workload | The workload of students on all bases is 1 ECTS credit point (30 semester hours) and is estimated as: |

| | *Obligation* | *Hours (estimated)* |
|---|---|---|
| | 12. Attending classes and language exercises | 45 |
| | 13. Preparing colloquia or exams through individual work | 45 |

## 4. GRADING SYSTEM

| | |
|---|---|
| 4.1. Grading seminar papers | - |

4.2. Grading colloquia/ written and oral exam

| Unsatisfactory | Satisfactory | Above average |
|---|---|---|
| Responds by memory, without a deeper understanding. Does not know or apply basic terms and concepts. Does not know how to apply or explain the contents of the course with examples. | Reproduces the basic concepts and without difficulty imparts new knowledge, understands the material, explains the terms and concepts supported with examples. | Knowledge is at the level of analysis, synthesis and evaluation. Observes the principles, accurately and thoroughly explains the content of the material, and logically connects and explains the terms and concepts supported with examples. Finds solutions that were not originally given. Notes correlations with related material. |

4.3. Final grade according to evaluation elements

| | | | | |
|---|---|---|---|---|
| Active participation of lectures and language exercises | 70-74,9% of attendance | 75-79,9% of attendance | 80-89,9% of attendance | 90-100% of attendance |
| | 2 points | 5 points | 10 points | 20 points |
| Colloquia/Written exam | 2 | 3 | 4 | 5 |
| | 50-64,9% | 65-79,9% | 80-89,9% | 90-100% |
| | 25 points | 30 points | 35 points | 40 points |
| Oral exam | 2 | 3 | 5 | 5 |
| | 25 points | 30 points | 35 points | 40 points |

4.4. Final grade according to absolute division

| Percentage of acquired knowledge, skills and competences (teaching + final exam) | Numerical grade | ECTS grade |
|---|---|---|
| 90 – 100% | 5 (excellent) | A |
| 80 – 89,9% | 4 (very good) | B |
| 65 – 79,9% | 3 (good) | C |
| 60 – 64,9% | 2 (satisfactory) | D |
| 50 – 59,9% | 2 (satisfactory) | E |

## 5. ADDITIONAL COURSE INFORMATION

| 5.1. Compulsory literature | Title | Number of copies in the library | Availability via other media |
|---|---|---|---|

| | | | |
|---|---|---|---|
| (available in the library and via other media) | 1. „Intelligent Business“, Coursebook, Intermediate Business English, Tonya Trappe, Graham Tullis, Pearson Longman | | |
| 5.2. Additional literature (at the moment of changes and/or amended of study programme) | 2. „Intelligent Business“, Skills Book, Intermediate Business English, Tonya Trappe, Graham Tullis, Pearson Longman<br>3. „Intelligent Business“, Workbook, Intermediate Business English, Tonya Trappe, Graham Tullis, Pearson Longman | | Availability via e-learning platform |
| 5.3. Quality assurance methods that ensure the acquisition of knowledge, skills and competences | The control of student work quality and the acquisition of necessary knowledge and skills will be ensured through interactive work. By keeping track of attendance and student activity during classes and provided information on student progress through short colloquiums and homework, information for further guidance to students will be provided to increase the efficiency of their work. Students will be informed about their rights and obligations as well as the methods of work and the required literature.<br>Indicators of quality assurance system: Student survey, monitoring of annual data from the Croatian employment service on the annual state of student employment, surveys from employers and Alumni association. | | |
| 5.4. Informing about the course and contacting the teacher | It is the responsibility of each student to be regularly informed about the course, the coursework, and classroom activities. All notices of classes or possible adjournment will be published on time on the e-learning site of the course and the website of the Polytechnic. Students can contact teachers during the consultation period (at least one hour per week), while for short questions and explanations they can be contacted during class. It is also possible to ask questions by e-mail (from the official e-mail address at @vus.hr), which will be answered as soon as possible (no later than five working days after receiving the e-mail). | | |

| 2. GENERAL INFORMATION | | | |
|---|---|---|---|
| 1.1. Course title | **English for Information Technology II** | 1.8. Course code in ISVU | 202201 |
| 1.2. Course lecturer | Goran Crnica, prof., pred. (lecturer) | 1.9. Course code in MOZVAG | |
| 1.3. Assistants and/or associates | - | 1.10. Forms of teaching (number of hours Lecturing +Practical exercises + Seminars + e learning) | (30+15+0+0) |
| 1.4. Study programme (specialist, undergraduate, graduate) | **Undergraduate professional study of management** | 1.11. Level of e-learning application (1st, 2nd, 3rd level), percentage of online course performance (max. 20%) | 1st, course materials are on-line, % |
| 1.5. Course status (obligatory, optional) | Obligatory | 1.12. Number of course revisions | 2 |
| 1.6. Year of study | 1st | 1.13. Modernization | ■ yes □ no |
| 1.7. Credit score (ECTS) | 3 | 1.14. Percentage estimate of course changes and/or supplements | Less than 20% ■<br>More than 20 % □ |

| 2. COURSE DESCRIPTION | |
|---|---|
| 2.1. Course objectives | The aim of the course is to develop language structures, lexis and grammar from the business English language at the intermediate and higher level. Special attention is given to perfecting the techniques of listening, reading, speaking and writing. Professional vocabulary should be mastered at an intermediate and higher level. The objectives also include the repetition and determination of basic tenses, the adoption of professional vocabulary related to the language of information technologies, as well as international and intercultural economic issues. |

| | | |
|---|---|---|
| 2.2. Terms of course entry and required competences | Four-year secondary education completed; possessing a Level 4.2 qualification according to the CROQF. Proficiency in English at minimum B1 level. | |
| 2.3. Learning outcomes on the study programme level | LO 1: To apply and link economic terms in more complex written and oral communication in Croatian and foreign language | |
| | LO 3: To individually and responsibly search relevant literature for reaching solutions and conclusions in Croatian and foreign languages | |
| | LO 10: Develop team and interpersonal teamwork skills, master communication skills and presentation skills for assigned topics and tasks (case studies, projects, seminars) using advanced software tools for document creation, presentation and budget implementation | |
| 2.4. Expected learning outcomes on the course level (4-10 learning outcomes) | **Learning outcomes according to Bloom's taxonomy:** | **LO level:** 1 - memory, 2 - understanding, 3 - application, 4 - analysis, 5- evaluation, 6 - synthesis |
| | 24. To **define** and **explain** business English keywords | 1,2 |
| | 25. To **explain** and **apply** correctly grammatical structures and vocabulary in the field of Business English and IT | 2,3 |
| | 26. To create independently and present content in the field of Business English for IT | 3 |
| | 27. To **analyse** medium-sized professional texts and **solve** language tasks | 4 |
| | 28. To **argue critically** the views expressed and express your own views on the topic of Business English | 5 |
| | 29. To use part of the Common European Framework of Reference for Languages (CEF) level B2 language competences to generate new ideas | 6 |

| | **Constructive alignment** | | | | | | |
|---|---|---|---|---|---|---|---|
| 2.5. Course content according to detailed curriculum schedule | **r.br.** | **Thematic topic of the lecture** | **Thematic topic of the language exercises** | **LO of the course** | **Content / teaching method** | **Evaluation** | **Hours needed** |
| | 121. | Outdourcing: „The great job migration“ | Offshoring, Collocations Making and responding to suggestions | 3,5,6 | Students listen to the lectures. They work independently on the computer, inform themselves about the course content and eLearning documents. Students get to know each other in small groups, discuss the reasons for choosing their studies and explain what they expect from the studies. Group representatives present to their colleagues the similarities and differences in the reasons for choosing their studies. Students are introduced to the Polytechnic's Code of Ethics. | In the oral part of the final exam, you introduce yourself or your colleagues. They express their opinion about their own linguistic progress and point out the shortcomings and strengths. | 3 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 122. | Modal verbs | Sentence completition and translation | 1,4,5,6 | Students listen to the lecture and take an active part by asking questions and answering questions. In the lectures, students are encouraged to engage in dialogue and discussion, as well as to express opinions and points of view. The use of all language skills (listening, speaking, reading and writing) is recommended. | At the colloquium or in the written part of the final exam, the pupils define and explain the most important terms of the learning units. They solve language exercises that demonstrate an understanding of the meaning of key terms. In the oral part of the final exam, the students critically discuss their views on the unit topics and texts and use part of the general language skills at level B2 of the Common European Framework of Reference for Languages by presenting their ideas and findings. | 3 |
| | 123. | Conditionals; Type 1 | The conditional sentences, practice | 2,3,4,6 | Students listen to a lecture on grammar and spelling. The students exchange their own experiences on a certain topic and practice language structures by formulating their own examples. | Students apply grammar structures and solve grammar and spelling problems at the colloquium or in the written part of the final exam. In the oral part of the final exam, students use everyday examples to explain how to use certain grammatical structures. | 3 |
| | 124. | Conditional sentence; Type 2 and Type 3 | Speaking, vocabulary practicing | 1,4,5,6 | Students listen to the lecture and take an active part by asking questions and answering questions. In the lectures, students are encouraged to engage in dialogue and discussion, as well as to express opinions and points of view. The use of all language skills (listening, speaking, reading and writing) is recommended. | At the colloquium or in the written part of the final exam, the pupils define and explain the most important terms of the learning units. They solve language exercises that demonstrate an understanding of the meaning of key terms. In the oral part of the final exam, the students critically discuss their views on the unit topics and texts and use part of the general language skills at level B2 of the Common European Framework of Reference for Languages by presenting their ideas and findings. | 3 |
| | 125. | Finance; The bottom line, The profit and loss | Adjetives and adverbs | 2,3,4,6 | Students listen to a lecture on grammar and spelling. The students exchange their own experiences on a certain topic and practice language structures by formulating their own examples. | Students apply grammar structures and solve grammar and spelling problems at the colloquium or in the written part of the final exam. In the oral part of the final exam, students use everyday examples to explain how to use certain grammatical structures. | 3 |
| | 126. | Passive voice | Passive sentence practicing | 1,4,5,6 | Students listen to the lecture and take an active part by asking questions and answering questions. In the lectures, students are encouraged to engage in dialogue and discussion, as well as to express opinions and points of view. The use of all language skills (listening, speaking, reading and writing) is recommended. | At the colloquium or in the written part of the final exam, the pupils define and explain the most important terms of the learning units. They solve language exercises that demonstrate an understanding of the meaning of key terms. In the oral part of the final exam, the students critically discuss their views on the unit topics and texts and use part of the general language skills at level B2 of the Common European Framework of Reference for Languages by presenting their ideas and findings. | 3 |
| | 127. | Recruitment; Hiring for the future | Relative pronouns; Word-building; | 2,3,4,6 | Students listen to a lecture on grammar and spelling. The students exchange their own experiences on a | Students apply grammar structures and solve grammar and spelling problems at the colloquium or in the written part of the final exam. | 3 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | A full house | Small-talk | | certain topic and practice language structures by formulating their own examples. | In the oral part of the final exam, students use everyday examples to explain how to use certain grammatical structures. | |
| | 128. | Relative pronouns | Career skills, attitudes to personal space | 2,3,4,6 | Students listen to a lecture on grammar and spelling. The students exchange their own experiences on a certain topic and practice language structures by formulating their own examples. | Students apply grammar structures and solve grammar and spelling problems at the colloquium or in the written part of the final exam.<br>In the oral part of the final exam, students use everyday examples to explain how to use certain grammatical structures. | 3 |
| | 129. | Review 1 | Review 1 – Self Evaluation | 1,2,4,5,6 | The students listen to the lecture and prepare individually for the exam. Before the colloquium, students are asked to ask questions about content or grammar. | At the colloquium or in the written part of the final exam, the pupils define and explain the most important terms of the learning units. They solve language exercises that demonstrate an understanding of the meaning of key terms.<br>In the oral part of the final exam, the students critically discuss their views on the unit topics and texts and use part of the general language skills at level B2 of the Common European Framework of Reference for Languages by presenting their ideas and findings. | 25 |
| | 130. | Counterfeiting Imitating property is theft | Prefixes Career skills; Giving reasons | 2,3,4,6 | Students listen to a lecture on grammar and spelling. The students exchange their own experiences on a certain topic and practice language structures by formulating their own examples. | Students apply grammar structures and solve grammar and spelling problems at the colloquium or in the written part of the final exam.<br>In the oral part of the final exam, students use everyday examples to explain how to use certain grammatical structures. | 3 |
| | 131. | Markets „Going, going, gone“ | Compound nouns Making and responding to offers | 1,4,5,6 | Students listen to the lecture and take an active part by asking questions and answering questions. In the lectures, students are encouraged to engage in dialogue and discussion, as well as to express opinions and points of view. The use of all language skills (listening, speaking, reading and writing) is recommended. | At the colloquium or in the written part of the final exam, the pupils define and explain the most important terms of the learning units. They solve language exercises that demonstrate an understanding of the meaning of key terms.<br>In the oral part of the final exam, the students critically discuss their views on the unit topics and texts and use part of the general language skills at level B2 of the Common European Framework of Reference for Languages by presenting their ideas and findings. | 3 |
| | 132. | Lobbies | Vocabulary and language check | 2,3,4,6 | Students listen to a lecture on grammar and spelling. The students exchange their own experiences on a certain topic and practice language structures by formulating their own examples. | Students apply grammar structures and solve grammar and spelling problems at the colloquium or in the written part of the final exam.<br>In the oral part of the final exam, students use everyday examples to explain how to use certain grammatical structures. | 3 |
| | 133. | Reported speech | Reported sentence formation | 1,4,5,6 | Students listen to the lecture and take an active part by asking questions and answering questions. In the lectures, students are encouraged to engage in dialogue and discussion, as well as to | At the colloquium or in the written part of the final exam, the pupils define and explain the most important terms of the learning units. They solve language exercises that demonstrate an understanding of the meaning of key terms. | 3 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | express opinions and points of view. The use of all language skills (listening, speaking, reading and writing) is recommended. | In the oral part of the final exam, the students critically discuss their views on the unit topics and texts and use part of the general language skills at level B2 of the Common European Framework of Reference for Languages by presenting their ideas and findings. | |
| | 134. | Communication: „Coping with infoglut“ | Information overload | 2,3,4,6 | Students listen to a lecture on grammar and spelling. The students exchange their own experiences on a certain topic and practice language structures by formulating their own examples. | Students apply grammar structures and solve grammar and spelling problems at the colloquium or in the written part of the final exam.<br>In the oral part of the final exam, students use everyday examples to explain how to use certain grammatical structures. | 3 |
| | 135. | Review 2 | Review 2 – Self evaluation | 1,2,4,5,6 | The students listen to the lecture and prepare individually for the exam. Before the colloquium, students are asked to ask questions about content or grammar. | Students apply grammar structures and solve grammar and spelling problems at the colloquium or in the written part of the final exam.<br>In the oral part of the final exam, students use everyday examples to explain how to use certain grammatical structures. | 26 |

**3. EVALUATION OF STUDENTWORK**

3.1. Student obligations

Following the Rulebook on Studying and the Rulebook on Student Assessment and Evaluation: for all full-time students, the required attendance is at least 70%. Part-time students are required to attend classes and teach at least 50%; they are also required to write homework. Students are required to bring writing materials (paper and pen/ballpoint pen) to the exercises. The student's acquired knowledge is tested during the course content. Students are evaluated during the teaching process, with particular attention being paid to the student's active participation in teaching and their presentation of homework. Of particular importance for the final grade are the two written tests that the student takes during the semester. If the student passes both exams, he/she is exempted from the written part of the final exam and is obliged to take the oral final exam.
Student achievements:

- Students with 0 - 24.9% of ECTS credits - are graded with an F (unsuccessful) and cannot earn ECTS credits and must re-enrol the course in the next academic year;
- Students with 25 - 49.9% of ECTS credits - are graded FX (insufficient) and must pass the written exam (test). The written exam can be held in a regular or extraordinary exam period;
- Students with more than 50% of ECTS credits - students have the right to take the final exam.

Students can pass the final exam in two ways:
a) by passing two colloquia and an oral exam during the regular or extraordinary exam;
b) by passing the final exam consisting of a written and an oral exam during the regular or extraordinary exam.

3.2. Monitoring student work (enter the share of ECTS credits for each activity so that the total number of ECTS points corresponds to the credit score of the course)

| | | | | | |
|---|---|---|---|---|---|
| Attendance | 0,5 | Written exam | 1 (without colloquia) | Project | |
| Experimental work | | Research | | Practical work | |
| Essay | | Report | | Continuous evaluation | |
| Colloquium | 1 (without written exam) | Seminar paper | | (Homework for part-time students) | 0,5 |
| Active participation | 0,5 | Oral exam | 1 | (Other) | |

3.3. Student workload

The workload of students on all bases is 1 ECTS credit point (30 semester hours) and is estimated as:

| | *Obligation* | *Hours (estimated)* |
|---|---|---|
| | 14. Attending classes and language exercises | 45 |
| | 15. Preparing colloquia or exams through individual work | 45 |

## 4. GRADING SYSTEM

| | |
|---|---|
| 4.1. Grading seminar papers | - |

4.2. Grading colloquia/ written and oral exam

| Unsatisfactory | Satisfactory | Above average |
|---|---|---|
| Responds by memory, without a deeper understanding. Does not know or apply basic terms and concepts. Does not know how to apply or explain the contents of the course with examples. | Reproduces the basic concepts and without difficulty imparts new knowledge, understands the material, explains the terms and concepts supported with examples. | Knowledge is at the level of analysis, synthesis and evaluation. Observes the principles, accurately and thoroughly explains the content of the material, and logically connects and explains the terms and concepts supported with examples. Finds solutions that were not originally given. Notes correlations with related material. |

4.3. Final grade according to evaluation elements

| | | | | |
|---|---|---|---|---|
| Active participation of lectures and language exercises | 70-74,9% of attendance | 75-79,9% of attendance | 80-89,9% of attendance | 90-100% of attendance |
| | 2 points | 5 points | 10 points | 20 points |
| Colloquia/Written exam | 2 | 3 | 4 | 5 |
| | 50-64,9% | 65-79,9% | 80-89,9% | 90-100% |
| | 25 points | 30 points | 35 points | 40 points |
| Oral exam | 2 | 3 | 5 | 5 |
| | 25 points | 30 points | 35 points | 40 points |

4.4. Final grade according to absolute division

| Percentage of acquired knowledge, skills and competences (teaching + final exam) | Numerical grade | ECTS grade |
|---|---|---|
| 90 – 100% | 5 (excellent) | A |
| 80 – 89,9% | 4 (very good) | B |
| 65 – 79,9% | 3 (good) | C |
| 60 – 64,9% | 2 (satisfactory) | D |
| 50 – 59,9% | 2 (satisfactory) | E |

## 5. ADDITIONAL COURSE INFORMATION

| 5.1. Compulsory literature | Title | Number of copies in the library | Availability via other media |
|---|---|---|---|

| | | | |
|---|---|---|---|
| (available in the library and via other media) | 4. Trappe, T., & Tullis, G. (2005). *Intelligent Business Coursebook, Intermediate Business English*: Pearson Longman. | 10 | |
| 5.2. Additional literature (at the moment of changes and/or amended of study programme) | 1. Trappe, T., & Tullis, G. (2005). *Intelligent Business Skills Book, Intermediate Business English*: Pearson Longman.<br>2. Trappe, T., & Tullis, G. (2005). *Intelligent Business Workbookbook, Intermediate Business English*: Pearson Longman. | | Availability via e-learning platform |
| 5.3. Quality assurance methods that ensure the acquisition of knowledge, skills and competences | The control of student work quality and the acquisition of necessary knowledge and skills will be ensured through interactive work. By keeping track of attendance and student activity during classes and provided information on student progress through short colloquiums and homework, information for further guidance to students will be provided to increase the efficiency of their work. Students will be informed about their rights and obligations as well as the methods of work and the required literature.<br>Indicators of quality assurance system: Student survey, monitoring of annual data from the Croatian employment service on the annual state of student employment, surveys from employers and Alumni association. | | |
| 5.4. Informing about the course and contacting the teacher | It is the responsibility of each student to be regularly informed about the course, the coursework, and classroom activities. All notices of classes or possible adjournment will be published on time on the e-learning site of the course and the website of the Polytechnic. Students can contact teachers during the consultation period (at least one hour per week), while for short questions and explanations they can be contacted during class. It is also possible to ask questions by e-mail (from the official e-mail address at @vus.hr), which will be answered as soon as possible (no later than five working days after receiving the e-mail). | | |

| 1. GENERAL INFORMATION ABOUT THE SUBJECT | | | |
|---|---|---|---|
| 1.1. Title | **Computer architecture** | 1.8. ISVU course code | 201307, 202203 (PINF-9, PINF-9I) |
| 1.2. Lecturer | Marko Pavelić | 1.9. MOZVAG course code | |
| 1.3. Assistants and/or associates | Milan Hrga, lecturer | 1.10. Forms of teaching (number of hours Lecturing +Practical exercises + Seminars + e learning) | (30+30+0+0) |
| 1.4. Study programme (specialist, undergraduate, graduate) | **Professional undergraduate study Business Informatics** | 1.11. Level of e- learning application (1st, 2nd, 3rd level), percentage of on line course performance (max. 20%) | 1st – materials available On-line, (lectures recorded)<br><br>20% |
| 1.5. Course status (obligatory, optional) | Obligatory | 1.12. Number of course revisions | 0. |
| 1.6. Study year | 1 | 1.13. Modernization | □ yes ■ no |
| 1.7. Credit score (ECTS) | 5 | 1.14. Percentage estimate of course changes and/or supplements | Less than 20% □<br>More than 20 % □ |

| 2. COURSE DESCRIPTION | |
|---|---|
| 2.1. Course objectives | This single semester course introduces students to the following:<br>• Basics of digital technology,<br>• Main computer building blocks according to von Neumann Architecture<br>• Way how main computer components are built from combinational and sequential logical devices<br>• Influence of computer hardware architecture on the performance. |

| | | |
|---|---|---|
| | • Hardware/Software interface<br>• How to applicate acquired knowledge in business praxis. | |
| 2.2. Terms of course entry and required competences | Four-year high school education completed; having a qualification at level 4.2. Required courses: Introduction to Computer Science | |
| 2.3. Learning outcomes on the study program level | LO1. Analyze conditions, identify opportunities and foresee problems which organizations and individuals meet then using information technologies. | |
| | LO2. Evaluate and define steps in planning, decision making, operations and control then applying computer aided business and manufacturing. | |
| | LO9. To individually and responsibly search and select relevant literature in Croatian and foreign languages, prepare papers and presentations for general and professional audience and critically evaluate presented professional topics. | |
| | LO11. Select and coordinate activities for designing and maintaining of information system with client's business needs. | |
| | LO15. Compare and select suitable development tools from professional viewpoint. | |
| 2.4. Expected learning outcomes on the course level | **Learning outcomes** towards Bloom's taxonomy:<br>(up to two verbs per LO) | **LO Level:**<br>*25. Recapture,*<br>*26. Understanding,*<br>*27. Application,*<br>*28. Analysis,*<br>*29. Evaluation,*<br>30. *Synthesis* |
| | 1. **Demonstrate** knowledge and understanding of course content **by defining and describing** basic topics in computer architecture | **4,5** |
| | 2. **Present** working principles of digital computers and how are they constructed from basic logic gates. | **4,5** |
| | 3. **Classify** basic building blocks of modern computers according to von Neuman's model and analyze their role | **4,5** |
| | 4. **Evaluate and recommend** computer components: processor, memory, bus organization, input-output and storage units, which serve best for specified tasks | **5,6** |
| | 5. **Judge** role of operating system in computer functioning, **establish conditions** for its installation | **4,5** |
| | 6. **Identify** and **argument** potential causes of lack of performance or deadlock in computer functioning. | **5,6** |
| | 7. **Critically** asses influence of processor type and frequency, ISA, memory subsystem (complete hierarchy) on configurations performance for specific task**.** | **5,6** |
| | 8. **Design** configuration out of standard components and **estimate** its performance | **5** |
| | 9. | |
| | 10. | |

| 2.5. Course content according to detailed curriculum schedule | **Constructive alignment** | | | | | |
|---|---|---|---|---|---|---|
| | **No:** | **Thematic ensemble / Lecture Topic** | **Course LO** | **Content / Teaching Method** | **Evaluation** | **Time needed (hours)** |
| | 136. | Introduction to digital logic – phisical characteristics | 1,2,3 | Listen to the lecture and read the literature. | Checked by written test and oral exam: student can estimate influence of technology development on capabilities and performance of computers. | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 137. | Classes of Computers | 1,8 | Listen to the lecture and read the literature. | -"- : student can classify computers according to their architecture and role they are expected to play | 4 |
| | 138. | Performance, definition , measurements | 1,7,8 | Listen to the lecture, read the literature and solving exercises. | -"- : student can critically asses performance of computers. | 12 |
| | 139. | Instruction Set Architecture (ISA), RISC-CISC | 1,2,4,7,8 | Listen to the lecture, read the literature and solving exercises. | -"- : student can critically asses influence of each component on hardware/software performance | 10 |
| | 140. | MIPS ISA, structure and formats, case study | 1,2,4,7,8 | Listen to the lecture + solving exercises. Working on simulator. | -"- | 14 |
| | 141. | Instructions and Addressing: data and branches | 1,4,6,7,8 | Listen to the lecture + solving exercises. Working on simulator. | -"- | 10 |
| | 142. | Processor | 1,4,6,7,8 | Listen to the lecture + solving exercises. Working on simulator. | -"- | 10 |
| | 143. | Pipeline architecture | 1,4,6,7,8 | Listen to the lecture, read the literature and solving exercises. | -"- | 10 |
| | 144. | Riscs | 1,4,6,7,8 | Listen to the lecture, read the literature and solving exercises. | -"- | 10 |
| | 145. | Memory hierarchy | 1,2,3,5,6,7,8 | Listen to the lecture, read the literature and solving exercises. | -"- | 8 |
| | 146. | Cache, performance | 1,2,4,6,7,8 | Listen to the lecture, read the literature and solving exercises. | -"- | 8 |
| | 147. | Virtual memmory | 1,2,4,6,7,8 | Listen to the lecture, read the literature and solving exercises. | -"- | 8 |
| | 148. | Storage units, RAID, SAN, NAS | 1,2,4,5,6,7,8 | Listen to the lecture, read the literature and solving exercises. | -"- | 10 |
| | 149. | I/O Devices, Networks, Clustering | 1, 2, 3, 5, 6, 7 | Listen to the lecture, read the literature and solving exercises. | -"- | 6 |
| | 150. | Role of Operation Systems, Future Development | 1,5,6,7,8 | Listen to the lecture. Performing installation on VM.. | Checked during exercises and oral exam: student can select install operating system on configuration. | 20 |

## 3. EVALUATION OF STUDENT WORK

| | |
|---|---|
| 3.1. Students` obligations | In accordance with the Book of Rules and the Rulebook on Student Assessment and Evaluation: for all regular students attend at least 70% attendance. Part-time students have the obligation to attend at least 50% of lectures through physical presence or via on-line attendance.<br><br>Students who have during the course:<br>• satisfied minimal attendance condition, may approach colloquium or written exam.<br>• past 50% score from all colloquium or from written exam (exam can be held in a regular or extraordinary exam period) may approach final oral exam<br>• past both written and oral exams receive grade and all ECTS credits for that course |

<table>
<tr><td rowspan="5">3.2. Monitoring student work (enter the share of ECTS credits for each activity so that the total number of ECTS points corresponds to the credit score of the course)</td><td>Attendance</td><td>0.5</td><td>Written exam</td><td>2 (by submitting both colloquiums the student is relieved of an written examination)</td><td>Project</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Research</td><td></td><td>Practical work</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Report</td><td></td><td>Continuous examination</td><td></td></tr>
<tr><td>Colloquium</td><td>2 (by submitting both colloquiums the student is relieved of a written exam)</td><td>Seminar paper</td><td></td><td>Other (inscribe)</td><td></td></tr>
<tr><td>Class activities</td><td>0.5</td><td>Oral exam</td><td>2 (by submitting both colloquiums the student is relieved of an oral examination)</td><td>Other (inscribe)</td><td></td></tr>
<tr><td>3.3. Student workload</td><td colspan="6">The student's workload on all bases amounts to 1 ECTS point for 30 hours of work per semester and is estimated as:
<table>
<tr><th>Commitment</th><th>Hours (estimate)</th></tr>
<tr><td>16. Attending classes</td><td>60</td></tr>
<tr><td>17. Preparation for the lectures and exercises</td><td>30</td></tr>
<tr><td>18. Preparation for the exam through self-study</td><td>60</td></tr>
<tr><td></td><td></td></tr>
</table></td></tr>
<tr><td colspan="7">4. GRADING</td></tr>
<tr><td>4.1. Seminar paper grading</td><td colspan="6"></td></tr>
<tr><td>4.2. Colloquium / exam grading</td><td colspan="6"><table>
<tr><th>Poor</th><th>Satisfying</th><th>Above average</th></tr>
</table></td></tr>
</table>

| | | | |
|---|---|---|---|
| | Give answer by memory, no deeper understanding. Does not know and does not apply the basic terms and concepts. Cannot apply or explain the contents of the course. | Reproduces basic terms, without difficulty transfers new knowledge, understands subject matter, explains the terms and the notions that substantiate by examples. | Knowledge is at the level of analysis, synthesis and evaluation. It observes legitimacy, accurately and thoroughly explains the content of the subject, and logically links and explains the terms and concepts that it encapsulates. Find solutions that are not originally given. There is a correlation with correlative subjects. |

| 4.3. Creating a final grade according to evaluation elements | | | | | |
|---|---|---|---|---|---|
| | Attendance and active participation in the lessons | 70-75% of attendance | 76-86% of attendance | 87-100% of attendance | Activity in class |
| | | 2 points | 5 points | 10 points | +10 points |
| | Colloquium / written exam | 2 | 3 | 4 | 5 |
| | | 50-64,9% | 65-79,9% | 80-89,9% | 90-100% |
| | | 25 points | 30 points | 35 points | 40 points |
| | Oral exam | 2 | 3 | 5 | 5 |
| | | 25 points | 30 points | 35 points | 40 points |

| 4.4. Creating a final grade according to absolute allocation | Percentage of adopted knowledge, skills and competences (teaching + final exam) | Numerous grade | ECTS grade |
|---|---|---|---|
| | 88 – 100% | 5 (excellent) | A |
| | 78 – 87.9% | 4 (very good) | B |
| | 62 – 77.9% | 3 (good) | C |
| | 50 – 61,9% | 2 (sufficient) | D |
| | 0 – 49.9% | 1 (unsufficient) | F |

## 5. ADDITIONAL INFORMATION ABOUT THE COURSE

| | Title | Number of copies in the library | Availability via other media |
|---|---|---|---|
| 5.1. Compulsory literature (available in the library and through other media) | 2. S.Ribarić: Građa računala - arhitektura i organizacija računarskih sustava, Algebra, Zagreb 2011, ISBN 978-953-322-074-1 | 5 | - |
| | 3. D. Petterson, J.Hennessy: Computer Organisation and Deign, 4rd ed., Morgan Kaufmann, 2011. | 1 | Available On-line |
| 5.2. Additional literature (at the moment of changes and/or amended of study programme) | 5. I.Englander: The Architecture of Computer Hardware, Systems Software & Networking, 4th ed., John Wiley & Sons, 2010 | 1 | e-learning - pdf |

| | |
|---|---|
| 5.3. Quality assurance methods that ensure the acquisition of knowledge, skills and competences | The control of students' work quality and the acquisition of necessary knowledge and skills will be ensured through interactive work. By keeping track of attendance and student activity during classes and provided information on students` progress through short colloquiums and homework, information for further guidance to students will be provided in order to increase the efficiency of their work. Students will be informed about their rights and obligations as well as the methods of work and the required literature.<br>Indicators of quality assurance system: Student survey, monitoring of annual data from the Croatian employment service on the annual state of student employment, surveys from employers and Alumni association. |
| 5.4. information on the course and contact with the teacher | It is obligatory for every student to regularly inform about the course, teaching and teaching activities. All information about teaching or any delay in teaching will be published on the e-learning pages of the course and on the web pages of the Polytechnic. Students can contact the teachers during the consultation term (at least one hour per week), while brief questions and explanations can be addressed during classes. It is possible to ask questions by e-mail (from the official e-mail address from the domain @ vus.hr) that will be answered in a short time (no later than five working days from the receipt of e-mail). |

| 1. GENERAL INFORMATION ABOUT THE SUBJECT | | | |
|---|---|---|---|
| 1.1. Title | **Business information systems** | 1.8. ISVU course code | 201315 |
| 1.2. Lecturer | Frane Urem PhD prof | 1.9. MOZVAG course code | |
| 1.3. Assistants and/or associates | | 1.10. Forms of teaching (number of hours Lecturing +Practical exercises + Seminars + e learning) | (30+30+0+0) |
| 1.4. Study programme (specialist, undergraduate, graduate) | undergraduate | 1.11. Level of e- learning application (1st, 2nd, 3rd level), percentage of on line course performance (max. 20%) | 3rd – materials available On-line,<br>0% |
| 1.5. Course status (obligatory, optional) | obligatory | 1.12. Number of course revisions | 1. |
| 1.6. Study year | 2 | 1.13. Modernization | ■ yes □ no |
| 1.7. Credit score (ECTS) | 6 | 1.14. Percentage estimate of course changes and/or supplements | Less than 20% ■<br>More than 20 % □ |

| 2. COURSE DESCRIPTION | |
|---|---|
| 2.1. Course objectives | Introduce the student to the concepts of business information systems |
| 2.2. Terms of course entry and required competences | Four-year high school education completed; having a qualification at level 4.2 |

| | | |
|---|---|---|
| 2.3. Learning outcomes on the study programme level | IU9 Select appropriate professional literature in Croatian and foreign languages, prepare and independently deliver presentations in Croatian and foreign languages to expert and general audiences, and critically evaluate the presented professional topics | |
| | IU12. Apply key aspects of information technology (programming, algorithms, data structures, databases and project management in the field of information technology) | |
| | IU15. Compare and select appropriate development tools at expert level | |
| 2.4. Expected learning outcomes on the course level | **Learning outcomes** towards Bloom's taxonomy:<br>(up to two verbs per LO) | **LO Level:**<br>*31. Recapture,*<br>*32. Understanding,*<br>*33. Application,*<br>*34. Analysis,*<br>*35. Evaluation,*<br>36. *Synthesis* |
| | 1. Understand the concept of systems and the importance of a systematic approach to analysis and a business information system. | 1,2 |
| | 2. Identify system boundaries, external and internal stakeholders and relationships among them and understand the risks that arise. | 2,3,4,5,6 |
| | 3. Understand the role of key system components and is able to identify processes and define procedures within an information system to support them. | 2,3,4,5,6 |
| | 4. Identify security threats in the system and propose techniques for their removal. | 2,3,4,5,6 |
| | 5. Use the software tools available within the MS Office suite to collect and analyze data. | 2,3,4,5,6 |
| | 6. Implement and deploy the appropriate ready-made business applications. | 2,3,4,5,6 |
| | 7. Understand the concept of systems and the importance of a systematic approach to analysis and a business information system. | 1,2 |

| | **Constructive alignment** | | | | | |
|---|---|---|---|---|---|---|
| | **No:** | **Thematic ensemble / Lecture Topic** | **Course LO** | **Content / Teaching Method** | **Evaluation** | **Time needed** |
| 2.5. Course content according to detailed curriculum schedule | 151. | Introduction to the course and detailed curriculum. | - | | | 2 hours |
| | | Basic terms | 1,2,3 | Listening to lectures, working on a computer, reading literature. | Understand the term business information system. Identify major groups of information systems. | 8 hours |
| | 152. | Types of information systems and components | 1,2,3 | Listening to lectures, working on a computer, reading literature. | Define the archive system. Identify archiving media. Identify the pros and cons of an individual archive medium. Explain the procedures for authenticating and authorizing access to business documentation. Protect digital content by encryption. Apply digital signature technology. | 10 hours |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 153. | Archiving and data protection | 1,2,3,4 | Listening to lectures, working on a computer, reading literature. | Define the levels of business automation. Identify prerequisites for business automation. Identify the role of business policy and organizational procedures in business automation. Explain the importance of working conditions and ergonomics in business automation. | 10 hours |
| | 154. | Business Automation | 1,2,3,4 | Listening to lectures, working on a computer, reading literature. | Identify information resources in the business. Identify the types and value of information. Interpret ways of classifying, evaluating, processing, storing, exchanging and distributing data and information | 10 hours |
| | 155. | Information resource management | 1,2,3,4 | Listening to lectures, working on a computer, reading literature. | Define the term telecommunications and telecommunication system. Identify elements of the telecommunications system. | 10 hours |
| | 156. | Business Information Systems Communication Infrastructure | 1,2,3,4 | Listening to lectures, working on a computer, reading literature. | Development trends of telecommunication systems. To interpret the division of telecommunications according to the type of information, the division of telecommunication processes, the division according to forms of communication. | 10 hours |
| | 157. | Key business applications | 1,2,3,4,5 | Listening to lectures, working on a computer, reading literature. | Advanced use of MS Office suite of office applications. | 10 hours |
| | 158. | Electronic business and trends | 1,2,3,4,5 | Listening to lectures, working on a computer, reading literature. | Define the essential terms of e-commerce. Identify emerging trends in e-commerce. Use cloud services. | 15 hours |
| | 159. | Information system development | 1,2,3,4 | Listening to lectures, working on a computer, reading literature. | Explain stakeholder roles in information system development. Analyze the architecture of an existing information system. Identify the stages of information system development. Explain the methodology of waterfall development<br>Explain the methodology of rapid application development<br>Explain the methodology of information engineering<br>Explain the methodology of the unified development process<br>Expose the most famous agile methodologies and explain their features | 15 hours |
| | 160. | Business information system and business management | 3,4,5,6 | Listening to lectures, working on a computer, reading literature. | Identify layers of business information system. Model the business process as a transaction. | 15 hours |
| | 161. | Business information system support for key business functions | 3,4,5,6 | Listening to lectures, working on a computer, reading literature. | Identify key business functions. Use the business intelligence analysis and planning subsystem. Use the permanent business asset management information subsystem. | 15 hours |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 162. | Business information system and business process management | 3,4,5,6 | Listening to lectures, working on a computer, reading literature. | Use the human resources management information subsystem. Use the Accounting and Financial Management Information Subsystem. | 15 hours |
| | 163. | Business information system and business process management | 3,4,5,6 | Listening to lectures, working on a computer, reading literature. | Use the procurement information system and inbound logistics. Use the production information subsystem. Use the sales and outbound logistics information subsystem | 15 hours |
| | 164. | Strategic management of business information system | 3,4,5,6 | Listening to lectures, working on a computer, reading literature. | Identify information systems as drivers of operational efficiency and business innovation. Formulate goals for building an information system. Analyze the risks of implementing business information systems. Apply the concepts, measurements and evaluation (audit) of the quality of business information systems | 15 hours |
| | 165. | Business information systems and electronic commerce | 3,4,5,6 | Listening to lectures, working on a computer, reading literature. | Define a company environment in e-commerce. Analyze the connectivity of the business information system with e-commerce activities. | 15 hours |

**3. EVALUATION OF STUDENT WORK**

| | |
|---|---|
| 3.1. Students` obligations | In accordance with the Book of Rules and the Rulebook on Student Assessment and Evaluation: for all regular students attend at least 70% attendance. Part-time students have the obligation to attend at least 50% of lectures. All students must create, present and positively colloquy seminar paper.<br><br>Students who have during the course achieved:<br>• From 0 – 24,9% ECTS credits- is rated F (unsuccessful) and cannot get ECTS credits and must re-enrol the subject in the next academic year;<br>• From 25 – 49,9% ECTS credits - is rated FX (inadequate) and has to come out and pass the test (exam). A written exam can be held in a regular or extraordinary exam period;<br>• More than 50% ECTS credits - students have the right to access the final exam of the subject.<br><br>Students can take the final exam in the course in two ways: a) during the course of teaching through continuous monitoring of students (active participation in classes and exercises and two exams); b) during class (active participation in classes and exercises) and passing exams (written and oral examinations). |

| 3.2. Monitoring student work (enter the share of ECTS credits for each activity so that the total number of ECTS points corresponds to the credit score of the course) | | | | | | |
|---|---|---|---|---|---|---|
| | Attendance | 2 | Written exam | 2 (by submitting both colloquiums the student is relieved of an written examination) | Project | |
| | Experimental work | | Research | | Practical work | 1 |
| | Essay | | Report | | Continuous examination | |
| | Colloquium | 3 (by submitting both colloquiums the student is relieved of a written and oral examination) | Seminar paper | | Other (inscribe) | |
| | Class activities | | Oral exam | 1 (by submitting both colloquiums the student is relieved of an oral examination) | Other (inscribe) | |

| | |
|---|---|
| 3.3. Student workload | The student's workload on all bases amounts to 1 ECTS point for 30 hours of work per semester and is estimated as: |

| ***Commitment*** | ***Hours (estimate)*** |
|---|---|
| 19. Attending classes | 60 |
| 20. Practical work | 30 |
| 21. Preparation for the Colloquium / exam through self-study | 90 |
| | |

## 4. GRADING

**4.1. Seminar paper grading**

| **Valuation Element** | **Poor** | **Satisfying** | **Above average** |
|---|---|---|---|
| | | | |

**4.2. Colloquium / exam grading**

| **Poor** | **Satisfying** | **Above average** |
|---|---|---|
| Give answer by memory, no deeper understanding. Does not know and does not apply the basic terms and concepts. Cannot apply or explain the contents of the course. | Reproduces basic terms, without difficulty transfers new knowledge, understands subject matter, explains the terms and the notions that substantiate by examples. | Knowledge is at the level of analysis, synthesis and evaluation. It observes legitimacy, accurately and thoroughly explains the content of the subject, and logically links and explains the terms and concepts that it encapsulates. Find solutions that are not originally given. There is a correlation with correlative subjects. |

**4.3. Creating a final grade according to evaluation elements**

| | | | | |
|---|---|---|---|---|
| Active participation in the lessons | 70-75% of attendance | 76-86% of attendance | 87-100% of attendance | Created mental map. Solved case study. |
| | 4 points | 7 points | 10 points | 3 points |
| Seminar paper | 2 | 3 | 4 | 5 |
| | 5 points | 7 points | 8 points | 10 points |
| Colloquium / written exam | 2 | 3 | 4 | 5 |
| | 50-64,9% | 65-79,9% | 80-89,9% | 90-100% |
| | 25 points | 30 points | 35 points | 40 points |
| Oral exam | 2 | 3 | 5 | 5 |
| | 25 points | 30 points | 35 points | 40 points |

| | | | | |
|---|---|---|---|---|
| 4.4. Creating a final grade according to absolute allocation | | Percentage of adopted knowledge, skills and competences (teaching + final exam) | Numerous grade | ECTS grade |
| | | 90 – 100% | 5 (excellent) | A |
| | | 80 – 89,9% | 4 (very good) | B |
| | | 65 – 79,9% | 3 (good) | C |
| | | 60 – 64,9% | 2 (sufficient) | D |
| | | 50 – 59,9% | 2 (sufficient) | E |

## 5. ADDITIONAL INFORMATION ABOUT THE COURSE

| | Title | Number of copies in the library | Availability via other media |
|---|---|---|---|
| 5.1. Compulsory literature (available in the library and through other media) | Ž.Panian, K.Čurko et al.: Poslovni informacijski sustavi, Element, 2010. | 5 | |
| 5.2. Additional literature (at the moment of changes and/or amended of study programme) | Bidgoli H.: Management Information Systems6, 4LTR Press,Cengage Learning, 2016.<br>J.O'Brien, G.Marakas: Menagement Information Systems, 7th ed., McGraw Hill, 2016. | 3 | Available online at e-learning system |
| 5.3. Quality assurance methods that ensure the acquisition of knowledge, skills and competences | The control of students' work quality and the acquisition of necessary knowledge and skills will be ensured through interactive work. By keeping track of attendance and student activity during classes and provided information on students` progress through short colloquiums and homework, information for further guidance to students will be provided in order to increase the efficiency of their work. Students will be informed about their rights and obligations as well as the methods of work and the required literature.<br>Indicators of quality assurance system: Student survey, monitoring of annual data from the Croatian employment service on the annual state of student employment, surveys from employers and Alumni association. | | |
| 5.4. information on the course and contact with the teacher | It is obligatory for every student to regularly inform about the course, teaching and teaching activities. All information about teaching or any delay in teaching will be published on the e-learning pages of the course and on the web pages of the Polytechnic. Students can contact the teachers during the consultation term (at least one hour per week), while brief questions and explanations can be addressed during classes. It is possible to ask questions by e-mail (from the official e-mail address from the domain @ vus.hr) that will be answered in a short time (no later than five working days from the receipt of e-mail). | | |

| **6. GENERAL INFORMATION** | | | |
|---|---|---|---|
| 1.1. Course lecturer | Ana Perišić | 1.8. Course code in ISVU | 201321<br>202221 |
| 1.2. Course title | **Business statistics** | 1.9. Course code in MOZVAG | |
| 1.3. Assistants and/or associates | | 1.10. Forms of teaching (number of hours Lecturing +Practical exercises + Seminars + e learning) | (30+30+0+0) |
| 1.4. Study programme (specialist, undergraduate, graduate) | Business Informatics | 1.11. Level of e- learning application (1st, 2nd, 3rd level), percentage of on line course performance (max. 20%) | 1st, course materials are on-line, 0% |
| 1.5. Course status (obligatory, optional) | Obligatory | 1.12. Number of course revisions | 2 |
| 1.6. Year of study | 2nd | 1.16. Modernization | Yes |
| 1.7. Credit score (ECTS) | 6 | 1.14. Percentage estimate of course changes and/or supplements | Less than 20% X□<br>More than 20 % □ |

| **2. COURSE DESCRIPTION** | | |
|---|---|---|
| 2.1. Course objectives | Train students to be able to comprehend, effectively understand and recognize fundamental statistical procedures and methods;<br>Provide theoretical and practical knowledge which enables students to develop and apply acquired knowledge, independently and/or within a team. | |
| 2.2. Terms of course entry and required competences | 4 year secondary education completed; qualification level 4.2 according to the CROQF. | |
| 2.3. Learning outcomes on the study programme level | LO 4: To collect, calculate and graphically display statistical data from the field of economics and business by using advanced software tools and further comment and analyze them.<br>LO 5: To use planning, organizing, management and control methods on practical examples, analyze the problem and propose appropriate solutions to problem situations.<br>LO 7: To interpret business and financial reports and propose solutions to improve financial performance and profitability.<br>LO 10: To interpret, solve and / or graphically present solutions in the fields of maths, statistics and information technology and apply their methods and techniques in analyzing economic problems by using advanced software tools. | |
| 2.4. Expected learning outcomes on the course level | **Learning outcomes** accroding to the Bloom`s taxonomy: (up to two verbs per LO) | **Level of LO:**<br>*1- remembering,*<br>*2- understanding,*<br>*3- application,*<br>*4-analysis,* |

| | | |
|---|---|---|
| | | *5-evaluation, 6-synthesis* |
| | 30. To define and explain fundamental concepts of descriptive statistics | 1,2 |
| | 31. To prepare tabular and graphical data representation of statistical data | 3,4 |
| | 32. To calculate and to interpret measures of central tendency and measures of dispersion | 3,4 |
| | 33. To perform correlation and regression analysis, to comment the results and to draw a conclusion about the relationship between variables | 3,4,5 |
| | 34. To identify time series type | 4 |
| | 35. To calculate and to interpret values of dynamics indicators | 3,2 |
| | 36. To estimate the linear trend equation and to apply it for forecasting future values of the time series | 3,4,6 |
| | 37. To set the statistical hypothesis and to conduct the chi square test. | 6,3 |

2.5. Course content according to detailed curriculum schedule

**Constructive allignement**

| no | Thematic unit | LO of the course | Content/teaching methods | Evaluation | Time |
|---|---|---|---|---|---|
| 166. | Introduction into the course and detailed plan.<br><br>Fundamental statistical terms | 1 | Attending lectures. Familiarize with course content, e-learning documents, literature and students' obligations. | Students define and explain fundamental concepts of descriptive statistics through colloquia or written/oral exams. | 1 h<br><br>8h<br>16 h |
| 167. | Grouping data and graphical data representation | 2 | Attending lectures. Actively involving students through problem solving and discussion. | Students will prepare tabular and graphical data representation of statistical data through colloquia or written/oral exams. | 4h<br>8h |
| 168. | Measures of central tendency | 1,3 | Attending lectures. Actively involving students through problem solving and discussion. | Students will define and explain fundamental concepts of descriptive statistics and calculate and to interpret measures of central tendency and measures of dispersion through colloquia or written/oral exams. | 4h<br>8h |
| 169. | Measures of central tendency | 1,3 | Attending lectures. Actively involving students through problem solving and discussion. | Students will define and explain fundamental concepts of descriptive statistics, calculate and interpret measures of central tendency and measures of dispersion through colloquia or written/oral exams. | 4h<br>8h |
| 170. | Measures of dispersion | 1,3 | Attending lectures. Actively involving students through problem solving and discussion. | Students will define and explain fundamental concepts of descriptive statistics and calculate and interpret measures of central tendency and measures of dispersion through colloquia or written/oral exams. | 4h<br>8h |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 171. | Standardized value. Outlies. Data distribution rules. Exam preparation | 1,3 | Attending lectures. Actively involving students through problem solving and discussion. Group problem solving and discussion. Exam preparation. | Students will define and explain fundamental concepts of descriptive statistics and calculate and interpret measures of central tendency and measures of dispersion through colloquia or written/oral exams. | 6h<br>12h | |
| | 172. | Time series | 5 | Attending lectures. Actively involving students through problem solving and discussion. | Students will identify time series type through colloquia or written/oral exams. | 4h<br>8h | |
| | 173. | Index numbers | 6 | Attending lectures. Actively involving students through problem solving and discussion. | Students will calculate and interpret the values of dynamics indicators through colloquia or written/oral exams. | 5h<br>10h | |
| | 174. | Trend | 7 | Attending lectures. Actively involving students through problem solving and discussion. | Students will estimate the linear trend equation and apply it for forecasting future values of the time series through colloquia or written/oral exams. | 6h<br>12h | |
| | 175. | Correlation and regression | 4 | Attending lectures. Actively involving students through problem solving and discussion. | Students will perform correlation and regression analysis, comment the results and draw a conclusion about the relationship between variables through colloquia or written/oral exams. | 6h<br>12h | |
| | 176. | Chi-square test | 8 | Attending lectures. Actively involving students through problem solving and discussion. | Students will set the statistical hypothesis and conduct the chi square test through colloquia or written/oral exams. | 6h<br>12h | |
| | 177. | Final conclusions. Exam preparation | | Attending lectures. Actively involving students through problem solving and discussion. Group problem solving and discussion. Exam preparation. | | 2h<br>6h | |

**3. EVALUATION OF STUDENTS` WORK**

| | |
|---|---|
| 3.1. Students` obligations | In accordance with the Regulations on Studying and the Regulations on Student Assessment and Evaluation: for all full-time students attendance of at least 70%. Part-time students are required to attend classes at least 50%. All students are required to carry calculator and formulae list.<br>Students who have during the course achieved:<br>• from 0 - 24,9% ECTS credits- are rated F (unsuccessful) and cannot obtain ECTS credits, and must re-enroll in the next academic year;<br>• from 25 - 49,9% - are assessed by FX (insufficient) and must pass the written exam (test). Written exam (test) can be held in a regular or extraordinary exam period;<br>• more than 50% - students have the right to take the final exam.<br>Students can take the final exam from the course in two ways: a) during the course of teaching through continuous monitoring of students (active participation in classes and through two colloquia); b) by passing the exam (written and oral part of the exam). |

<table>
<tr><td rowspan="5">3.2. Monitoring student work (enter the share of ECTS credits for each activity so that the total number of ECTS points corresponds to the credit score of the course)</td><td>Attendance</td><td>0,5</td><td>Written exam</td><td>3,5 (without colloquia)</td><td>Project</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Research</td><td></td><td>Practical work</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Report</td><td></td><td>Continuous examination</td><td>0,5</td></tr>
<tr><td>Colloquium</td><td>3,5 (without written exam)</td><td>Seminar paper</td><td></td><td>Other</td><td></td></tr>
<tr><td>Class activity</td><td>0,5</td><td>Oral exam</td><td>1</td><td>Other</td><td></td></tr>
<tr><td>3.3. Student workload</td><td colspan="6">Student workload on all bases for 1 ECTS credit is 30 hours in a semester and is estimated as:<br>7. Attending classes and exercises 60 hours<br>8. Preparing colloquia or exams through individual work 120 hours</td></tr>
<tr><td colspan="7">4. GRADING SYSTEM</td></tr>
<tr><td>4.1. Grading seminar papers</td><td colspan="6"></td></tr>
<tr><td>4.2. Grading colloquia/ written and oral exam</td><td colspan="6"><table>
<tr><th>Unsatisfactory</th><th>Satisfactory</th><th>Above average</th></tr>
<tr><td>Responds by memory, without a deeper understanding. Does not know or apply basic terms and concepts. Does not know how to apply or explain the contents of the course with examples.</td><td>Reproduces the basic concepts and without difficulty imparts new knowledge, understands the material, explains the terms and concepts supported with examples.</td><td>Knowledge is at the level of analysis, synthesis and evaluation. Observes the principles, accurately and thoroughly explains the content of the material, and logically connects and explains the terms and concepts supported with examples. Finds solutions that were not originally given. Notes correlations with related material.</td></tr>
<tr><td></td><td></td><td></td></tr>
</table></td></tr>
<tr><td>4.3. Final grade according to evaluation elements</td><td colspan="6">During the semester, students have the possibility to partially take written exams through colloquia (twice during the semester). In order to have access to the oral exam, students need to achieve at least 50% on each colloquium. Also, students have a possibility to retake one colloquium. Students who did not pass at least one colloquia (or retaken colloquia) need to take part in the written exam. In this case, in order to have access to the oral exam, students need to achieve at least 50% on written exam. The final grade is formed after the oral exam by aggregating scores achieved through the written exam/colloquia, oral exam and during classes.</td></tr>
<tr><td>4.3. Final grade according to absolute division</td><td colspan="6"><table>
<tr><td>Percentage of acquired knowledge, skills and competences (teaching + final exam)</td><td>Numerical grade</td><td>ECTS grade</td></tr>
<tr><td>90 – 100%</td><td>5 (excellent)</td><td>A</td></tr>
<tr><td>80 – 89,9%</td><td>4 (very good)</td><td>B</td></tr>
<tr><td>65 – 79,9%</td><td>3 (good)</td><td>C</td></tr>
<tr><td>60 – 64,9%</td><td>2 (satisfactory)</td><td>D</td></tr>
<tr><td>50 – 59,9%</td><td>2 (satisfactory)</td><td>E</td></tr>
</table></td></tr>
</table>

| **5. ADDITIONAL COURSE INFORMATION** | | | |
|---|---|---|---|
| 5.1. Compulsory literature (available in the library and via other media) | **Title** | **Number of copies in the library** | **Availability via other media** |
| | Dumičić, K. i suradnici (2011) Poslovna statistika. Zagreb: Element (odabrana poglavlja)<br>Šošić I., Primijenjena statistika, Školska knjiga, Zagreb, 2004. | 5<br>12 | |
| 5.2. Additional literature (at the moment of changes and/or amended of study programme) | Šošić I., Serdar V., Uvod u statistiku, Školska knjiga, Zagreb, 2002.<br>Azcel A. Sounderpandian J., Complete Business Statistics, McGraw Hill, 2009.<br>Čižmešija M., Kurnoga Živadinović N., Zbirka riješenih zadataka iz osnova statistike, Mirorad d.o.o., Zagreb,2006<br>Patrick R. McMullen, Poslovna statistika za stručne studije [prijevod Devčić,K., Perišić,A.], Veleučilište u Šibeniku, 2017<br>Teaching materials | | |
| 5.3. Quality assurance methods that ensure the acquisition of knowledge, skills and competences | The control of students' work quality and the acquisition of necessary knowledge and skills will be ensured through interactive work. By keeping track of attendance and student activity during classes and provided information on students` progress through short colloquiums and homework, information for further guidance to students will be provided in order to increase the efficiency of their work. Students will be informed about their rights and obligations as well as the methods of work and the required literature.<br>Indicators of quality assurance system: Student survey, monitoring of annual data from the Croatian employment service on the annual state of student employment, surveys from employers and Alumni association. | | |
| 5.4. Informing about the course and contacting the teacher | It is the responsibility of each student to be regularly informed about the course, the coursework, and the classroom activities. All notices of classes or possible adjournment will be published in a timely manner on the e-learning site of the course and on the website of the Polytechnic. Students can contact teachers during the consultation period (at least one hour per week), while for short questions and explanations they can be contacted during class. It is also possible to ask questions by e-mail (from the official e-mail address at @ vus.hr), which will be answered as soon as possible (no later than five working days after receiving the e-mail). | | |

| 7. GENERAL INFORMATION | | | |
|---|---|---|---|
| 1.1. Course lecturer | Ivan Livaja | 1.8. Course code in ISVU | 187581 |
| 1.2. Course title | **Protection and security of information systems** | 1.9. Course code in MOZVAG | |
| 1.3. Assistants and/or associates | | 1.10. Forms of teaching (number of hours Lecturing +Practical exercises + Seminars + e learning) | (30+30+0+0) |
| 1.4. Study programme (specialist, undergraduate, graduate) | Undergraduate Professional Study of Business informatics | 1.11. Level of e- learning application (1st, 2nd, 3rd level), percentage of on line course performance (max. 20%) | 1st, course materials are on-line, 0% |
| 1.5. Course status (obligatory, optional) | Optional | 1.12. Number of course revisions | 2 |
| 1.6. Year of study | 3st | 1.17.Modernization | Yes |
| 1.7. Credit score (ECTS) | 4 | 1.14. Percentage estimate of course changes and/or supplements | Less than 20% X□<br>More than 20 % □ |

| 2. COURSE DESCRIPTION | | |
|---|---|---|
| 2.1. Course objectives | To individually and responsibly search relevant literature for reaching solutions and conclusions in Croatian and foreign languages<br>To recognize and rank security threats, as well as to select and apply appropriate countermeasures to protect the information system<br>To interpret mechanisms for the control of: data flow, errors and fragmentation, data transfer multiplexing methods using routing methods in computer networks; as well as to configure and maintain active network devices | |
| 2.2. Terms of course entry and required competences | 4 year secondary education completed; qualification level 4.2 according to the CROQF. | |
| 2.3. Learning outcomes on the study programme level | LO2: to define and evaluate process of thinking, planning, decision making and management in terms of electronically supported business and production | |
| | LO3: to define and evaluate process of thinking, planning, decision making and management in terms of electronically supported business and productio | |
| | LO16: to valorize elevant factors that affect organization`s and individual`s business and apply basic methods and concepts of planning, management and ac | |
| | LO17: to conclude what the basic principles and methods of good project management are and work successfully in a team | |
| 2.4. Expected learning outcomes on the course level | **Learning outcomes** accroding to the Bloom`s taxonomy: (up to two verbs per LO) | **Level of LO:**<br>*1- remembering,*<br>*2- understanding,*<br>*3- application,* |

| | | |
|---|---|---|
| | | *4-analysis, 5-evaluation, 6-synthesis* |
| | 1. Assess information security risks | 2, 4 |
| | 2. Apply information system security procedures | 3 |
| | 3. Describe the proposed security system solution | 1, 4 |
| | 4. Propose and argue proposals for the protection of the information system | 5, 6 |
| | 5. Present the acquired knowledge, ideas, problems and solutions independently and in a team. | 6 |
| | 6. Use materials and tools to search scientific and professional literature in native and English languages | 3 |
| | 7. Identify and rank security threats and select and apply appropriate countermeasures to protect the information system | 3 |

2.5. Course content according to detailed curriculum schedule

**Constructive allignement**

| no | Thematic unit | LO of the course | Content/teaching methods | Evaluation | Time |
|---|---|---|---|---|---|
| 178. | Defining security issues, objectives, principles and security policy | 1, 2, 5 | Listen to lectures. Work independently on computer, get to know course content and elearning documents. | - | 18 h |
| 179. | Defining security issues, objectives, principles and security policy | 1, 2, 3, 5 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the midterm or written / oral exam, they define the foundations of analysis and risk | 10 h |
| 180. | Access control and flow control; Mathematical models of security | 2, 3 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the midterm or the written / oral exam, they define the basic concepts of access controls and flows. | 10 h |
| 181. | Basics of cryptography; The protocols, techniques and algorithms | 7 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the midterm or the written / oral exam, they define the basic concepts of cryptography. | 10 h |
| 182. | The architecture of the security system – basic modules | 3, 4, 5, 6, 7 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the midterm or the written / oral exam, they define the basic concepts of security architectures | 10 h |
| 183. | Methods of digital identification and authentification | 3, 4, 5, 6, 7 | Write the colloquium. | - | 10 h |
| 184. | Security and protection of programs and operating systems | 3, 4, 5, 6, 7 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the colloquium or the written / oral exam define security and protection of programs and operating systems | 10 h |
| 185. | Standards and criteria for evaluation of security and thrustworthiness of systems | 3, 4, 5, 6, 7 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the colloquium or the written / oral exam define Standards and criteria for evaluation of security and thrustworthiness of systems | 10 h |
| 186. | Investment proposal and feasibility study | 3, 4, 5, 6, 7 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the colloquium or the written / oral exam define Investment proposal and feasibility study | 10 h |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 187. | Security of computer networks and distributed systems | 3, 4, 5, 6, 7 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the colloquium or the written / oral exam define Security of computer networks and distributed systems | 10 h | |
| | 188. | Systems for the detection of security breach (IDS) | 3, 4, 5, 6, 7 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the colloquium or the written / oral exam define Systems for the detection of security breach (IDS) | 11 h | |
| | 189. | Managing and monitoring the security system (ISMS); Legal and Ethical Aspects of Security | 3, 4, 5, 6, 7 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the colloquium or the written / oral exam define anaging and monitoring the security system (ISMS); Legal and Ethical Aspects of Security | 11 h | |
| | 190. | Managing security incidents and business continuity | 3, 4, 5, 6, 7 | Listen to lectures and read literature. The exercises demonstrate how to solve tasks. Solve exercises. | At the colloquium or the written / oral exam define anaging security incidents and business continuity | 10 h | |
| | 191. | Defense and presentation of the seminar, recurrence of colloquia | 1, 2, 3, 4, 5, 6, 7 | Write the colloquium. | - | 10 h | |
| | 192. | Defense and presentation of the seminar, recurrence of colloquia | | Listen to lectures and read literature. | - | 10 h | |

**3. EVALUATION OF STUDENTS` WORK**

| | | | | | | |
|---|---|---|---|---|---|---|
| 3.1. Students` obligations | In accordance with the Regulations on Studying and the Regulations onStudentAssessment and Evaluation: for all full-time students attendance of at least 70%. Part-time students are required to attend classes at least50%.All students are required to carry calculator and formulae list.<br>Students who have during the course achieved:<br>• from 0 - 24,9% ECTS credits- are rated F (unsuccessful) and cannot obtain ECTS credits, and must re-enroll in the next academic year;<br>• from 25 - 49,9% - are assessed by FX (insufficient) and must pass the written exam (test). Written exam (test) can be held in a regular or extraordinary exam period;<br>• more than 50% - students have the right to take the final exam.<br>Students cantake the final exam from the course in two ways: a) during the course ofteaching through continuous monitoring of students (active participationin classes and through two colloquia); b) by passing the exam (writtenand oralpart of the exam). | | | | | |
| 3.2. Monitoring student work (enter the share of ECTS credits for each activity so that the total number of ECTS points corresponds to the credit score of the course) | Attendance | 0,5 | Written exam | 2,0 (without colloquia) | Project | |
| | Experimental work | | Research | | Practical work | |
| | Essay | | Report | | Continuous examination | |
| | Colloquium | 2,0 (without written exam) | Seminar paper | 0,5 | Other | |
| | Class activity | | Oral exam | 1,0 | Other | |
| 3.3. Student workload | Student workload on all bases for 1 ECTS credit is 30 hours in a semester and is estimated as:<br>9. Attending classes and exercises 60 hours<br>10. Preparing colloquia or exams through individual work 60 hours | | | | | |

## 4. GRADING SYSTEM

### 4.1. Grading seminar papers

### 4.2. Grading colloquia/ written and oral exam

| Unsatisfactory | Satisfactory | Above average |
|---|---|---|
| Responds by memory, without a deeper understanding. Does not know or apply basic terms and concepts. Does not know how to apply or explain the contents of the course with examples. | Reproduces the basic concepts and without difficulty imparts new knowledge, understands the material, explains the terms and concepts supported with examples. | Knowledge is at the level of analysis, synthesis and evaluation. Observes the principles, accurately and thoroughly explains the content of the material, and logically connects and explains the terms and concepts supported with examples. Finds solutions that were not originally given. Notes correlations with related material. |
| | | |

### 4.3. Final grade according to evaluation elements

| | | | | |
|---|---|---|---|---|
| Active course attendance | 70-74,9% of attendance | 75-79,9% of attendance | 80-89,9% of attendance | 90-100% of attendance |
| | 2 points | 5 points | 10 points | 20 points |
| Colloquia/ Written exam | 2 | 3 | 4 | 5 |
| | 50-64,9% | 65-79,9% | 80-89,9% | 90-100% |
| | 25 points | 30 points | 35 points | 40 points |
| Oral exam | 2 | 3 | 5 | 5 |
| | 25 points | 30 points | 35 points | 40 points |

### 4.3. Final grade according to absolute division

| Percentage of acquired knowledge, skills and competences (teaching + final exam) | Numerical grade | ECTS grade |
|---|---|---|
| 90 – 100% | 5 (excellent) | A |
| 80 – 89,9% | 4 (very good) | B |
| 65 – 79,9% | 3 (good) | C |
| 60 – 64,9% | 2 (satisfactory) | D |
| 50 – 59,9% | 2 (satisfactory) | E |

## 5. ADDITIONAL COURSE INFORMATION

### 5.1. Compulsory literature (available in the library and via other media)

| Title | Number of copies in the library | Availability via other media |
|---|---|---|
| Bruce Schneier (1996.), Applied Cryptography B. Schneier John Wiley & Sons 1996, John Wiley & Sons, Inc | | |

| | | | |
|---|---|---|---|
| | BS ISO/IEC 17799:2005, BS 7799-1:2005 norma: information technology, security techniques, code of practice for information security management. BSI, UK.<br><br>Charles P. Pfleger (1997.), Security in Computing, Prentice Hall | | |
| 5.2. Additional literature (at the moment of changes and/or amended of study programme) | Teaching material and exercises<br>Harold F. Tipton, Micki Krause (2000.), Information Security Management Handbook, CRC Press LLC | | |
| 5.3. Quality assurance methods that ensure the acquisition of knowledge, skills and competences | The control of students' work quality and the acquisition of necessary knowledge and skills will be ensured through interactive work. By keeping track of attendance and student activity during classes and provided information on students` progress through short colloquiums and homework, information for further guidance to students will be provided in order to increase the efficiency of their work. Students will be informed about their rights and obligations as well as the methods of work and the required literature.<br>Indicators of quality assurance system: Student survey, monitoring of annual data from the Croatian employment service on the annual state of student employment, surveys from employers and Alumni association. | | |
| 5.4. Informing about the course and contacting the teacher | It is the responsibility of each student to be regularly informed about the course, the coursework, and the classroom activities. All notices of classes or possible adjournment will be published in a timely manner on the e-learning site of the course and on the website of the Polytechnic. Students can contact teachers during the consultation period (at least one hour per week), while for short questions and explanations they can be contacted during class. It is also possible to ask questions by e-mail (from the official e-mail address at @ vus.hr), which will be answered as soon as possible (no later than five working days after receiving the e-mail). | | |

| 1. GENERAL INFORMATION ABOUT THE SUBJECT | | | |
|---|---|---|---|
| 1.1. Title | **Financial management** | 1.8. ISVU course code | 141499 |
| 1.2. Lecturer | Jelena Žaja, mag.oec., lec. | 1.9. MOZVAG course code | |
| 1.3. Assistants and/or associates | | 1.10. Forms of teaching (number of hours Lecturing +Practical exercises + Seminars + e learning) | (45+30+0+0) |
| 1.4. Study programme (specialist, undergraduate, graduate) | **Professional Undergraduate study of IT Management** | 1.11. Level of e- learning application (1st, 2nd, 3rd level), percentage of on line course performance (max. 20%) | 1st – materials available On-line,<br>0% |
| 1.5. Course status (obligatory, optional) | Obligatory | 1.12. Number of course revisions | 2. |
| 1.6. Study year | 3rd | 1.13. Modernization | ■ yes □ no |
| 1.7. Credit score (ECTS) | 6 | 1.14. Percentage estimate of course changes and/or supplements | Less than 20% ■<br>More than 20 % □ |

| 2. COURSE DESCRIPTION | |
|---|---|
| 2.1. Course objectives | Introduce students with basic concepts of modern financial management through lectures, classroom discussions, business cases and project task solving so that after completing the course each student knows how to approach basic financial management issues and where to look for additional information to solve complex issues that appear in practice in everyday business.<br>To introduce students to the concept of corporate finance, its role in the company's business and to expand their basic knowledge in the field of: |

| | | |
|---|---|---|
| | • time preferences of money;<br>• measurement of financial risk in function of capital cost;<br>• money markets and capital markets, flows of funds in business processes and the interdependence of property and liabilities management and ways of financing them;<br>• analysis of financial operations of business entities;<br>• elements of financial and investment planning;<br>• basis of financial efficiency of investment projects;<br>• financing securities transactions with a special focus on bonds and shares and assessing the justification for investing in financial instruments in the money and capital market;<br>• financing business with own capital;<br>• fundamental laws of debt utilization, capital structure and dividend policy. | |
| 2.2. Terms of course entry and required competences | No conditions. | |
| 2.3. Learning outcomes on the study programme level | LO1. To apply and link economic terms in more complex written and oral communication in Croatian and foreign languages | |
| | LO2. To organize and lead team work, and critically judge the opinions and attitudes of team members. | |
| | LO3. To individually and responsibly search relevant literature for reaching solutions and conclusions in Croatian and foreign languages. | |
| | LO6. To analyse and link basic concepts and apply content related to the area of economics, management, accounting, and finance. | |
| | LO7. To interpret business and financial reports and propose solutions to improve financial performance and profitability. | |
| | | |
| 2.4. Expected learning outcomes on the course level | **Learning outcomes** towards Bloom's taxonomy:<br>(up to two verbs per LO) | **LO Level:**<br>*37. Recapture,*<br>*38. Understanding,*<br>*39. Application,*<br>*40. Analysis,*<br>*41. Evaluation,*<br>42. *Synthesis* |
| | 11. to define and categorize basic concepts and tasks of financial management, | 1,4 |
| | 12. to measure the return and financial risk of the securities portfolio and analyse the relation between risk and return, | 3,4 |
| | 13. to interpret the financial relations of the enterprise with the financial institutions and the financial market, | 4 |
| | 14. to evaluate the impact of financial leverage and on the profitability of business entities, | 4 |
| | 15. to prepare an analysis of financial statements on the example of a business entity by performing horizontal and vertical analysis and analysis by financial indicators, | 6 |
| | 16. to apply methods of net present value, return period, internal rate of return, profitability index, and assess the eligibility of investment in a project, | 3,5 |
| | 17. to propose the application of appropriate models and evaluate the value of equity and debt securities, | 6,5 |
| | 18. use materials and tools to search scientific and professional literature in Croatian and in English, and present accepted knowledge, ideas, problems and solutions independently and in the team. | 3,6 |
| | | |
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|---|---|---|---|---|---|---|
| 2.5. Course content according to detailed curriculum schedule | **Constructive alignment** | | | | | |
| | **No:** | **Thematic ensemble / Lecture Topic** | **Course LO** | **Content / Teaching Method** | **Evaluation** | **Time needed** |
| | 193. | Introduction to the course and a detailed performance plan. | - | Listen to the lecture. In the exercise classes, by independent work on computer students get acquainted with course content and documents on the e-learning course page. | - | 2 hours |
| | | Introductory lecture - basic concepts and determinants of financial management. | 1, 3 | Listen to the lecture and read the literature. | At the colloquium or the written and oral exam define the basic concepts of financial management. They know how to list and explain basic financial activities, sources of company assets and tasks of financial function in the company. They can explain the role of the Financial Manager, goals of corporation, and agency problem. | 8 hours |
| | 194. | Financial environment. | 1,3 | Listen to the lecture and read the literature. | Describe the basic characteristics of the financial market. At the colloquium or the written and oral exam they know how to define and describe the basic securities that circulate in the money market. | 6 hours |
| | 195. | Time value of money. | 1,6 | Listen to the lecture and read the literature. | They know how to explain the concept of time value of money and identify the basic variables in calculations of time value of money | 10 hours |
| | 196. | The Valuation of Long-Term Securities | 1, 2,7 | Listen to the lecture and read the literature. | They can make distinction among valuation concepts. They know how to valuate long term securities (bond valuation, preferred stock valuation, common stock valuation). | 8 hours |
| | 197. | Risk and financial management. Balance as a source of financial information. | 1, 2,3, 8 | Listen to the lecture and read literature. In the exercise classes, they calculate the yield and financial risk of the securities portfolio independently or in a team, and draw conclusions about the risk-return relationship. | At the colloquium or the written and oral exam they can explain the concepts of investment portfolio, financial risk and ways of managing risk. They know how to calculate the expected return, the standard deviation and the coefficient of variation for an individual security or a portfolio of securities and to evaluate the risk of investing on the basis of the relationship between risk and return. They know how to interpret the relationship between security yields and market returns. They know how to explain the concept of a balance sheet, its properties and indicate users of financial information. | 8 hours |
| | 198. | Financial reports. | 1, 3, 8 | Listen to the lecture and read the literature. | At the colloquium or the written and oral exam they can state the types of basic financial statements and explain their basic components. Know what can all be a source of cash in a business. | 8 hours |
| | 199. | Objectives, purpose and methods of analysis of financial reports. | 1, 3, 6, 8 | They listen to a lecture and read literature. In the exercise classes, independently on a computer, they | At the colloquium or the written and oral exam they can explain the term financial analysis and specify and explain the methods of analysis of financial | 12 hours |

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|---|---|---|---|---|---|---|
| | | | | perform horizontal and vertical analysis of financial statements on the example of a business entity's financial statements. They research the content of this thematic area and make a project assignment that presents the knowledge they have acquired and their ideas, and ways to solve problems. | statements. They know how to explain horizontal and vertical analysis procedures and apply them to financial statement analysis. Created and presented project assignment (using computer programs). | |
| | 200. | Indicators of financial analysis, examples and interpretations. | 1, 5, 6, 8 | They listen to a lecture and read literature. In the exercise classes, they calculate financial indicators and interpret the obtained results independently on a computer based on the financial statement of a business entity.<br>They research the content of this thematic area and make a project assignment that presents the knowledge they have acquired and their ideas, and ways to solve problems. | At the colloquium or the written and oral exam they can define and describe the types / groups of financial indicators and apply them in the analysis of financial statements (in the exam and in the preparation of the project assignment). They know how to sketch and interpret Du Pont's indicator system and explain synthetic indicators.<br>Created and presented project assignment (using computer programs). | 14 hours |
| | 201. | Rules and principles of financing, liquidity and solvency. | 1, 5, 6, 8 | They listen to a lecture and read literature.<br>In the exercise classes, independently on a computer, they calculate financial indicators and interpret the obtained results based on the financial statements of a business entity. | At the colloquium or the written and oral exam they can define and describe the basic principles and rules of financing. They know how to explain the difference between the concepts of liquidity and solvency, explain the term financial leverage and judge when it is opportune to use it. They are able to identify internal and external causes of insolvency and propose measures to improve the solvency of companies.<br>Created and presented project assignment (using computer programs). | 10 hours |
| | 202. | Short-term asset management. | 1, 4, 8 | They listen to a lecture and read literature.<br>In the exercise classes, they calculate the value of working capital needed in the company. | At the colloquium or the written and oral exam they can define and describe the notion of working capital, permanent working capital, circular movement of working capital, factors on which the amount of working capital depends, management of working capital, inventory management and receivables management. They know how to analyze the structure of working capital and recommend the optimal size and structure of working capital in a particular company. | 8 hours |
| | 203. | Financial planning and methods of assessing the profitability of capital investments. | 1, 7, 8 | They listen to a lecture and read literature.<br>In the exercise classes, independently on a computer, they apply the methods of capital investment | At the colloquium or the written and oral exam they can explain the term financial planning, cash control instruments. They know how to define the term investment and classify investments, identify the common characteristics of all investment | 14 hours |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | assessment on an example of a financial statement of a business entity and interpret the results obtained. They research the content of this thematic area and develop a project assignment that presents the knowledge they have acquired and their ideas, and ways to solve problems. | projects and explain why the sensitivity analysis of an investment project is done. They know how to explain commonly used methods of evaluating investment projects, apply them on an example, and make a decision on the profitability of investing in a particular project. Created and presented project assignment (using computer programs). | |
| | 204. | Financial insurance and short term financing. | 1, 3, 5, 8 | They listen to a lecture and read literature. | At the colloquium or the written and oral exam they can state the types and forms of financing of the company according to the availability of sources, identify differences between credit and equity financing. They know how to explain the four methods and techniques of short-term bank lending, the relative advantages and disadvantages of bank loans, and the factors that determine the amount of trade credit from the point of view of the debtor and creditor. | 8 hours |
| | 205. | Mid-term and long-term financing - concepts and practical application. | 1, 3, 5, 8 | They listen to lectures and read literature, handle case studies. | At the colloquium or the written and oral exam they can define and describe the characteristics of medium and long-term credit. They can explain what leasing financing is (the concept and types of leasing, the advantages and disadvantages of leasing financing); identify differences between operating and financial leasing and recommend when to use what type of leasing. | 8 hours |
| | 206. | Equity financing. | 1, 5, 8 | They listen to a lecture and read literature. | At the colloquium or the written and oral exam they can determine the structure of the financial capital of a joint stock company, they can indicate own and external sources of equity of a joint stock company and explain the way of financing a business with own funds.<br>They know how to explain the notion of non-nominal and nominal capital of a joint stock company, and evaluate the benefits of financing with own capital. | 8 hours |
| | 207. | Concluding Considerations / Repeating and Preparing for Exam. | | | | 48 hours |

| **3. EVALUATION OF STUDENT WORK** | |
|---|---|
| 3.1. Students` obligations | In accordance with the Book of Rules and the Rulebook on Student Assessment and Evaluation: for all regular students attend at least 70% attendance. Part-time students have the obligation to attend at least 50% of lectures. All students must create, present and positively colloquy seminar paper.<br><br>Students who have during the course achieved:<br>• From 0 – 24,9% ECTS credits- is rated F (unsuccessful) and cannot get ECTS credits and must re-enrol the subject in the next academic year;<br>• From 25 – 49,9% ECTS credits - is rated FX (inadequate) and has to come out and pass the test (exam). A written exam can be held in a regular or extraordinary exam period; |

| | |
|---|---|
| | • More than 50% ECTS credits - students have the right to access the final exam of the subject.<br><br>Students can pass the final exam in two ways: a) during the course through continuous student attendance (active participation in the lessons, solving case studies, making and presenting the project and passing two colloquia); b) during the course (active participation in the lessons, solving case studies, creating and presenting the project) and passing the exam (written and oral exam). |

| 3.2. Monitoring student work (enter the share of ECTS credits for each activity so that the total number of ECTS points corresponds to the credit score of the course) | | | | | | |
|---|---|---|---|---|---|---|
| | Attendance | 1 | Written exam | 2,5 (by submitting both colloquiums the student is relieved of an written examination) | Project | 0,5 |
| | Experimental work | | Research | | Practical work | |
| | Essay | | Report | | Continuous examination | |
| | Colloquium | 4,5 (by submitting both colloquiums the student is relieved of a written and oral examination) | Seminar paper | | Other (inscribe) | |
| | Class activities | | Oral exam | 2 (by submitting both colloquiums the student is relieved of an oral examination) | Other (inscribe) | |

3.3. Student workload

The student's workload on all bases amounts to 1 ECTS point for 30 hours of work per semester and is estimated as:

| ***Commitment*** | ***Hours (estimate)*** |
|---|---|
| 22. Attending classes | 75 |
| 23. Creating and Project | 15 |
| 24. Preparation for the Colloquium / exam through self-study | 90 |
| | |

## 4. GRADING

4.1. Seminar paper grading

| **Valuation Element** | **Poor** | **Satisfying** | **Above average** |
|---|---|---|---|
| Organization | The paper is not organized in a logical order and its structure is lacking. | The paper is well structured with a clear distinction between the introduction, the main part of the text and the conclusion. | The paper is well-structured with a clear distinction between the introduction, the main part of the text and the conclusions that are perfectly logically linked to one another |
| Terminology, writing style | Words and phrases are low harmonized with official terminology. Writing style is not appropriate, sentences are too long, modest vocabulary, and frequent and repeated grammatical mistakes. | Words and phrases are aligned with official terminology. The writing style is appropriate, the sentence structure is clear, the vocabulary is appropriate and has little grammatical errors. | Words and phrases are aligned with official terminology and show an understanding of their meaning. The writing style is excellent, the sentences are clear and concise, the vocabulary is rich and there are no grammatical errors. |

| | | | | |
|---|---|---|---|---|
| Quoting and referencing | Sources are not specified at all. The references do not match the topic and show a superficial approach to the research topic. | Sources are listed, but incomplete and with errors. The references are appropriate for the subject and show a satisfactory research attitude. | Sources are accurate, complete and consistent. The references are appropriate, their list is "rich" and comprehensive and shows a robust research approach. |

**4.2. Colloquium / exam grading**

| Poor | Satisfying | Above average |
|---|---|---|
| Give answer by memory, no deeper understanding. Does not know and does not apply the basic terms and concepts. Cannot apply or explain the contents of the course. | Reproduces basic terms, without difficulty transfers new knowledge, understands subject matter, explains the terms and the notions that substantiate by examples. | Knowledge is at the level of analysis, synthesis and evaluation. It observes legitimacy, accurately and thoroughly explains the content of the subject, and logically links and explains the terms and concepts that it encapsulates. Find solutions that are not originally given. There is a correlation with correlative subjects. |

**4.3. Creating a final grade according to evaluation elements**

| | | | | |
|---|---|---|---|---|
| Active participation in the lessons | 70-75% of attendance | 76-86% of attendance | 87-100% of attendance | Solved case study. |
| | 2 points | 4 points | 7 points | 3 points |
| Project | 2 | 3 | 4 | 5 |
| | 5 points | 7 points | 8 points | 10 points |
| Colloquium / written exam | 2 | 3 | 4 | 5 |
| | 50-64,9% | 65-79,9% | 80-89,9% | 90-100% |
| | 25 points | 30 points | 35 points | 40 points |
| Oral exam | 2 | 3 | 5 | 5 |
| | 25 points | 30 points | 35 points | 40 points |

**4.4. Creating a final grade according to absolute allocation**

| Percentage of adopted knowledge, skills and competences (teaching + final exam) | Numerous grade | ECTS grade |
|---|---|---|
| 90 – 100% | 5 (excellent) | A |
| 80 – 89,9% | 4 (very good) | B |
| 65 – 79,9% | 3 (good) | C |
| 60 – 64,9% | 2 (sufficient) | D |
| 50 – 59,9% | 2 (sufficient) | E |

| 5. ADDITIONAL INFORMATION ABOUT THE COURSE | | | |
|---|---|---|---|
| 5.1. Compulsory literature (available in the library and through other media) | **Title** | **Number of copies in the library** | **Availability via other media** |
| | 1. Brealley, R., Myers, S., Marcus, A. (2011). *Principles of Corporate Finance*. McGraw Hill, New York. | | On line |
| | 2. Van Horne, J. C., Wachowicz, J.M. (2009). *Fundamentals of Financial Management*. Prentice Hall | | On line |
| | | | |
| 5.2. Additional literature (at the moment of changes and/or amended of study programme) | | | |
| 5.3. Quality assurance methods that ensure the acquisition of knowledge, skills and competences | The control of students' work quality and the acquisition of necessary knowledge and skills will be ensured through interactive work. By keeping track of attendance and student activity during classes and provided information on students` progress through short colloquiums and homework, information for further guidance to students will be provided in order to increase the efficiency of their work. Students will be informed about their rights and obligations as well as the methods of work and the required literature.<br>Indicators of quality assurance system: Student survey, monitoring of annual data from the Croatian employment service on the annual state of student employment, surveys from employers and Alumni association. | | |
| 5.4. information on the course and contact with the teacher | It is obligatory for every student to regularly inform about the course, teaching and teaching activities. All information about teaching or any delay in teaching will be published on the e-learning pages of the course and on the web pages of the Polytechnic. Students can contact the teachers during the consultation term (at least one hour per week), while brief questions and explanations can be addressed during classes. It is possible to ask questions by e-mail (from the official e-mail address from the domain @ vus.hr) that will be answered in a short time (no later than five working days from the receipt of e-mail). | | |

| 1. GENERAL INFORMATION ABOUT THE SUBJECT | | | |
|---|---|---|---|
| 1.1. Title | **Business organization** | 1.8. ISVU course code | |
| 1.2. Lecturer | Ana Vukičević, Ph.D. | 1.9. MOZVAG course code | |
| 1.3. Assistants and/or associates | None | 1.10. Forms of teaching (number of hours Lecturing +Practical exercises + Seminars + e learning) | (45+0+15+0) |
| 1.4. Study programme (specialist, undergraduate, graduate) | undergraduate | 1.11. Level of e- learning application (1st, 2nd, 3rd level), percentage of on line course performance (max. 20%) | 1st – materials available On-line,<br>0% |
| 1.5. Course status (obligatory, optional) | optional | 1.12. Number of course revisions | 2. |
| 1.6. Study year | 3 | 1.13. Modernization | ■ yes □ no |
| 1.7. Credit score (ECTS) | 4 | 1.14. Percentage estimate of course changes and/or supplements | Less than 20% ■<br>More than 20 % □ |

| 2. COURSE DESCRIPTION | |
|---|---|
| 2.1. Course objectives | Introduce students with organizations theories and organizations structures and types of leadership styles. |

| | | |
|---|---|---|
| 2.2. Terms of course entry and required competences | Four-year high school education completed; having a qualification at level 4.2 | |
| 2.3. Learning outcomes on the study programme level | LO5 : To use planning, organizing, management and control methods on practical examples, analyze the problem and propose appropriate solutions to problem situations | |
| | LO11 : To analyze new roles of organizations, systems, processes, products and services and quality standards in companies and propose valorization of new trends in companies and organizations | |
| | LO13: To understand specific human resource management processes and propose a proper value system in judgment process and assessment of work achievements and performances | |
| | | |
| | | |
| | | |
| 2.4. Expected learning outcomes on the course level | **Learning outcomes** towards Bloom's taxonomy:<br>(up to two verbs per LO) | **LO Level:**<br>*43. Recapture,*<br>*44. Understanding,*<br>*45. Application,*<br>*46. Analysis,*<br>*47. Evaluation,*<br>48. *Synthesis* |
| | 19. analyze new roles of organizations | 1,2 |
| | 20. critically analyze organizations theories and identify modern organization structures | 5,2 |
| | 21. comment problematic of different organizations' structures and to recommend leadership styles | 4,5 |
| | 22. analyze and to grade satisfactions and employees' values. | 6 |
| | 23. | |
| | 24. | |
| | 25. | |
| | 26. | |
| | 27. | |
| | 28. | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2.5. Course content according to detailed curriculum schedule | **Constructive alignment** | | | | | |
| | **No:** | **Thematic ensemble / Lecture Topic** | **Course LO** | **Content / Teaching Method** | **Evaluation** | **Time needed** |
| | 208. | Introduction to course | -, | Listen to the lecture. On seminary teaching, by independent work on the computer students get acquainted with course content and documents on the e-learning course page. | - | 2 hours |
| | | Organization theories | 1,6 | Listen to the lecture and read the literature. | In a colloquy or written and oral exam students define main organization theories and define their representatives. | 4 hours |
| | 209. | Organization behavior | 1, 6, | Listen to the lecture and read the literature. | In a colloquy or written and oral exam students can name and distinguish organization behaviour | 4 hours |
| | 210. | Perception and individual decision making | 1,2,3,4,5,6, | Listen to the lecture and read the literature. | In a colloquy or written and oral exam students can define and describe the perception of an individual inside the organization and define the process of decision making. | 4 hours |
| | 211. | Group behavior | 1, 5,6, | Listen to the lecture and read the literature. At the seminar student individually, in pairs or Socrates threes solve case studies thus presenting the appropriateness of previously acquired knowledge and presenting adopted knowledge and ideas, discuss issues. | In a colloquy or written and oral exam students can define group behaviour and name the specifics of an formal and informal group. . Solved case study. | 10 hours |
| | 212. | Team work | 1, 3,5,6 | Listen to the lecture and read the literature.<br>At the seminar student individually explore the content of this topic area by searching the database and based on it and read literature students write seminar paper thus presenting the acquired knowledge and making their own ideas, and ways to solve problems. Methods of brain storm and discussion on the exposed topic is applied in the whole group. | In a colloquy or written and oral exam students can define and describe team work as a part of decision making and problem solving technique in organization. Created and Presented seminar paper (by independent use of computer programs). | 10 hours |
| | 213. | Motivation | 1, 3, 5, 6, | Listen to the lecture and read the literature.<br>At the seminar student individually explore the content of this topic area by searching the database and based on it and read literature students write seminar paper thus presenting the acquired knowledge and making their | In a colloquy or written and oral exam they can define and describe different types of motivation. Created and Presented seminar paper (by independent use of computer programs). | 8 hours |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | own ideas, and ways to solve problems. Methods of brain storm and discussion on the exposed topic is applied in the whole group. | | |
| | 214. | Communication | 1, 2, 3, 4, 5, 6, 7 | Listen to the lecture and read the literature.<br>At the seminar student individually explore the content of this topic area by searching the database and based on it and read literature students write seminar paper thus presenting the acquired knowledge and making their own ideas, and ways to solve problems. Methods of brain storm and discussion on the exposed topic is applied in the whole group. | In a colloquy or written and oral exam they can define and describe communicational channels in organization. Seminar paper (by independent use of computer programs). | 10 hours |
| | 215. | Leadership theories | 1, 4, 5, 6, 7 | Listen to the lecture and read the literature.<br>They use multimedia and network.<br>Listen to the lecture and read the literature.<br>At the seminar student individually explore the content of this topic area by searching the database and based on it and read literature students write seminar paper thus presenting the acquired knowledge and making their own ideas, and ways to solve problems. Methods of brain storm and discussion on the exposed topic is applied in the whole group. | In a colloquy or written and oral exam they can define and describe each leadership theories and define leadership styles. Created and Presented seminar paper (by independent use of computer programs). | 4 hours |
| | 216. | Organization structures | 1, 2, 3, 4, 5, 6, 7 | Listen to the lecture and read the literature.<br>Listen to the lecture and read the literature.<br>At the seminar student individually explore the content of this topic area by searching the database and based on it and read literature students write seminar paper thus presenting the acquired knowledge and making their own ideas, and ways to solve problems. Methods of brain storm and discussion on the exposed topic is applied in the whole group. | In a colloquy or written and oral exam students can define and describe different modern and traditional organization structures.. Created and Presented seminar paper (by independent use of computer programs). | 6 hours |
| | 217. | Organization changes | 1, 2, 3, 4, 5, 6, 7 | Listen to the lecture and read the literature. | In a colloquy or written and oral exam students can define and describe organizational changes and choose between mechanisms to solve changes. | 8 hours |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | At the seminar, students solve the case study. | .. Created and Presented seminar paper (by independent use of computer programs). | |
| | 218. | Values and job satisfaction | 1, 2, 3, 4, 5, 6, 7 | Listen to the lecture and read the literature. At the seminar, students solve the case study. | In a colloquy or written and oral exam they can define and describe how individuals measure and value job satisfaction.<br><br>Created and Presented seminar paper (by independent use of computer programs). | 8 hours |
| | 219. | Personalities and values | 1, 2, 3, 4, 5, 6, 7 | Listen to the lecture and read the literature.<br>They use multimedia and network.<br>Listen to the lecture and read the literature.<br>At the seminar student individually explore the content of this topic area by searching the database and based on it and read literature students write seminar paper thus presenting the acquired knowledge and making their own ideas, and ways to solve problems. Methods of brain storm and discussion on the exposed topic is applied in the whole group. | In a colloquy or written and oral exam students can define and describe the values and external and internal factors of an individual in organization.<br><br>Created and Presented seminar paper (by independent use of computer programs). | 6 hours |
| | 220. | Business politics | 2,3 | Listen to the lecture and read the literature.<br>Listen to the lecture and read the literature.<br>At the seminar student individually explore the content of this topic area by searching the database and based on it and read literature students write seminar paper thus presenting the acquired knowledge and making their own ideas, and ways to solve problems. Methods of brain storm and discussion on the exposed topic is applied in the whole group. | In a colloquy or written and oral exam students can define and describe the politics and power within the organization.<br>Created and Presented seminar paper (by independent use of computer programs). | 6 hours |
| | 221. | Organization culture | 2,3 | Listen to the lecture and read the literature. | In a colloquy or written and oral exam they can describe different organization cultures.<br>Created and Presented seminar paper (by independent use of computer programs). | 8 hours |
| | 222. | Concluding Considerations / Repeating and Preparing for Exam. | | Listen to the lecture and individual preparation for the exam. | | 20 hours |

## 3. EVALUATION OF STUDENT WORK

### 3.1. Students` obligations

In accordance with the Book of Rules and the Rulebook on Student Assessment and Evaluation: for all regular students attend at least 70% attendance. Part-time students have the obligation to attend at least 50% of lectures. All students must create, present and positively colloquy seminar paper.

Students who have during the course achieved:

- From 0 – 24,9% ECTS credits- is rated F (unsuccessful) and cannot get ECTS credits and must re-enrol the subject in the next academic year;
- From 25 – 49,9% ECTS credits - is rated FX (inadequate) and has to come out and pass the test (exam). A written exam can be held in a regular or extraordinary exam period;
- More than 50% ECTS credits - students have the right to access the final exam of the subject.

Students can pass the final exam in two ways: a) during the course through continuous student attendance (active participation in the lessons, , solving case studies, making and presenting the seminar paper and passing two colloquia); b) during the course (active participation in the lessons,, solving case studies, creating and presenting the seminar paper) and passing the exam (written and oral exam).

### 3.2. Monitoring student work (enter the share of ECTS credits for each activity so that the total number of ECTS points corresponds to the credit score of the course)

| | | | | | |
|---|---|---|---|---|---|
| Attendance | | Written exam | (by submitting both colloquiums the student is relieved of an written examination) | Project | |
| Experimental work | | Research | 0,5 | Practical work | |
| Essay | | Report | | Continuous examination | |
| Colloquium | 1 (by submitting both colloquiums the student is relieved of a written and oral examination) | Seminar paper | 0,5 | Other (inscribe) | |
| Class activities | | Oral exam | 1 (by submitting both colloquiums the student is relieved of an oral examination) | Other (inscribe) | |

### 3.3. Student workload

The student's workload on all bases amounts to 1 ECTS point for 30 hours of work per semester and is estimated as:

| ***Commitment*** | ***Hours (estimate)*** |
|---|---|
| 25. Attending classes | 20 |
| 26. Creating and Presenting seminar paper | 40 |
| 27. Preparation for the Colloquium / exam through self-study | 50 |
| | |

## 4. GRADING

**4.1. Seminar paper grading**

| Valuation Element | Poor | Satisfying | Above average |
|---|---|---|---|
| Organization | The paper is not organized in a logical order and its structure is lacking. | The paper is well structured with a clear distinction between the introduction, the main part of the text and the conclusion. | The paper is well-structured with a clear distinction between the introduction, the main part of the text and the conclusions that are perfectly logically linked to one another |
| Terminology, writing style | Words and phrases are low harmonized with official terminology. Writing style is not appropriate, sentences are too long, modest vocabulary, and frequent and repeated grammatical mistakes. | Words and phrases are aligned with official terminology. The writing style is appropriate, the sentence structure is clear, the vocabulary is appropriate and has little grammatical errors. | Words and phrases are aligned with official terminology and show an understanding of their meaning. The writing style is excellent, the sentences are clear and concise, the vocabulary is rich and there are no grammatical errors. |
| Quoting and referencing | Sources are not specified at all. The references do not match the topic and show a superficial approach to the research topic. | Sources are listed, but incomplete and with errors. The references are appropriate for the subject and show a satisfactory research attitude. | Sources are accurate, complete and consistent. The references are appropriate, their list is "rich" and comprehensive and shows a robust research approach. |

**4.2. Colloquium / exam grading**

| Poor | Satisfying | Above average |
|---|---|---|
| Give answer by memory, no deeper understanding. Does not know and does not apply the basic terms and concepts. Cannot apply or explain the contents of the course. | Reproduces basic terms, without difficulty transfers new knowledge, understands subject matter, explains the terms and the notions that substantiate by examples. | Knowledge is at the level of analysis, synthesis and evaluation. It observes legitimacy, accurately and thoroughly explains the content of the subject, and logically links and explains the terms and concepts that it encapsulates. Find solutions that are not originally given. There is a correlation with correlative subjects. |

**4.3. Creating a final grade according to evaluation elements**

| | | | | |
|---|---|---|---|---|
| Active participation in the lessons | 70-75% of attendance | 76-86% of attendance | 87-100% of attendance | Created mental map. Solved case study. |
| | 2 points | 4 points | 7 points | 3 points |
| Seminar paper | 2 | 3 | 4 | 5 |
| | 5 points | 7 points | 8 points | 10 points |
| Colloquium / written exam | 2 | 3 | 4 | 5 |
| | 50-64,9% | 65-79,9% | 80-89,9% | 90-100% |
| | 25 points | 30 points | 35 points | 40 points |
| Oral exam | 2 | 3 | 5 | 5 |
| | 25 points | 30 points | 35 points | 40 points |

**4.4. Creating a final grade according to absolute allocation**

| Percentage of adopted knowledge, skills and | Numerous grade | ECTS grade |
|---|---|---|

| | | | | |
|---|---|---|---|---|
| | | competences (teaching + final exam) | | |
| | | 90 – 100% | 5 (excellent) | A |
| | | 80 – 89,9% | 4 (very good) | B |
| | | 65 – 79,9% | 3 (good) | C |
| | | 60 – 64,9% | 2 (sufficient) | D |
| | | 50 – 59,9% | 2 (sufficient) | E |

## 5. ADDITIONAL INFORMATION ABOUT THE COURSE

| | Title | Number of copies in the library | Availability via other media |
|---|---|---|---|
| 5.1. Compulsory literature (available in the library and through other media) | 4. 1. Robbins, S.P. i Judge, T.A.: Organizacijsko ponašanje, Mate, 2009.. | 3 | - |
| | 2. Sikavica, P., Novak, M.: Modeliranje organizacijske strukture poduzeća, Informator, Zagreb. | 3 | - |
| 5.2. Additional literature (at the moment of changes and/or amended of study programme) | 1. Sikavica, P., Novak, M., Poslovno odlučivanje, Informator, Zagreb, 1999. | 2 | - |
| 5.3. Quality assurance methods that ensure the acquisition of knowledge, skills and competences | The control of students' work quality and the acquisition of necessary knowledge and skills will be ensured through interactive work. By keeping track of attendance and student activity during classes and provided information on students` progress through short colloquiums and homework, information for further guidance to students will be provided in order to increase the efficiency of their work. Students will be informed about their rights and obligations as well as the methods of work and the required literature.<br>Indicators of quality assurance system: Student survey, monitoring of annual data from the Croatian employment service on the annual state of student employment, surveys from employers and Alumni association. | | |
| 5.4. information on the course and contact with the teacher | It is obligatory for every student to regularly inform about the course, teaching and teaching activities. All information about teaching or any delay in teaching will be published on the e-learning pages of the course and on the web pages of the Polytechnic. Students can contact the teachers during the consultation term (at least one hour per week), while brief questions and explanations can be addressed during classes. It is possible to ask questions by e-mail (from the official e-mail address from the domain @ vus.hr) that will be answered in a short time (no later than five working days from the receipt of e-mail). | | |